



Touchstones for Deterritorializing Socioecological Learning

The Anthropocene, Posthumanism and
Common Worlds as Creative Milieux

Edited by Amy Cutter-Mackenzie-Knowles
Alexandra Laszlik · Judith Wilks
Marianne Logan · Angela Turner
Wendy Boyd



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“This important book comes as daily news cycles consistently report “catastrophic” events in Earth’s new geostory—the Anthropocene. Amy Cutter-Mackenzie-Knowles and her team of editors gather leading educational thinkers to contemplate an uncertain future. In the face of epochal change they assert that we will not adapt by using old habits of mind and old ways of being. As touchstones, the anthropocene, posthumanism and common worlds guide educators into a creative learning milieu: examining new relationships with Earth; permeating boundaries that separate human and more-than-human worlds; moving beyond stewardship ethics; enacting flatter more equitable ways of being; developing new forms of literacy to decode today’s world. A vital book for our times.”

—Professor Emeritus Bob Jickling, *Lakehead University, Canada*

“Often we come across terms that challenge us to re-think the touchstone ideas that shape how we can live, think, and be in the world. Terms such as *Anthropocene* and *Posthumanism* are some of the more illuminating and perplexing of our contemporary world. Having a text that explores these terms set in the contexts of teaching and learning in our social and ecological challenges has to be useful and instructive for those who want to re-think (and deterritorialise) the learning opportunities we frame for our students and ourselves. Thank you to the authors for coalescing around these obligatory and unpalatable ideas to help us find intentional acts of resistance and ways towards respecting the interrelationship of all things.”

—Dr Peta White, Faculty of Education, *Deakin University, Australia*

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Editors

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Foreword

In my final year as a secondary school student in the late 1970s in South Australia I was fortunate enough to be able to study Geology. Mr Ingram's classes were as much experiential as they were theoretical. Every class had us examining rock samples and fossils – studying their crystal structure, touching (and even tasting) them to try to learn what they were as we thought about where they came from and what they could teach us. We handled 500 million year old Cambrian quartzites and made landform models to look at tectonic plate movements, folding and erosion. We studied geological eras, periods and epochs. We went into the field on numerous occasions to learn about specific geological formations and how the Earth had formed and changed through time. Geology taught us about Deep Time, that the Earth was always in a state of change, and that change was a natural process. But geologists also recognised the last ten thousand years as the Holocene, an epoch in which the impact of humans through agricultural land use, species extinction and increasing negative impacts on local ecosystems had begun to change the world. Geologists are now arguing about whether we have recently entered another epoch called the Anthropocene, a time when the impact of human activity is so profound that it is even changing the very nature of the Earth's processes and geology.

Since the Industrial Revolution, and especially since World War II, the world has experienced the Great Acceleration, where humans have

become the dominant species, instigating radical changes to the composition of the atmosphere, rises in sea levels and sea temperatures and where wide scale destruction and disturbance of vast ecosystems – even whole oceans – now occur at a speed not previously evident in the whole geological record. It now seems routine that daily news coverage will include stories close to home about wildfire and megastorms, droughts and floods as well as reports on the meetings of world economic leaders and inter-governmental panels to discuss climate change and the now very real challenges it poses for the future of humanity. So entangled are human-induced problems and catastrophes that it seems reasonable to say that we have entered what we might call the Great Uncertainty. All of us as individuals, and each profession, are now called upon to respond. So, what happens when environmental educators and educational researchers enter this uncertainty? What arguments must be made, what assumptions need disrupting, and how will thinking and practice need to change? These are absolutely crucial questions, for how we educate the current and coming generations will surely be amongst the most crucial responses humans make to the many challenges we face.

This is the territory that the editors and writers of *Touchstones for Deterritorializing Socioecological Learning: The Anthropocene, Posthumanism and Common Worlds as Creative Milieux* have entered. The book commences by carefully examining the Anthropocene, its origins and the extent of its impacts. The challenges raised here have their parallel in education, from micro to macro scales; for the individual learner and teacher through to their society and their supporting ecosystems. The book develops a searching examination of the ‘saturation of humanism’ and what may be required to clear away persistent assumptions and habits, to make room for new ideas and actions. Readers will be asked to consider a flattened ontology, where humans are no longer positioned as the centre. *Touchstones for Deterritorializing Socioecological Learning* addresses this possibility from a deeply pedagogical position, discussing what it might mean for the learner to learn and the educator to educate in such a common world.

Each chapter of the book examines, provokes and debates aspects and examples of socioecological learning. The chapters may be read independently with detailed discussion that addresses unlearning the dualisms (or

delearning as the editors phrase it) that have led to the onset of the Anthropocene, or an analysis of the lived experience of learners in institutions beset with tensions between creativity and compliance. There is discussion of the essential characteristics of the socioecological learner and how this challenges dominant beliefs about voice, authority, decision-making. Provocative discussion of Big History, collaborative arts and the learner as activist will challenge the reader to consider antidisciplinary boundaries and how to foster more relational approaches and community connections. But the real power of the book, I feel, is when we gather these collective provocations, visions and discussions into a larger, coherent and louder pedagogy of hope.

We cannot return to the dawn of the Holocene when, it is argued, humans first began to live apart from nature as they begun the domestication of crops and stock. We cannot even return to unmake the steam engine and curtail the radical trajectory that it launched. But the message that this book makes most clear is that we can, from today, seek more ethical relations with our fellow inhabitants on this beautiful, but troubled, planet. *Touchstones for Deterritorializing Socioecological Learning* will help us disassemble a human-centric education and raise a new pedagogy of dwelling with the more than human world – with other species and the rocks, oceans, ecosystems and atmosphere which we call Earth – *our only home*.

Mount Helen, VIC, Australia

Brian Wattchow

Author – *A Pedagogy of Place: Outdoor Education for a Changing World and Song of the Wounded River*.

Lead Editor – *The Socioecological educator: A 21st Century Renewal of Physical, Health, Environment and Outdoor Education*.

Acknowledgments

The idea of this book sparked at a writing retreat at the Angourie Rainforest Retreat on the North Coast of Australia in 2016. Huddled together in a dark, dim-lit cabin the idea took hold as we troubled education—what it was, what it could be, what it is for and what we could not even yet imagine. This led us down a concentrated conversation path about the focus of our writing at ‘this writing retreat’. The question was posed ‘what book have you always wanted to write?’ As ideas circulated with passion, frustration and intensity, sparks knocked together and we found ourselves immersed in a rich dialogue about socioecological learning. It was that collective energy and passion of Southern Cross University’s Sustainability, Environment and the Arts in Education (SEAE) Research Cluster that made this book a possibility. The editors and authors are indebted to its many members for providing reviews, much support and camaraderie throughout the writing process.

We are especially grateful to the School of Education for its financial and scholarly support of our writing retreats, which make books like these imaginable.

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Philemon Chigeza is an experienced school teacher and academic at James Cook University. He has a broad interest in the interaction between cultural and cognitive representation and systems of representation. Philemon's earlier research focused on developing capacity building pedagogies that affirm students' lived languages, experiences and knowledge in their learning. His work explores the notion of agency and students' negotiation of language and culture in mathematics and science classrooms. Philemon's present research is focused on emerging technology-based curriculum innovation designed to enhance engagement and learning, particularly for blended and virtual spaces. Philemon is also passionate about issues of environmental sustainability and how schools, electronic media and the home can be productively used to work towards a more sustainable and just society.

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1

Touchstones for Deterritorializing the Socioecological Learner

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Abstract The opening chapter of this book orients the reader through the introduction of the concept of the socioecological learner. In so doing the chapter *clears the ground* through a diffractive untangling of the

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socioecological learner drawing upon research vignettes and the touchstone concepts of the Anthropocene, Posthumanism and Common Worlds as Creative Milieux (In this collection, the authors engage the French plural of milieu: milieux, not milieus). This ‘clearing of the ground’ is an ontological and epistemological approach of de-territorializing the learner for a post-Anthropocene world. It opens up the space for de-learning and de-imagining (*de’ meaning ‘from’ in Spanish*) the learner as a socioecological learner.

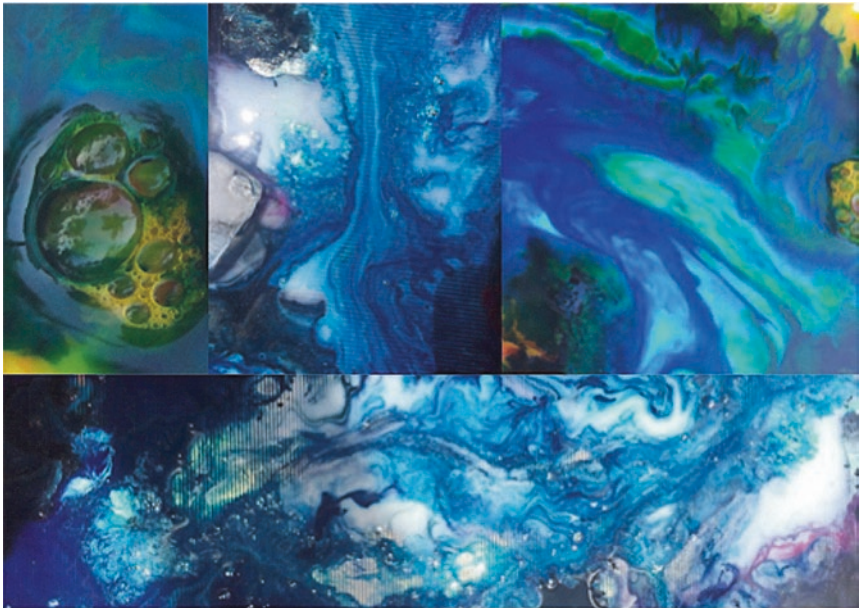
Keywords Anthropocene • Post-Anthropocene • Posthumanism • Common Worlds • Creative Milieux • De-learning • De-imagining • Deterritorializing

Clearing the Socioecological Ground

Clearing the ground seems like an overtly ‘human’ endeavour, but this clearing is in fact an unhumanising process in an attempt to generate new ways of thinking and being as ‘a learner’. Some may describe this as a process of re-learning, but we see it as de-learning and de-imagining (*de’ after the Spanish word for ‘from’*) what it is to be human on a planet where humans are one of many species rather than ‘the superior dominant species’. This book embraces a flat ontology, which rejects human privileging and dominance over nonhuman subjects and objects. A flattened ontology requires humans to radically and actively live carefully, thoughtfully and ethically.

Snaza and Weaver (2015) argue that given the saturation of humanism “it is not even remotely possible at the present moment to conceptually or practically lay out a theory of posthumanist education or outline the contours of a posthumanist pedagogy” (p. 3). It is for this reason that the Editors resisted calling the book ‘The Posthumanist Learner’. By doing so though it is important to acknowledge the complexities between the theories of the socioecological and of posthumanism, indeed an enduring tension is provoked throughout this collection, which is purposeful and useful.

This brings us to the *touchstone concepts* of what it is to be a socioecological learner, for the purposes of this collection and the thoughts and actions that stem from it. By touchstones, we mean to work the concepts as an assaying apparatus. The notion, *socioecological*, in and of itself is problematic in that some may see it as saturated, disassembled, humanist. Yet we argue that at the centre of socioecological learning is a posthumanist ethos. There is a dualism automatically established between socio and ecological, but we believe it is crucial to dwell in these tensions and spaces as a process of dissembling human dominance in education. As such, this requires a deterritorializing of the socioecological, in the context of the Anthropocene. We now turn to a de-imagining of the socioecological, before presenting the touchstone concepts, namely the Anthropocene, Posthumanism and Common Worlds as Creative Milieux.



Vignette 1 Socioecological – A fluid yet intertangled mesh. (Image by Authors (Laszcik and Cutter-Mackenzie-Knowles). Reproduced with permission)

De-imagining the Socioecological

A socioecological framing is grounded in a post-anarchist theoretical orientation (Bookchin, 1994), yet supported by an experiential learning framework (Dewey, 1916, 1938; Merleau-Ponty, 1945). It is antidisciplinary whereby fields of research operate as collectives rather than as silos (Wattchow et al., 2014). In the book *The Socioecological Educator*, Brown, Jeanes and Cutter-Mackenzie (2014) identify four foundational concepts central to a socioecological framing, namely: (i) lived experience, (ii) place, (iii) experiential pedagogies/learnings, and (iv) agency and participation. These concepts are helpful in thinking through the complexity of the educator or pedagogue, although problematic insofar as these concepts retain an explicit focus on the human, albeit in place.

At the core, *socio* is thought of as ‘social, sociological or society’. Such concepts are readily human-saturated and imbued. *Socio* alludes to Latin etymologies of *socius*, which translate as companion, associate, ally – all very humancentric concepts. In our conceptualisations, we are expanding *socio* to embrace the nonhuman in subject and object, so that the ‘companions’, ‘allies’ and ‘associate’ relationalities transcend human boundaries.

Ecological is relating to or concerned with the relationship of subjects and objects to one another. Traditional definitions of ‘ecological’ however have tended to frame it through the connections of ‘living organisms’ and their relationship to the ‘physical environment’. In this chapter, and indeed in the collection, we view ecology as the entanglement of everything – common and uncommon subjects and objects.

Applying such a socioecological framing is fluid rather than developmental, and its components are not conceived as systems. Rather, they are approached as interpenetrating fields of relationships which come to shape emergent and dynamic processes of socioecological learning. Throughout this book we use the three touchstone concepts to illustrate the fluid and interrelational character of learning, viewed within this socioecological framing.

Of particular focus in the de-imaginings of the socioecological learner is the premise that the Anthropocene, Posthumanism and Common Worlds operate as Creative Milieux. By this we mean that these touchstone concepts reverberate and resonate as milieux – places, environments, conditions and events (Rousell & Cutter-Mackenzie-Knowles, 2019a) with and through which we put them to work in the assemblage of socioecological learning. The touchstones are entwined, and do not necessarily have to be engaged evenly or simultaneously in socioecological learning. Rather, it is understood that as each touchstone is engaged it is implied that so do the others in lesser and greater ways implicit in their assemblage. This is how they engage as milieux creatively, affectively and in synergy with the Anthropocene, Common Worlds and Posthumanism. What follows is an exploration of these touchstone concepts and how they may be engaged.

Touchstone 1: Anthropocene

According to scientific estimates, the Earth is 4.5 billion years old and has undergone enormous change since its evolutionary beginnings (Gaffey & Steffen, 2017, p. 53). The universe is approximately 13.7 billion years old. The Earth's age can be evidenced within the Earth's crust 'iridium layer', which evidences the existence of fossilised plant and animal life over time. Figure 1.1 displays land and sea split into specific periods, rounded as time estimates (US Geological Survey Names Committee, 2010).

The Anthropocene is also referred to as the Capitolcene, Chthulucene and the Gynocene (among other names). While not yet officially approved, a formal geological timescale is currently under consideration by the International Union of Geological Sciences (IUGS).¹ It is important to note that in 2018 the International Commission on Stratigraphy (2018) (a subordinate body of the IUGS) introduced the Meghalayan Age within the existing geologic era of the

¹ While there is wide consensus of the Anthropocene, Baskin (2015) contentiously argues that the Anthropocene is a value or worldview rather than geological epoch. He positions the Anthropocene as a radical reconceptualisation of the human-nature relationship, acknowledging that radical shifts in human-nature values are urgently needed.

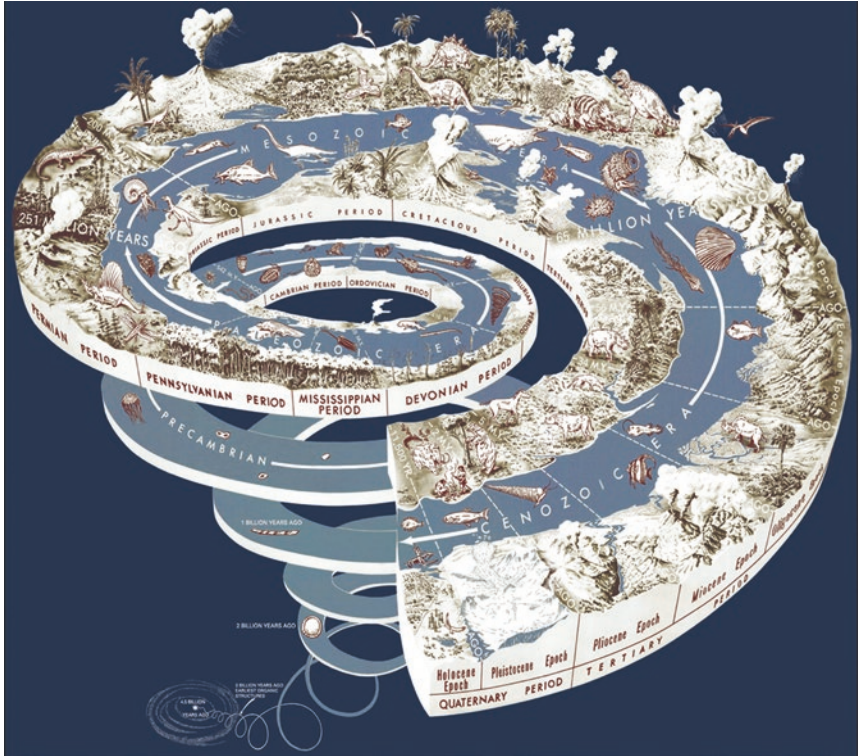


Fig. 1.1 The geological time spiral-A path to the past. The U.S. geological survey (<https://pubs.usgs.gov/gip/2008/58/>). (Copyright (2016) by USGS. Reproduced with permission)

Holocene which has been met with intense criticism by researchers (Voosen, 2018). The Meghalayan Age represents the last 4200 years largely characterised by drought. It is neither focussed on nor associated with the Anthropocene. The term ‘Anthropocene’, coined by Nobel Prize-winning scientist Paul Crutzen (2002), aptly encapsulates the significant human impact on the Earth, including anthropogenic climate change. Braidotti (2013, p. 5) describes the Anthropocene as the “biogenic age” given humans’ propensity as a “geological” force, capable of disrupting the ecological balance. Notably, the Italian geologist Antonio Stoppani in 1882 predicted human impact

on the Earth as a “new telluric force which in power and universality may be compared to the greater forces of earth” (cited in Crutzen, 2002, p. 23).

The early stimulus for the Anthropocene started during the Industrial Revolution (17th–18th Century), a period characterised by large scale technological activity fuelled by steam power and coal. This was evidenced by trapped air in polar ice that showed unusually high traces of carbon dioxide and methane. Crutzen (2002) adds the timeframe placed on this discovery overlaps with the great acceleration of inventions after 1760, most notably the steam engine. Steam and coal powered trains, ships and factories resulted in air pollution, toxic waste, and degradation of the environment, a situation that persists in the 21st Century. Unquestionably, Post World War II is defined as the main catalyst for the Anthropocene caused through the rapid acceleration of technological and scientific development. This is evidenced by the radioactive elements dispersed across Earth by nuclear bomb tests from the 1950s through to the 1970s (Gaffey & Steffen, 2017). From an anthropological perspective, these periods radically changed social, cultural, environmental and economic conditions, and it is argued, human’s current ‘technosphere’ continues to shape the future into the vortex of the Anthropocene (Haff, 2014; Williams et al., 2015). Mumford (1963, p. 255) predicted the “deep gap between habits of mind and the tactics we have carried over from the old order are obstacles in the way of our developing the new”.

Throughout the Anthropocene humans have used the Earth as a resource to be consumed, using more than half of the available fresh water and almost fifty percent of the Earth’s total land. Humans have changed the chemical composition of the atmosphere which has led to climate change and subsequent acidification of the oceans (Gaffey & Steffen, 2017; Williams et al., 2015). These anthropogenic changes include human intervention on microbes, plant and animal mass extinctions/biodiversity loss, manipulation of human organisms and ecosystems for thousands of years. In addition, genetic engineering has ruptured the organic evolutionary path and ecosystem. As a result, wild ecosystems devoid of human impact no longer exist (Williams et al., 2015).

Correspondingly, robotics coupled with synthetic biology is leading to an entanglement of biology and technology, representing a very different biosphere in the Anthropocene (Williams et al., 2015). Kurzweil (2001) predicted ‘singularity’ as the next fundamental shift to re-shape human history – humans will co-evolve with technology and vice versa. These concerns are evident across archaeological and climate change literature, and according to Crutzen (2002) unless a catastrophic event takes place such as “a meteorite impact, a world war or a pandemic” this anthropogenic devastation will continue for “many millennia” (p. 23).

Human destruction (in minority Western cultures) is at the centre of the Anthropocene with humans placing themselves in a privileged, exceptional and superior positioning to the more-than-human. This can be characterised by human anthropocentrism where over time humans (again in minority Western cultures) have significantly detached from their organic habitat (Braidotti, 2013; Mumford, 1967). An example of an anthropocentric view is the humanising of other animals for the entertainment of the human (see Fig. 1.2). While many countries have moved away from the appalling mistreatment of primates documented during the 1970s, the manner in which human-animal relationships intersect in contemporary times reveals mass habitat destruction and



Fig. 1.2 Animal exploitation as entertainment; a chimpanzee dressed in human clothing and smoking to ‘entertain’ the young children at a pre-school, Australia, 1970s. (Images by author (Logan). Reproduced with permission)

animal genocide. We draw on the critically endangered Sumatran Orang-utan (*Pongo abelii*) as an example – reclaiming their habitat for palm oil, rubber trees and coffee plantations (Szantoi, Smith, Strona, Koh, & Wich, 2017).

And while the treatment of non human primates depicted in Fig. 1.2 evidence a disdain for animal welfare and ethics in the past, humans continue to purchase products (often inadvertently) that contain palm oil or rubber, grown in converted Orang-utan habitats (Koh & Wilcove, 2007). Humans are also primates, and notably share more DNA with Chimpanzees, Orang-utans and Lemurs compared to any other mammal. For that reason an anthropocentric perception would be to distinguish these animals as superior to other animals. However, with the destruction of ecosystems comes the impact and mistreatment of numerous ‘more-than-human’ others, who may not receive the same attention of their plight compared to the non-human primate, such as amphibians (see Fig. 1.3).

Some animal species’ mistreatment is condoned as they may be considered a ‘pest’. The Cane Toad (*Rhinella marina*) is one example. Indigenous



Fig. 1.3 The cane toad – an introduced species in Australia by humans. (Image by author (Logan, 2018). Reproduced with permission)

to South and Central America, the cane toad was introduced into Australian cane fields in 1935 to control the native grey-backed cane beetle (*Dermolepida albobirtum*) and Frenchi beetle (*Lepidiota frenchi*) (Shine, 2010). The cane toad contains toxicity at every stage of its life cycle that can and do kill native frog eating predators (Shine, 2010).

Cane toad invasion has resulted in initial species decline, mainly predators and scavengers, in some Australian ecosystems. However species recovery has occurred over time in some areas due to the adaptation of species through taste aversion learning (Shine, 2010). The general opinion in Australia relating to cane toads is that they are among the greatest ecological threat to Australian ecosystems, despite lack of data to substantiate this supposition (Shine, 2010). This perception has led to large scale government eradication campaigns and individuals (including children) perpetrating cruel activities, such as pouring salt or disinfectant on the backs of cane toads, directing cars to kill cane toads (*running them over*), or hitting cane toads with a golf club or hammer (Australian Associated Press, 2005). Such approaches are well known and widely executed in the vernacular of Australian life (Carew, 2011).

Destroying these animals is typically considered the individual's responsibility as cane toads poison Australian indigenous wildlife therefore the suffering of the cane toad is not at the forefront of mind. The idea of humans perceiving that they have moral and ethical responsibility over other animals separates humans from other living organisms. It demonstrates a dominance of humans over all other animals and likely draws from traditional positionings that posit humans are at the pinnacle of all existence. It is essential for the socioecological learner to rethink this notion of superiority towards the more-than-human in the Anthropocene, as humans navigate a changing world with all its concomitant challenges (Braidotti, 2013; Somerville, 2016, p. 18). Such flattened ontologies segue to the touchstone of the posthuman and indeed the post-Anthropocene.



Vignette 2 The Anthropocene, malconsumption and the impact on the planet; stumbling stone at the beginning of Wall Street, New York transposed over water drenched windscreen in carwash. (Images by Authors (Lasczik & Cutter-Mackenzie-Knowles). Reproduced with permission)

Touchstone 2: Posthumanism

“What if the human doesn’t have to be the measure? We would call ‘post-humanist’ any thinking that responds to this question” (Snaza & Weaver, 2015, p. 3). Posthumanism evokes a rethink of what it is to be human. In biblical terms, humans are traditionally viewed as separate and superior to nature (White, 1967). This traditional view of a human as a separate individual detached from nature is problematic as humans are an assemblage of

numerous interrelated organisms and elements; humans are not separate from nature, humans are but one animal in nature. Human bodies are an entanglement of water, air, earth, a multitude of microorganisms, metals, other elements and even plastics (Malone, 2016, 2018; Neimanis, 2017). In many respects humans are more other-than-human than human. To these ends, for socioecological learning to be authentic and effective in the Anthropocene (working towards a post-Anthropocene), humans must develop an acute understanding of their own animality and interrelatedness with the more or other-than-human.

Posthumanist thought may be said to have generated from Foucault's treatise, *The Order of Things*, where he asserted that the concept of 'man' [sic] is an invention, one that has appeared only recently, and one which is conceivably nearing its end. Posthumanism can also be seen as a western (minority) construct for some Indigenous ways of knowing. Posthumanism reconfigures human agency as a meshwork of relationships between the human and the nonhuman (Jackson, 2013). Indeed the term 'posthuman' is rather an umbrella key term for various philosophical, cultural schools of thought, including concepts of extropianism, antihumanism, metahumanities and transhumanism, which all share understandings of the human as a non-fixed and fluctuating condition (Fernando, 2013). As Barad (2003) asserts, human bodies are not significantly different to nonhuman ones, and thus what is considered to be human and nonhuman is not fixed, nor free-floating. Rather, what is of interest is the,

... material dynamics of intra-activity: material apparatuses produce material phenomena through specific causal intra-actions, where "material" is always already material-discursive... The differential constitution of the "human" ("nonhuman") is always accompanied by particular exclusions and always open to contestation. This is a result of the nondeterministic causal nature of agential intra-actions. (p. 824)

Humans and humanity are concepts that are culturally constructed, ideological and to be considered within larger ecologies, including theories of technologies and science (Herbrechter, 2013). These concepts

become posthuman when the human is no longer the only element within the growth of multifaceted forms of existence.

The diverse aims of posthumanism itself defies a universally accepted definition, due to its shifting aims and positionings (Badmington, 2000), dependant on the purposes for which the notion of the posthuman is engaged. However, it could be argued that a central tenet of posthumanism is the permeable and porous boundary that separates the human and the nonhuman, affirm the human's very animality, and thereby relegating humans to the same hierarchy as other nonhuman entities (Badmington, 2000).

Haraway's contributions to posthuman thinking are significant (Braidotti, 2006), in that she dislodges the centrality of the human, and argues for a renewed familial system that engages affection with nonhuman others, including but not limited to animals, bacteria, cells and plants. Such thinking seeks to create ecologies of empathy, recognition and accountability (Haraway, 1997).

So controversial are its tenets, Donna Haraway for whom many credit as one of posthumanism's founders, asserted that she herself is not posthumanist (2008), and Badmington argues that although posthumanism seeks to leave humanism behind, in doing so it is quite possibly the most humanist notion of agency, as if an ending to humanism is in humanity's control (2000). As Derrida (2008) asserts, even when we erase things, traces will always exist (2008). Thus, posthumanism itself is an unstable concept, in that by naming the human to be now posthuman is progressively mimicking Enlightenment concepts of idealism and perfection that it would surely eschew (Badmington, 2000). Other issues with posthumanism include a need for a greater attention to diversity, colonialisms, gender and ableism (Jackson, 2013), even though it is avowed that the posthuman gazes towards an equality of all beings. The leaning into technological enhancements of cybernetics and artificial intelligences perhaps is not posthuman in the sense we gesture to here, although this is arguable. As Braidotti (2006) asserts, the purposes of alluding to companion species is political rather than abstract, and points towards thinking about the "unity of the human being. We need new forms of literacy to decode today's world. Figurations also entail a discursive ethics: that

one cannot know properly, or even begin to understand, that towards which one has no affinity” (p. 200). The discursive nature of the posthuman concept as portrayed by Braidotti (2006) and Barad (2003) is of particular use to the notion of socioecologies as it is through discourse that learning occurs – discourse between all things, objects and beings that cohere, diffract, align and disperse. It is these very intra-actions that are discursively constructed.

In thinking about the touchstone concept of the posthuman, we cohere to the notion of a flat ontology of posthumanism, an ethics of equity, as we acknowledge the violences and aggressions large and small perpetrated on the nonhumans amongst us (Badmington, 2000). But what is the materiality of the posthuman in a socioecological context? As Barad (2003, p. 829) eloquently argues,

Practices of knowing and being are not isolatable, but rather they are mutually implicated. We do not obtain knowledge by standing outside of the world; we know because “we” are of the world. We are part of the world in its differential becoming. The separation of epistemology from ontology is a reverberation of a metaphysics that assumes an inherent difference between human and nonhuman, subject and object, mind and body, matter and discourse. Onto-epistem-ology—the study of practices of knowing in being—is probably a better way to think about the kind of understandings that are needed to come to terms with how specific intra-actions matter.

Such inter-actions are useful potentials for socioecological learnings. The body, nature and materiality in their becomings are acknowledged, whilst resisting binaries of transparency/opacity, exteriority/interiority, cause/effect, we remain ethically and purposefully accountable for the parts we play in knowing and becoming (Barad, 2003).

Throughout the writing in this collection on the socioecological posthuman, there is a vital element of performativity. As Barad (2003, p. 808) maintains, a posthuman concept of *performativity* that includes important discursives of the human and nonhuman, the scientific, social, cultural and natural features, calls into question these very categorisations and how such boundaries are destabilised. Haraway’s (1997) assemblage

of primates, cyborgs and other companion species makes this important point.

For the purposes of this touchstone concept, posthumanism is a praxis (Fernando, 2013) and a *potential*, as well as the concept of a posthumanism to come (Badmington, 2000), in the epoch of the Anthropocene. Fernando (2013) argues,

The way humans inhabit this planet, what they eat, how they behave, what relations they entertain, creates the network of who and what they are: it is not a disembodied network, but (also) a material one, whose agency exceeds the political, social, and biological human realms, as new materialist thinkers sharply point out. In this expanded horizon, it becomes clear that any types of essentialism, reductionism, or intrinsic biases are limiting factors in approaching such multidimensional networks. Posthumanism keeps a critical and deconstructive standpoint informed by the acknowledgement of the past, while setting a comprehensive and generative perspective to sustain and nurture alternatives for the present and for the futures. Within the current philosophical environment, posthumanism offers a unique balance between agency, memory, and imagination, aiming to achieve harmonic legacies in the evolving ecology of interconnected existence. (p. 32)

Rhetoric is all well and good in academic life, indeed it is a necessity, however, what posthumanism needs in order to fulfil its rhetorical potential is action. Yet such action is also troubled by the inevitable human-centric existence we all occupy, irrespective of our cogent philosophical meanderings. If humans decentre the 'I' as in postmodernism and again in posthumanism, shifting human thinking and actions, humans are still at the centre of their own existence by virtue of the body they inhabit, coming into contact with other bodies, entities and sentient beings, just as they in turn are at the centre of their own existence/s. If we take this concept outwards to the socioecological learner, acknowledging that in a posthuman philosophy the learner is but part of a greater ecology, they are connected rhizomatically to all other nonhuman entities currently and historically in existence. Indeed, when considering the notion of the Deleuzoguattarian rhizome read

alongside Haraway's conceptions of the companion species, we are to think of the interdependencies and unities of the human in all their physiological otherings just as the humanistic worldview is being dislocated (Braidotti, 2006). Yet however these connections realise themselves and others, the learner remains at the centre of their learning by virtue of the milieux in which they find themselves, including the milieux that is their own body. The touchstone of common worlds cuts across and through and with the Anthropocene and the Posthuman via the synergies of their respective and mutual ecologies.



Vignette 3 Humanism, where the nonhuman is an object; Washed up fishing catch in net and decomposed turtle on Kingscliff, Australia. (Images by authors (Lasczik and Cutter-Mackenzie-Knowles). Reproduced with permission)

Touchstone 3: Common Worlds

At the 2017 World Environmental Education Congress in Vancouver during a keynote address, David Suzuki remarked that for years environmentalists have been talking about how we must ‘save the planet’. He ventured that Earth will actually be fine once the dominant force of the Anthropocene, i.e. humans, has disappeared (or perhaps radically transformed). It will heal itself over time, as it always has and enter a post-Anthropocene.

Suzuki’s (2017) powerful address outlined the imperative to connect with Indigenous knowledges if humans are to have any reasonable chance of addressing the many risks posed to human life by climate change. He observed that Indigenous people on all continents have lived sustainably for thousands of years, and in fact, Indigenous knowledges is the only track record humans have of living sustainably. In Indigenous knowledges everything is connected, everything is relational (Martin, 2005): nature; humans; culture; religion; place; values and beliefs. These things are all linked. It is important to understand and acknowledge though as Horsthemke (2008) notes, that when considering Indigenous knowledges in education contexts, Indigenous elemental knowledges are an incomplete and partial concept. For example, there are practices in Indigenous cultures that could be considered by some in Western (minority) cultures as sexist, aggressive and cruel (Horsthemke, 2008). This view is from though a particular cultural perspective, highlighting the otherness of Indigenous cultures while ignoring sexist, aggressive and cruel practices in one’s own.

Education has its very roots in nature where over 250 years ago Rousseau (2003/1762) recognised ‘*Nature as the child’s best teacher*’. Taylor (2013, 2017) has urged educators to steer towards a hybridised collective understanding of nature-culture (Latour, 2004, 2013). Re-citing Prout’s 2005 challenge, scholars are to “pursue ways of studying childhood that do not require mutually exclusive choices between the assumed-to-be-purely-natural or the assumed-to-be-purely cultural” (2013, p. xix). A powerful means of stepping forward is the utilisation of the posthumanist conceptual frame *common worlds* (Latour, 2013). In

adopting this frame we are able to de-couple and avoid the “divisive distinction between that is often drawn between human societies and natural environments” (Common Worlds Research Collective, 2015). Further, this frame possesses the ultimately enabling capacity to “de-centre our understandings of the human” (Taylor & Guigni, 2012, p. 108).

Adopting the conceptual framework of common worlds endows educators and researchers with the means to replace an educational paradigm characterised by “stewardship pedagogies” (Duhn, Malone, & Tesar, 2017, p. 1368), through linking to broader, interdisciplinary movements calling for “a paradigm shift in thinking about what it means to be human and about our place and agency in the world” (Duhn et al., 2017, p. 1448). However as educators we need to determine a direction where thinking and practice converge, and as much as common worlds is a significant, game-changing and “generative framework for reconceptualising childhood”, we need to find within this frame, the “pedagogical opportunity for practising a politically attuned and non-human-centric ethics of inclusion within early childhood” (Taylor & Guigni, 2012, p. 108). Indeed all learning settings with children and young people, and their repositioning in terms of their “relations with all the others in their world ... the ethics and politics of living together in these common worlds” is an important addition (Taylor & Guigni, 2012, p. 108).

Thinking and research is evolving rapidly around the pedagogical spaces and opportunities for common worlds, frequently framed by considerations of ethics and politics. Against this backdrop, Rousell and Cutter-Mackenzie-Knowles (2019a) recently issued a cautionary note warning of the ‘backgrounding of aesthetics’ resulting from our collective ardour to move towards posthumanist conceptions of common worlds in environmental and socioecological education. Rousell and Cutter-Mackenzie-Knowles (2019a) have proposed that there exists complex, unrepeatable *uncommon* moments in every child’s life “through which the common world of nature is felt, perceived, and experienced differently” (p. 1). They argue for alternative theoretical perspectives that foreground the unique and relational qualities of a child’s ecological-aesthetic experiences. Such thinking, and the refinement, enrichment and insights it brings, are to be aligned with the posthuman in the Anthropocene

moment. Indeed such imaginative aligning of Common Worlds, Posthumanism and the Anthropocene as Creative Milieux in the engagement of socioecological learning is but one praxical perspective that allows for learners' ecological-aesthetic experiences.



Vignette 4 Common Worlds of nature-culture-childhood; Children playing in tree next to a de-natured human play structure, No adults without children, Glass sculptures made by a human artist that resemble plants; a mother, child and tree. (Images by authors (Lasczik and Cutter-Mackenzie-Knowles). Reproduced with permission)

Creative Milieux

The word milieu is French and in the simplest terms comes from *mi* (mid) + *lieux* (places). For Deleuze and Guattari (1987), the term ‘milieu’ takes on both aesthetic and relational connotations – as the living “exteriors”, “interiors” and “intermediaries” of “energy sources and actions-perceptions” (p. 313). As Massumi further notes (1987, p. xvi), this usage of the concept effectively combines its three discrete definitions in French as “surroundings”, “medium” (as in chemistry), and “middle”. Massumi also suggests that milieu is a technical term (1987), which, like chaos is composed of middles that are not territories, but rather “dimensions, or rather directions in motion” (Deleuze & Guattari, 1987, p. 21). The difference between a ‘milieu’ and a ‘territory’ or a ‘unit’, is that a milieu has substantial movement in its design, namely a form of cyclical and temporal arrangement (Bertelsen & Murphie, 2010). Milieux are vibratory, a direction in space/time (Deleuze & Guattari, 1987) and relational (Bertelsen & Murphie, 2010).

The milieu is thus more than place, more than a site (Janz, 2001), since a milieu has ambiguous and shifting materiality, although the concept of milieu certainly alludes to places. Yet the milieu may assemble themselves into refrains with rhythms. It is from chaos, say Deleuze and Guattari (1987, p. 313) that milieu and rhythms are born. Milieux act and inter-act, and as assemblages become territories, which themselves become deterritorialized through “the creative power of the refrain” (Janz, 2001, p. 394). Indeed, ‘A territory organises milieu,’ for example the territory of the ocean consists of the milieu of the currents, the sun’s energy, schools of fish, osmotic membranes, sand and rock formations, which overlap, interact, intersect (Bertelsen & Murphie, 2010, p. 14). As Deleuze and Guattari (1987) argue, “... the living thing has an exterior milieu of materials, an interior milieu of composing elements and composed substances, an intermediary milieu of membranes and limits, and an annexed milieu of energy sources and actions-perceptions” (p. 313). Further, as Janz (2001, p. 394) explains,

Deterritorialization, and its counterpart, reterritorialization, becomes possible because the refrain, the reflective habits that show us for who we are, continually re-think our place in all its forms, re-configure it to be adequate for the times, and ultimately “release it to the Cosmos.” Place becomes something more than simple location, but less than essence, entitlement, or citizenship. It cannot be identified by a map, it is not reducible to power alone.

As such, we can begin to understand the lifeworlds of the learner as a nexus or interpenetrating series of socioecological milieux which account for not only the external environment and atmosphere of learning, but also the internal states and biophysical responses which come to condition the lived experience of relationality within the home, classroom or educational setting. Thus, for the purposes of engaging the touchstones of the Anthropocene, Posthumanism and Common Worlds as creative milieux in sociological learning, thinking of these touchstones as living, aesthetic, haptic ecologies in a network of relationships, understandings and resonances is useful. In Deleuze and Guattari’s (1987) terms, the learner is a territory that is continuously being composed of rhythmic milieux as fields of interpenetrating experiences that are actually lived. The milieux thus take on a vibratory resonance as “a block of space-time constituted by the periodic repetition of the component” (p. 313). The learner milieux is in this sense, are intimately linked to the rhythmic repetition of the everyday. As a result, the concept of ‘learner milieux’ is significantly different from the conventional understanding of the learner as a bounded individual subject. Rather, we understand the learner milieux as fields of relational potentials and decisive actualisations that both condition and modulate the dynamics of learning (Rousell & Cutter-Mackenzie-Knowles, 2019b).

Moreover, this understanding of learner milieux is not limited to the human, as Khalfa (1999, p. 126) clarifies that “all animals intersect with the world to fashion environments, or milieux, and each milieu is defined by the components of what is comprised”. In this way, the touchstones come together creatively, purposefully usefully.



Vignette 5 Creative Milieus; Child in a cage in Japanese monkey park where humans are enclosed and wild monkeys are 'free'. Humans use nuts to lure the monkeys in; Domestic kitten gazes outside where he longs to be; Two metre dog sculpture made of plants in Atlanta Botanical Gardens; Interspecies affection with a dog and a seal. (Images by Authors (Lasczik and Cutter-Mackenzie-Knowles). Reproduced with Permission)

Conclusion

From this chapter's clearing of socioecological ground, the touchstone concepts of the Anthropocene, Posthumanism, and Common Worlds as Creative Milieux orient the educator to a framing of contemporary socioecologies that are sensitively, aesthetically and mindfully attuned to the needs of deterritorialized learners, but perhaps more importantly to the needs of the planet we occupy. Acknowledging the epoch of the Anthropocene and the human actions that have given rise to it, not only raises consciousness, but positions all learning that occurs within this time/space moment. A posthumanist ethos positions all beings as ethically and morally equal networks that inhabit the common worlds we occupy and engage. These interpenetrating fields of relationships shape the emergent, generative and dynamic processes of socioecological learning. In such a conceptualisation, a flat ontology ensures that learners (and all of the materials, spaces, environments, histories, positionings, pedagogies and sentient beings they learn from, with and through) are acknowledged and engaged. Socioecological learning then, seeks a more ethical, critical and proactive process of disassembling, de-learning and de-imaging human dominance in education, dwelling in useful, imaginative and uncomfortable tensions and living relationships with the more-than-human. In doing so, a post-Anthropocene world might then be possible.

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2

Posthumanist Learning: *Nature as Event*

Tracy Young and Amy Cutter-Mackenzie-Knowles

Abstract This chapter places learning in a posthumanist frame. Starting with classic learning theorists such as Socrates and Plato, we then turn sharply to contemporary thinking acknowledging that a key tenet of posthumanism is to de-centre or deterritorialize the all-important human, and venture towards knowing in a different way. We move through four key concepts of posthumanism, putting these concepts to work through a series of ‘nature as event’ as framed by Debaise (2017) and formerly by Whitehead (1920), James (1912) and Deleuze (1990). Nature as event is a pluralistic concept that rearticulates nature through deterritorializing, de-bifurcation and relationality. In effect, the posthumanist learner (re)adjusts to being already entangled as nature and not separated or dominated by humanist dispositions.

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Learning and Childhood

Learning is sometimes framed as acquiring knowledge and skills. Confucius wrote, “when you know a thing, to recognise that you know it, and when you do not know a thing, to recognise that you do not know it. That is knowledge” (cited in Noble, 1995, p. 141). In that sense, what is the process that takes place when learning or knowing transpires? Such questions have been troubled for thousands of years by some of the earliest Western (minority) philosophers including Socrates, Plato and Aristotle. Plato (1966) wrote,

Now, how about the acquirement of pure knowledge? Is the body a hindrance or not, if it is made to share in the search for wisdom? What I mean is this: Have the sight and hearing of men [sic] any truth in them, or is it true, as the poets are always telling us, that we neither hear nor see any thing accurately? And yet if these two physical senses are not accurate or exact, the rest are not likely to be, for they are inferior to these. In thought, then, if at all, something of the realities becomes clear to it? (pp. 65a–c)

Plato is troubling direct experience in learning here, which his teacher, Socrates, termed an *elenctic* method. Socrates and Plato significantly valued dialectical discussion or dialogue in learning, and Socratic questioning cultivates learning through layers of inquiry questions. While these philosophical remnants are evident in contemporary learning theory, the conception of the child or young learner has evolved markedly. Until the 15th century the child was positioned as an “immature specimen” (Aristotle) or later as an “empty vessel” (Locke). It was not until the enlightenment in the 18th century that significant theoretical shifts were noted with Rousseau declaring, “nature requires children to be children first” (Platz & Arellano, 2011, p. 56). While Rousseau’s philosophies have been labelled as both romantic and dark portrayals of childhood (Darling & Van De Pijpekamp, 1994; James & Prout, 1997), his work (*Emile*) brought the notion of personification or children’s interest to learning.

Specifically, Rousseau proclaimed, “If educators let the child always be himself [sic], attending to only what touches him [sic] immediately, then and only then will they find the child learning, capable of perceiving, memorizing, and even reasoning” (cited in Oelkers, 2002, p. 683).

The concept of child-centred learning remains contemporaneous, yet learning theory has traversed major philosophical thought from Froebelian principles of early childhood education (Froebel, 1826, 1861), cognitive learning theory (Piaget, 1955), experiential learning theory (Dewey, 1916, 1938, 1956), cultural-historical learning theory (Vygotsky, 1986, 1997, 2004), critical learning theory (Freire, 1970, 1974, 1996, 1998) to social ecology systems theory (Bronfenbrenner, 1979). It is not our intention in this chapter to review these philosophical and distinctly humanist fields of thought or learning, but rather shift the conversation of learning theory entirely. As Edwards (2015) argues,

... post-humanism, unlike postmodernism and poststructuralism, has had little attention in the discussion of education and learning. This is perhaps unsurprising given the focus on the human subject and the learning of and by humans at the centre of educational concerns. (p. 107)

Recent educational researchers have embraced posthumanist inquiry to discover the intricate relationships between human and more-than-human, and educational concerns (Murriss, 2016; Osgood & Scarlett, 2015; Pacini-Ketchabaw, 2010; Pederson, 2010a, 2010b; Rautio, 2013; Snaza & Weaver, 2015; Taylor & Pacini-Ketchabaw, 2015). Beyond notions of posthuman cyborgs in education (Gough, 2004), or transhuman technological advancements (Baofu, 2011), there has been little consideration of posthumanism in the praxis of learning in education as it has typically been isolated to discussion about the post/transhuman, originating from enlightenment and humanist traditions of thought, of advancing the exceptional human (Ferrando, 2018). Education praxis is still conservative to new ideas, partly because the anthropocentric schooling of exceptional all-singing, all-dancing, all-knowing, speaking human students, have been separated and privileged above or outside of nature in the learning dyad. In traversing through the learning contours of posthumanism we think with the paradigm and concepts of posthumanism with the full acknowledgement that these concepts are neither simple nor easy to disrupt,

Every concept has an irregular contour defined by the sum of its components, which is why, from Plato to Bergson, we find the idea of the concept being a matter of articulation, of cutting and cross-cutting. (Deleuze & Guattari, 1994, p. 15)

In putting these concepts to work, our cutting and cross-cutting is not about the certainties of dissecting ideas, but rather a way to ignite, expand or diffract learning, rather than narrow them through a filter of certainty. Deleuze and Guattari (1987) highlight the need to deterritorialize or unsettle the conservative spaces of institutions like education, to see, sense, think and act anew. Learning is discovery, or what Foucault would refer to as a heightened curiosity, “not the kind of curiosity that seeks to assimilate what is proper for one to know, but that which enables one to get free of oneself” (Foucault, 1985, p. 8) with the discovery of something not yet known or imagined. Learning as discovery is not the subtraction of information, or imitation through representation, or fixed ideas. When we discover, we are uncovering our ability and the ability of others, to see anew. Learning is therefore in a constant process of discovery or ‘becomings’ that never reach an end point. For Deleuze and Guattari (1987) learning unfolds with thinking, creativity and through social dilemma, as nomadic (always moving) inquiry into the not-yet-known.

This approach works well for the socioecological learner [or for that matter the posthumanist learner] as a philosophical framing offers a “conceptual toolbox” (Deleuze 1990, p. 17), where concepts help to shift the image of thought in ways that are not inflexible or fixed. We traverse through four examples, or nature as event, as we attempt to articulate and agitate posthumanist learning. Nature as event is a new pluralistic concept conceived of by Debaise (2017) extending the works of Whitehead (1920), James (1912) and Deleuze (1990). Debaise (2017) explains,

... all events are composed of entities that are not, themselves, “eventual.” “As you are walking along the Embankment you suddenly look up and say, “Hullo, there’s the Needle”. In other words, you recognise it. You cannot recognise an event, because when it is gone, it is gone. You may observe another event of analogous character, but the actual chunk of the life of nature is inseparable from its unique occurrence. Each event is a passage, inherently unique in its moment, different from all others according to a

rekindling of the principle of indiscernibles, but there are elements in all events that literally do not pass, elements which have neither spatial extension or nor temporal thickness. We are having an experience each time we are able to say, “it is there, it is here again.” This is the minimal, the most succinct, expression of the confirmation of the existence of an object. Something is here again. What exactly have we recognized? Variations of color, varying geometric forms, specific intensities of sound, particular *sensa*. (p. 35)

Through embracing this concept of nature as event, we attempt to lay paths of thought and praxis by showing that conceptions of posthumanist learnings are incomplete or impartial and always moving in their becoming.

Nature as Event: Putting Posthumanist Learning Concepts to Work

De-centring or Deterritorializing the Human

Why are we suddenly so interested in humans as a species, and what might need adjusting is how we picture ourselves to ourselves? (Morton, 2017, p. 39)

Braidotti (2017) aptly claims that the field of posthumanities can be defined as a dynamic, multidisciplinary field where the motivating force for knowledge production is “not disciplinary purity, but rather the modes of relation these discourses are able and willing to engage in” (p. 88). We concur with this statement, but also contend that it is a process of de-centring the human in learning. Snaza and Weaver (2015) asked, “what if the human doesn’t have to be the measure?” (p. 3). In a learning sense, this is a repositioning of the human, which is almost an implausible undertaking as contemporary education systems are saturated in humanism. Deleuze and Guattari’s (1984) concept of deterritorialization is particularly valuable here as discipline structures are vehemently rejected where the focus is on the whole rather than its parts. In this sense, the child or learner is a metaphysical being (Deleuze & Guattari, 1984).

We have brought examples of thinking with elements of life as ‘nature as event’, to build relational posthumanist understandings, acknowledging that these relations are already in place, and we are playing with ideas to make them visible. Events for Deleuze (1990, 1993) and Deleuze and Guattari (1994) explore ontologies of the multiple and multiplicity. An event is therefore an accumulation of what could be seen as uneventful relations and happenings. Collective memory overlaps or folds with every small ripple of affect with no specific time or space because they are always expanding and morphing through ongoing processes. The event can therefore generate political and ethical action as intensities build to the point of change or deterritorialization, and this is part of the final event in this chapter.

We commence with a nature as event from the Climate Change + Me Project that was grounded in a posthumanist framing. Cutter-Mackenzie-Knowles and Rousell (Cutter-Mackenzie-Knowles & Rousell, 2018, 2019; Rousell & Cutter-Mackenzie-Knowles, 2015, 2019; Rousell, Cutter-Mackenzie, & Foster, 2017) worked with 135 children and young people aged 9–14 years over a three-year period (see <http://climatechangeandme.com.au>).

In the initial stage of the project the children and young people participated in a number of research training workshops where children and young people were invited to interview another co-researcher about their climate change perspectives. Co-researchers were provided with an iPad to record their interview/s. What we received back was entirely unexpected. We expected to view many interviews of children and young people in conversation about climate change. While there were a number of interviews of this nature, there were also many interviews or videos of a different kind.

Interview with a Tree: *De-centring or Deterritorializing the Human*

One such example was where a young boy (10 years old, Daniel) elected to interview a tree (see Fig. 2.1) about their perspectives on climate change. The transcript follows:

Interviewer: So, what’s your opinion on climate change?
 Tree: 2 second pause

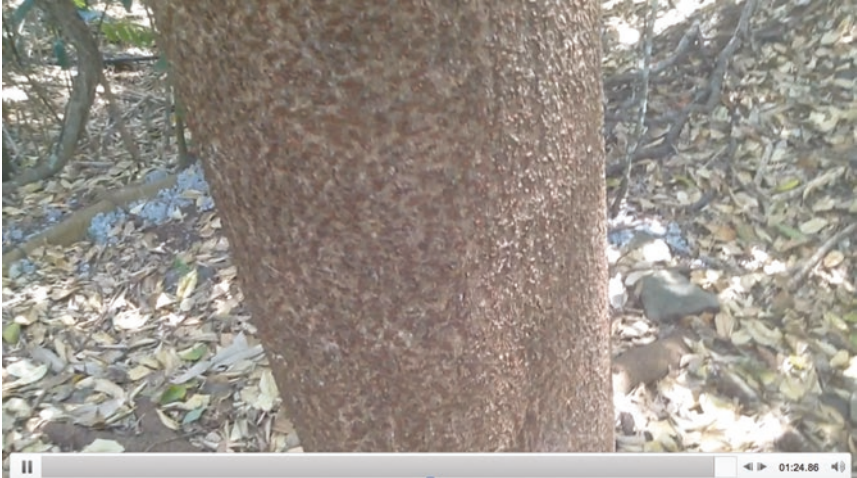


Fig. 2.1 Daniel's interview with a tree

- Interviewer: Do you have any solutions for climate change? Okay next question.
- Tree: 3 second pause
- Interviewer: How do you feel about climate change?
- Tree: 3 second pause
- Interviewer: Stupid tree
- Interviewer: Do you think Climate Change is a threat?
- Tree: 5 second pause
- Interviewer: Um, is climate change a good thing? Is it a bad thing?
- Tree: 5 second pause
- Interviewer: I really don't have any other questions, other than do you have any worries about climate change?
- Tree: 3 second pause
- Interviewer: No, well thank you. Thanks for your opinion.

Daniel's explanation of interviewing a tree was simple – “a tree is a being who stores carbon – why wouldn't I ask their opinion?”. His response was somewhat tongue in cheek and playful, but at the same time the iPad provided Daniel with a creative impulse, which Winnicott (1989) maintained occurs in learning when creative thought and experimentation place internal and external worlds into transformative relation

(Cutter-Mackenzie-Knowles & Rousell, 2019). The iPad (being a material object) offered a window into the phenomena of climate change from Daniel's perspective; specifically, the questions he was asking himself about the entanglement between himself, the tree and climate change. Thinking with plants as entities in shared biocultural environments introduces practices that question knowledge and learning. For example, what if Daniel's conversation is expanded by studies of tree communication and relational terms of existence, where mycorrhizal fungal networks, perform a key role in supporting other trees and their offspring (Wohlleben, 2016). Kimmerer (2003) reflects in her insightful book about the lives of mosses, that are common but largely unnoticed biocultural teachers. "I want to tell the mosses" story, since their voices are little heard, and we have much to learn from them. They have messages of consequence that need to be heard, the perspectives of species other than our own (p. vii). Virtual possibilities of Daniel's iPad chat with a fellow socioecological traveller becomes grounded by something new, that stirs up what was thought to be known about the nature event.

De-bifurcation of Nature

The logic of coexistence is different from the logic of separation. The logic of belonging is different to being a part. (Masumi, 2011, p. 36)

Brian Masumi speaks in part to the complexity of multispecies and multiplanetary coexistence where understanding belonging is very different to actually belonging. For example, we may feel levels of connection to the tree, water invertebrates, dog and river outlined in this chapter, but not sure how, why or if we want to live with these entities as kin. The de-bifurcation of nature in posthumanism is not a romanticised ideal but rather thinking about how we already share biocultural lives on a fragile planet. The concept of 'bifurcation of nature' was conceived by Whitehead (1920) in one of his key writings where the 'concept of nature' is contested as a structure of representable techniques that can be traced across geographical, historical and political boundaries. The separation between nature is the subject of a long history that "extends back before the advent of the Neolithic, and ranges from mythic to modern scientific accounts"

(Bennison, 2011, p. 41). The scientific seeds of this taxonomy were sown by Aristotle who created the species classification and subgroups based on a hierarchy of value from plants, animals to humans. Whitehead (1920) asks the question “how is this to be achieved?” (p. 20) and in part responded through his consideration of “nature-philosophy” raising “nature to independence” where it is constructed and therefore “never feels... the necessity of opposing nature as constructed (i.e. as experience) to real nature, or of correcting the one by means of the other” (p. 25). Debaise (2017) argues that “bifurcation needs to be overcome” (p. 26). Leveraging from Whitehead (1920), Debaise (2017, p. 30) argues that nature is event as “the perspectives through which we experience it and the parts of it that we differentiate in our perception. All is event within perception.” In this sense, a *de (meaning from)* bifurcation of nature resists categorisations of nature. Our second nature event takes up some of these ideas.

The Creatures in the Lake: *The De-bifurcation of Nature*

As part of a large Australian Research Council project, Cutter-Mackenzie and Edwards (Cutter-Mackenzie, Edwards, Moore, & Boyd, 2014) sought to understand ecological play. This event captures the limitations of humanist paradigms, where we then consider how the learning could be expanded. What we draw upon here is one example of a narrative created from a dialogue between a four-year-old child May, Amy the researcher, and Indi the teacher about May’s learning experience at a lake, which was adjacent to May’s preschool:

Amy accompanies the children on the short walk to the large lake situated on this K-12 school in Melbourne, Australia. The children carry large white plastic trays that they sit alongside at the riverbank and fill with water from the lake. Indi suggests they use magnifying glasses to search for creatures (invertebrates).

This exercise is repeated at a later stage except this time Indi has prepared the white trays in the classroom and the lake creatures are already present. Amy asks May to think about when she went to the lake, repeatedly asking if she was playing or learning at this time? May first replies by stating, “we were catching creatures”, then “we were finding things”, followed by, “we were not playing we were seeing what to do”. Amy attempts once more to define the learning by ask-

ing May what she learned about the creatures and May states that seeing them was learning “when we looked at them”. Indi asked if this was by the lake or in the classroom and May states that, “the water in the classroom was too dirty”. Indi questions, “and what about at the lake?”: “It was still dirty” replies May.

Indi probes further to provoke May’s thinking about the two contexts. So, which was the best place to look at the creatures when could you see them the best? May thinks carefully and answers, “with the water at the lake”. Amy asks, “what helped you see or learn about those creatures” and May names the magnifying glasses and teacher, but not her friends.

As can be seen in this narrative with May, the researcher and the teacher, a *bifurcation of nature*, is enacted as the researcher and teacher attempts to understand what the child learnt. May classified ponding (water macro-invertebrate sampling) activities as seeing and learning, with definite preferences expressed for the natural environment (lake) as the best place to see the water creatures and not the classroom. Although May’s responses did not flow with eagerness to answer the questions, there was however a clarity around the notion of learning taking place at the lake and not in the classroom, even though it was the same water, the same creatures and the same white container. Is this a child grappling with categories where creatures belong, categories that form part of the bifurcation of nature? This reminds us of Phillips Payne’s research about sixth grade children’s conception of nature (Payne, 1998) where the responses to questions often indicated that they perceived nature as something external to humans. One child indicated that she thought koalas were part of nature, however, this classification changed when asked if nature is also a koala in a zoo when the child said “Koala’s have been harmed by humans so were no longer natural”. This was a common response as children perceived nature as being “something that has not been touched or harmed by humans” (Payne, 1998, p. 21).

The theoretical framing of Cutter-Mackenzie and Edwards’s project was cultural-historical learning theory, which is based on the central tenet of knowledge being socially constructed. If a posthumanist theoretical framing had been applied, the focus would have been on self-constructing. Self-constructing requires “an intellectual intuition of nature” or “the relation between things”. Whitehead (1920) explains that “nature makes abstractions for us, deciding what range of vibrations we are to see and

hear, what things we are to notice and remember” (p. 26). Deterritorializing the making and (dis)order of the world from a posthumanist perspective is enhanced by shifting to virtual ways of imagining something new. For example to think of the creatures, the lake and the tools that tried to capture who they are in much deeper, ethereal and nuanced ways, where the focus could have turned to what children felt, saw, heard, sensed and imagined, rather than what they did not see or experience.

Entanglements with the More-Than-Human

How do we tell stories that acknowledge other animals/beings as subjects of lives we share, lives that parallel and are interdependent in profound ways? How do we ensure that their voices are audible and that we can co-author environmental stories to live, teach, and learn with? (Fawcett, 2000, p. 140)

Entanglements have many meanings, and in this chapter, it illumines poetic phrasings and stories that explore non-dualistic ways for humans to unsettle perceived realities. Haraway (2003, 2006, 2008, 2013) refers to this approach as a generative relational ontology – a process of ‘becoming with’, ‘becoming worldly’ and ‘worldling’. The linguistically awkward term ‘more-than-human’ (Abram, 1996) signals the diversity of living and non-living beings, earthly forces, and material elements that negate binaries like nature-culture or human-animal recognising how “landscapes are co-fabricated between more-than-human bodies and a lively Earth” (Whatmore, 2006, p. 603). The next nature as event assembles within Tracy’s Doctoral studies (Young, 2019; Young & Bone, 2018), challenging ideas of who can be teacher, who can be a learner, and what circumstances support the role of the pedadog.

Learning with Kosi the Pedadog: Entanglements with the More-Than-Human

Kosi is a two-year old border collie who lives within the school grounds of a kindergarten to Year 12 school in Melbourne, Australia with Mr. D who has worked and lived at the school for over twenty years (see Fig. 2.2).



Fig. 2.2 Kosi the pedadog exploring animal tracks with the kindergarten children

This unique lived situation opens up rare border spaces in education settings where a dog is enabled a level of freedom and privilege that can be seen when you enter the school and his photo is positioned at the top of the staff noticeboard, as a testament to his position at the school. Kosi is privileged by the school community and children who see him as a friend and playmate and they relish in his energy and playfulness. He appears in the drawings of children in the early learning centre and is often a topic of conversations with family members. The children take turns at being Kosi in their dramatic play, telling Tracy that there can't be two Kosis as they take turns asking, "Who is Kosi today"? During research interviews Kate the early childhood teacher identified many ways that Kosi is a pedadog, including helping three-year-old Ruby to move through her fear of dogs.

Kosi has been coming to visit each week since he was a puppy for over a year now. We would be walking as we do each week and he would escape to join us. He was still quite big, but with puppy behaviours where he was 'out there' and a bit ratty and would run wild. He would find us on the walks and the children

loved it but of course Ruby was terrified, and she would scream, even when he was on the lead. We noticed how this was a really important learning opportunity for Kosi and Ruby. We suggested to Mr D, who is a secondary trained teacher, that we trial bringing Kosi to the weekly outdoor education lessons. The surprising part of this practice was not how quickly Ruby got used to Kosi, but how he became a conduit for Mr D to build stronger relationships with the early childhood children who he was previously a little unsure of teaching. Kosi has been really important in developing tangible ways to show Mr D how to communicate with the children in his teachings, such as being more patient with their restlessness. Like he is with Kosi. (Young, 2019)

Kosi has a great deal of freedom at the school and he challenges the common hierarchical position of the animal in educational spaces that does not always end well, when they are situated as objects of educational consumption (Young & Bone, 2018). Despret and Buchanan (2016) attend to relations between species demonstrating how human and more-than-human animal collaborations can work against the oppressions of anthropomorphism, when the right questions are asked, and if positive ethical relations are in place. Kosi shows the power of positive relations and brings delight to children, educators, parents and seemingly to himself. What we draw from the closer interpretation of these narratives is the relationality of power afforded to Kosi by the school community who enable this practice to take place, as a being who responds and reacts. He is not trapped or contained all of the time as the object of study, or an educational tool to be consumed, for when animals are “denied the possibility of reaction, they pass from the category of the ‘reactive other’ to being a ‘thing’ over whom capacities are exerted rather than power relations exercised” (Palmer, 2001, p. 354).

Kosi is unpredictable; he takes every opportunity to swim across the school lake onto the island in the centre, urged on by cheering children and parents who catch a glimpse of him. He breaks rules, walks off leash, is uncaged and unleashed, he makes decisions, works with the children and generally fulfills his role as pedadog. He has the starring role in the escapades of his life that proliferate in the school community. He is an animal species bestowed with privilege, who shows the children a different image of the animal as both teacher and learner. These entanglements with children, Kosi and the more-than-human affordances of the educational space, like the land to roam and the lake to swim, offers a very

different integration of animals in education where children and young people are presented with an alternative image of the dog. Through his ability and the permission granted for him to move, there are hopeful possibilities of a free animal in action. This nature event uncovers praxis that unsettles anthropocentric default perceptions of human superiority in life and education. It advocates for learning-with the more-than-human in ways that entangle each other as learner and teacher so different questions emerge about teaching, learning and inquiry.

Attuning with the Affective, Material and Unknown

Socrates in fact argues that to learn something means to discover a previously unknown truth; it is clear, however, that we would not be able to recognize it anyway. (Semetsky, 2009, p. 445)

Socrates and Deleuze concur that learning is not only about facts and experience but also the unknowable and silent. The final nature as event takes us to unknown places and opens discussion about learning in this way with a river. Matters of matter or the ‘new materialisms’ have emerged with a plurality of approaches and disciplinary perspectives that challenge the construct of natural and material worlds that are perceived to exist outside the human, and are therefore constructed as resources for human consumption, economic production or social construction (Bennett, 2010). The posthumanist learner is therefore in relation with the unknown of human, material and more-than-human worlds in the pursuit of new worldviews and perspectives.

It invites a practice of thinking with what is around and inside us, before and after us, to extend connective tissue of our relations, our materiality and out creativity enmeshed in environmental complexities that unfold from the threshold of their ecological, philosophical and literary labyrinths. (Oppermann, 2018, p. 122)

These ways of relating pay “close attention to the material – where stuff is not merely stuff but the constituent part of subjectivities” (Osgood, 2016, p. 161). What might this subjectivity look and feel like in relation with a river?

The Entity of a River: Attuning with the Affective, Material and Unknown

In 2017 India and New Zealand passed legislation to grant personhood to three rivers. The Whanganui river in New Zealand (see Fig. 2.3) is part of treaty negotiations with Indigenous Māori people who have been campaigning for the recognition of this river as an ancestor for over one hundred years; and The Ganga and Yamuna rivers sacred to Hindu traditions were granted legal rights the same as people (O'Donnell & Talbot-Jones, 2017). Indigenous perspectives and Hindu or Vedic philosophy are materialist and vitalist in their recognition of the agency of nature and liveliness of matter (Horton & Berlo, 2013). Vitalism is the philosophy that tries to see and sense forces, matter and energies that are vibrant and inventive (Bennett, 2010). The river from a vitalist perspective is not passive; it has flows, tides, generating life in ways that are both independent and intra-connected with human life.



Fig. 2.3 River flowing through the Whanganui National Park, New Zealand

More-than-human geographers (Lorimar, 2010; Whatmore, 2013a, 2013b) are also interested in nonhuman agency and affect, exploring how these concepts can reveal and expand nature/culture relations in the midst of particular time and place. To launch this, more-than-human geographers trace the affective energies, habits and everyday practices that are used to attune humans with the multiple many of the more-than-human world. This is learning that is not driven by humanist cognitive thought or language, but with emotion, embodiment and affect. Whatmore (2006) explains that affect is “the force of intensive relationality – intensities that are felt but not personal; visceral but not confined to an individuated body” (p. 604). It is this affect that enabled the Whanganui Iwi people to fight so hard for recognition, for this river is more than life – I am the river and the river is me. The Whanganui river has long been recognised through the four values of ‘the new legal status Te Awa Tupua’ through its traditions, customs and practice of the geographic region that is embedded within ancestral land (King, 2003).

What does it mean to think about a river as a living entity, as an ancestor? Will it disrupt practices of pollution, or will humans who live near these rivers, move from perspectives of ownership and management towards kin relations? Will granting legal rights to nature minimise harm to the rivers through waste or overfishing and hold more legal weight for prosecution? We offer no answers to these questions as they provide examples of the kind of posthumanist inquiry that could be integrated into Western (minority) teaching and learning. Many questions remain about the practical impact of the legal personhood approach. However, the very act of thinking about a river as an interconnected, living entity is an enormous cultural shift in thinking and praxis that offers potential for posthumanist discussion.

Conclusion

This chapter has considered learning in a posthuman frame. Learning shifts from anthropocentric privilege and certainty, toward the freedoms of body and mind that are required for new thinking and praxis to take shape. The posthumanist learner therefore has to feel and sense to learn,

using experimental methods such as relating with rivers, talking with trees, or becoming speculative with lake creatures through stories, poetry, art or deeper questions that put the quest of discovery into learning. The socioecological learner is learning with, from, and in natural worlds, within they are already immersed. By using nature as event we have drawn upon a Whitehead, James, Deleuze and Debaise lens, to make visible some of the relational and nuanced complexities of learning that requires a rethinking of ontology of knowing and being that embraces the collective. Exploring virtual and actual nature events, may be a way to prompt, discover and shift ecological becomings, providing a counterpoint to humanist assumptions, enabling the more-than-human to become teacher, like Kosi the pedadog. Thinking of learning and praxis as assembling through the productive forces and movements of the four concepts we have described, attempts to decentre the human, challenge the bifurcation of nature, entangle with the more-than-human and attune with the unknown. These concepts offer inventive methods of learning that deterritorialize and open education spaces to new socioecological inquiry that as Foucault (1985) suggests, is where posthumanism “enables one to get free of oneself” (p. 8).

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3

The Socioecological (Un)learner: *Unlearning Binary Oppositions and the Wicked Problems of the Anthropocene*

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and Philemon Chigeza

Abstract The purpose of this chapter is to justify, theorise and contextualise a way to *unlearn* the binary oppositions of the Anthropocene (e.g. nature<culture). We define *unlearning* as a disassembling part of the

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whole of learning involving the realisation and removal of deep commitments to obsolescent learnings. We justify unlearning the binary oppositions of the Anthropocene on the premise that they have failed to represent the genuinely wicked problems of being human. We theorise the unlearning of binary oppositions with a form of *monistic dualism*, which simultaneously represents the division and unification of ‘opposites’. Finally, we contextualise the unlearning of binary oppositions in relation to the wicked problems of the Anthropocene, including sustainability, education and globalisation. The authors’ hope is that this way of unlearning binary oppositions may help diversify the community of socioecological learners who recognise, and respond to, the Anthropocene.

Keywords Unlearning • Binary opposition • Monistic dualism • Socioecological • Nature/culture • Anthropocene • Posthumanism • Wicked problems

Introduction

Are ancient Greek philosophers, medieval theologians, and contemporary metaphysicians going to keep Bangladesh from being inundated by rising oceans? Of course not. (Scranton, 2014, p. 234)

For many socioecological learners, the recognition of a new geological epoch of human influence – the *Anthropocene* – would provide impetus to move on in the grand scale of geological time. So, where to from here? The question evokes more ultimate questions, including ‘What does it mean to be human?’ and ‘How are we to live?’. The many answers and contexts to these questions create and reflect some of our most wicked problems (e.g. sustainability, education, globalisation). These problems, like the rising oceans, have metaphysical and scientific dimensions.

There is a mounting body of empirical evidence for the Anthropocene. For example, the Anthropocene Working Group (AWG) (Zalasiewicz et al., 2017) reports,

The group identified a number of changes to the Earth System that characterize the geological Anthropocene. These include: marked acceleration of rates of

erosion and sedimentation; large-scale chemical perturbations to the cycles of carbon, nitrogen, phosphorus and other elements; the inception of significant change in global climate and sea level; and biotic changes including unprecedented levels of species invasions across the Earth. Many of these changes are geologically long-lasting, and some are effectively irreversible. (p. 56)

The biological and geological evidence of human activity suggests that we somehow learned a relationship between the social and the ecological that threatens the survival of both.

How may the relationship between the Anthropocentric and the social and the ecological be unlearned to know the possibilities for *being human* differently?¹ *Unlearning* is, of course, just another form of learning. However, unlearning highlights the often painful discovery and undoing of past learnings and deep commitments, that is often required to learn something new. Unlearning the metaphysics of the Anthropocene may help to consider the possibilities of a *posthuman* (Braidotti, 2017; Graham, 2002; Haraway, 1991; Hayles, 1999) future, with more clarity and caution. The *posthuman*, as defined and defended by Braidotti (2017), is essentially a “critique of the humanist ideal of Man [sic] as the allegedly universal measure of all things, on the one hand, and the rejection of species hierarchy and human exceptionalism, on the other” (p. 11). What metaphysics reside in the posthuman critique? Badminton (2003) cautions that posthumanism may find it difficult and possibly undesirable to fully escape: “the distinctly humanist matrix of Cartesian dualism” (p. 11) that permeates the Anthropocene. There is a metaphysical dimension to the empirical evidence for the Anthropocene that needs unlearning. There are Cartesian ontologies and epistemologies hidden within the ‘large-scale chemical perturbations’, ‘global climate inceptions’ and ‘species invasions’ (Zalasiewicz et al., 2017) of our geological epoch. The com-

¹We use ‘unlearning’ as a particular type of ‘de-learning’. The prefix ‘de-’ denotes movement from (e.g. decentre) but is also used as a privative meaning take apart (e.g. decompose), remove (e.g. deregulate) or even oppose (e.g. defrost). The prefix ‘un-’ more strongly emphasises the relatively reversing, returning and opposing directions of movement from. We retain this emphasis to acknowledge how far humans have gone in the context of the Anthropocene and the related scale of reversing, returning and opposing needed to move away from this position. Malone’s (2016) reference to, ‘an “unlearning” of anthropomorphic ways of educating about the world’ (p. 187) illustrates our usage and our expanded definition in the context of socioecological learning.

munity of socioecological learners needs scientists *and* ‘contemporary metaphysicians’ to address the different dimensions, scales and degrees of the ‘same’ Anthropocentric problem that we seem to have learned our way into. Unlearning the Cartesian metaphysic of the Anthropocene more fully and deeply, may offer some new paths, and even some old ones.

Arguably, the Anthropocene reflects a failure to recognise the wicked problem of being human. ‘Wicked problems’ (Rittel & Webber, 1973) have no definitive formulation that can contain all significant variables and yet we must live out our formulations and their consequences, regardless. Some of the socioecological problems of the Anthropocene (e.g. sustainability, education and globalisation) have been described as ‘super-wicked problems’. Levin, Cashore, Bernstein and Auld (2012) characterise super-wicked problems by: (i) the urgency of the problem; (ii) the causal culpability of those who have the power to seek a solution; (iii) the lack of a centralised body to find and implement solutions; and (iv) the short-term constraints on long-term solutions. But there is another dimension to the problems that make them ‘wicked’. Dorst (2006, 2015) and Adam (2016) observe that wicked problems emerge from core paradoxes (e.g. nature=<culture) and are exacerbated by exclusively binary oppositional formulations (e.g. culture>nature or nature>culture). Whilst the wicked problems of the Anthropocene cannot be ‘solved’ per se, they may be *tamed* or recurrently (*re*)*solved* in context. This chapter proposes a ‘taming’ metaphysic (i.e. *monistic dualism*) that recognises human *being* as a wicked problem, helping to unlearn the binary oppositional excesses of the Anthropocene. Our general approach is that a *monistic dualism* can help human beings to recognise and unlearn the binary oppositional excesses of the Anthropocene in a way that does not simply reverse these oppositions and exacerbate a different set of problems.

We ask *how* the binary oppositions of the Anthropocene (i.e. nature<culture, mind>body, male>female, local<global, living>non-living, human>non-human, conservation<development) became the learned answers to our ultimate questions. As Bourdieu (1977) reminds us, one can learn subtly “by the hidden persuasion of an implicit pedagogy, capable of instilling a whole cosmology, an ethic, a metaphysic, a political philosophy, through injunctions as insignificant as “stand up straight” or “don’t hold your knife in your left hand” (p. 94). The spectre of the Anthropocene

encourages to unlearn its dominant ways of knowing and being – to hold them closer for inspection and reimagination – so that one may choose more consciously to keep them, or to let them go, without losing one’s selves.

Summarily, the purpose of this chapter is to explore and encourage the unlearning of socioecological dualisms that have defined the Anthropocene, and this, so that humans may learn their roles within, and responses to, its wicked problems more selectively and purposefully from a broader range of choices. To this end we justify the unlearning of binary oppositions on the premise that they exacerbate the genuinely wicked problems of the Anthropocene. We theorise this unlearning with a form of *monistic dualism* that stops us (*as the authors*) tearing ourselves apart in the ways of the Anthropocene or losing ourselves altogether as we contemplate a *posthuman* future. Finally, we contextualise this unlearning in relation to the wicked socioecological problems of the Anthropocene (e.g. sustainability education and globalisation).

Learning in the Anthropocene

The term *Anthropocene* has various scientific, social and cultural meanings, but is popularly used to describe the scale of human interference and domination of the Earth system as a whole. More literally, the Anthropocene describes the global scale of human influence on the planet, regardless of the moral evaluation of that influence. However, as Castree (2016) notes, “more than the concept of global warming, the Anthropocene is provocative because it implies that our current way of life, especially in wealthy parts of the world, is utterly unsustainable” (np.). If we treat the *Anthropocene* as a signalling social concept, and as a lexicon for understanding our place in planetary history at what seems to be a pivotal juncture, it becomes useful for discussions on socioecological learning and unlearning. The ‘pivotal juncture’ of the Anthropocene describes the growing realisation of the extent of human influence on the planet. We are coming (or need to come), to the paradoxical realisation of the Pyrrhic victory of the Anthropocene – the defeat of nature was self-defeating.

The conceptualisation of socioecological learning in and beyond the Anthropocene, presents a particularly challenging task, given that educa-

tion *and* sustainability have been characterised as wicked problems (e.g. Blok, Gremmen, & Wesselink 2016; Borko, Whitcomb, & Liston, 2009; Incropera, 2015; Sun & Yang, 2016). Education represents a super-wicked problem in the context of the Anthropocene. Considered in terms of Levin et al.'s (2012) criteria for a super-wicked problem, formal education needs urgent restructuring to be more responsive to rapid social and environmental changes; the existing structure and products of formal education have been complicit in the very production of these social and environmental conditions; formal education is a necessarily contested space that lacks a way to effect change; and educational systems are often bound to political systems, which encourage self-serving and short-term sensitivities.

So, what does it mean to educate in an Anthropocene defined by socioecological problems that we have learned into existence? The characteristics of wicked problems, as already described, also have implications for learning and learners. For example, inquiry approaches to wicked socioecological problems need to reposition science and ecology ontologically and epistemologically by engaging and reflecting on “the full spectrum of ways of knowing and being” (Adam, 2016, p. 210), including the imaginative, intuitive, creative and emotive. Learning approaches to these problems should encourage learners to engage collaboratively in deliberate, systematic, critical and deeply reflexive knowledge-building, as well as intuitive and creative thinking, in order to stimulate the emergence of ‘transformative disruptions’ of existing unsustainable patterns, routines or systems. Learners need to be treated as co-constructors of knowledge in a collaborative and emergent learning process that creates shared ownership of both our current unsustainable ways of thinking and living and our responsibility for and the necessity to contribute to more sustainable, just and flourishing ways of knowing and being.

Educators are turning their attention to the problems of educating in times of very rapid environmental change and very large disturbances in the Earth's atmosphere. Somehow, humans have learned their way to this point and somehow they must unlearn, to know a different way of being and knowing in-relation to each other and the cosmos. These are grand thoughts, but times of crisis often force seeing how the answers to the biggest questions in the smallest ways have been lived, and to wonder anew if this is truly how one may wish to live and learn. Is formal education serving, representing and preparing children and young people adequately or

enough for the scale of future changes and wicked problems they will face? To this question we can add, ‘What does it mean to learn?’ The Anthropocene means that the focus of education systems themselves, for the sake of human survival will have to transform as a matter of great urgency. This is such a huge challenge for traditional, formal education and for educators, for humans have found themselves caught within a cascade of tipping points that threaten to decentre them from themselves, to ask more collectively than before: ‘Who are we?’ and ‘How are we to live?’

The work of educators is to now apply educational thinking to the task of living in the Anthropocene and to the post-Anthropocene. We actually have little choice in this matter. Either we change and transform, or we are looking at a very unhappy and, to be honest, frightening future. We have to reverse the current collapse of biodiversity working at all scales, from local to large scale to protect everything from forests, swamps and pollinators, to apex predators. We have to clear our oceans of plastic, cease and remediate pollution, and transform our social, economic, political and cultural practices to build a partnership and an ethics of care for a shared Earth. Such tasks require much *unlearning* to clear the ground for different directions and new choices.

Unlearning in the Anthropocene

Humans often must unlearn before they can relearn, de-learn and/or learn anew (Cegarra-Navarro, Eldridge, & Martinez-Martinez, 2010). Arguably, unlearning is a neglected part of learning because it lies hidden within it (Antonacopoulou, 2009). Unlearning is part of a whole – a whole that is often conflated with an ‘opposing’ half. Whereas learning takes on normative associations with accumulating, assembling and constructing – *unlearning* emphasises the co-necessity of discarding, disassembling and deconstructing. Thus, in dialectical terms – unlearning is the disassembling half of the whole of learning, where the whole is normatively conflated with its other half, that is, learning as assembling. Perhaps due to this normativity, unlearning is one of the more valuable but less cited skills of a modern learner. Dominant pedagogical discourse is characterised by metaphors of building, adding and creating. Teachers are used to *building* on prior learning, assessing the *accumulation* of

knowledge, and *constructing* meaning. However, *unlearning* emphasises the implicit destruction in learning as building. It asks: What did we, *as humans*, destroy in order to build? What hole did we dig to raise this mountain? What mountain did we raze to fill this hole?

Some of the most difficult things to unlearn can be things humans do not know they have learned because they have never had to consider alternatives. Unlearning can be an ontologically and epistemologically difficult task, involving radical disruptions of cultural and cognitive assumptions and commitments to prior learnings. The cost can be high and the time too short. However, unlearning need not be unnecessarily and indiscriminately destructive if it is embraced as a normative dimension of learning, more than an afterthought. The unlearning of learning inspires a playfully disruptive, even a *dark pedagogy* that paradoxically clears the ground for new learnings and brings innovations to light. Baldacchino (2013) expresses a similar sentiment in the context of unlearning in the arts: “This peculiar ‘movement’ from a state of learning to that of unlearning constitutes the basis for a special kind of pedagogical aesthetics where the challenges of criticality and laterality articulate a special ‘world’ where learning may well work backwards” (p. 415). If the implicit unlearning of learning (and vice-versa) is not acknowledged, the risk is in reinforcing processes and accumulating contents that *will* fail in unnecessarily destructive ways. If we as educators can take apart our learning effectively, we can put these parts back together in different ways, add to them, take from them, or simply reinforce existing learnings with a greater understanding of their function, and a stronger commitment to their value.

As suggested from the outset, our ability to unlearn is of great importance in an age where some of our past learnings – which may (or may not) have served humans well – now seem to have their limits, tipping points and turning points. These limits draw the line between the spectre and the promise of the Anthropocene. Humans are now witness to their own inability to live and learn within such limits, especially *shifting* limits. Arguably, what humans are witnessing in this topsy-turvy world is a sort of *socioecological enantiodromia*, where progress becomes regress, self-preservation becomes self-harm, development becomes decay, and creation becomes extinction. The human transgression of limits is nothing new, however, the sheer scale of these transgressions, as recognised in the coining of the *Anthropocene*, surely has no precedent.

How can socioecological (un)learners make sense of these transgressions? Greta Gaard (2011) argues that what is needed now, to address the climate emergency and the many problems of the Anthropocene, is an intersectional approach which “frames these issues [problems] in such a way that people can recognize common cause across the boundaries of race, class, gender, sexuality, species, age, ability, nation—and affords a basis for engaged theory, education, and activism” (p. 44). This search for common causes and frames of reference may well involve the more revolutionary forms of unlearning – the destruction of idols, the shattering of images, and tearful unravellings. The search pushes us (as humans) more deeply into our-selves and, somewhat disconcertingly, beyond them. Admittedly, *destroying*, *shattering* and *unravelling* are the more violent and revolutionary acts of unlearning. Revolutionary unlearning may be a proportionate response to the insidiously ‘peaceful’ learning that builds of towers of Babel to invisible gods. However, unlearning can be softer, kinder, more playful and compassionate, though just as powerful, as its revolutionary forms. But it must be taken seriously from the start of learning, and at key junctures of learning along the way. This sort of unlearning asks, ‘What is our learning?’, ‘Where did we learn our way from?’, ‘Where are we learning our way to?’ and ‘Do we still want to learn this way?’ This is not a paralysing call for doubt and uncertainty; it is a gentle reminder that reflexive time to self-doubt, self-question, and consider alternatives along the way, may cost humans less than living immutable answers beyond contextual questions. Unlearning may be the one step back that repositions humans to take two steps forward.

Monistic Dualism and the Anthropocene

So far, this chapter has attempted to elucidate and connect some core concepts (i.e. *Anthropocene*, *wicked problems*, *unlearning*, *binary oppositions*) to make a general case for their significance to socioecological learners. Educators have the unenviable task of representing and communicating these problems simply, without neglecting their complexity. To this end, this section introduces a more formal philosophy (i.e. monistic dualism) and a heuristic model for unlearning the binary oppositions of the Anthropocene.

Monistic dualism (or dualistic monism) is a metaphysical position that recognises: (i) the unity of all things, (ii) the implicit plurality in the realisation of unity, and (iii) the implicit duality in the realisation of plurality. Translated into the relationship between the social (culture) and the ecological (nature): (i) there is a unity of nature and culture, (ii) this unity implies a plurality of expressions and degrees of difference between nature and culture, and (iii) this plurality implies a duality between nature and culture.

It is worth acknowledging that monistic dualism has been used elsewhere, either explicitly (e.g. Bosworth, 2014) or implicitly (e.g. Reich, 2002), to frame complex social problems. It represents a metaphysical stance that can accommodate and coordinate multiple paradigms in relation and in-context. Monistic dualism recognises the intractability of dualism, for as Gould (1997) observes,

The human mind seems to work as a categorising device (perhaps even, as many French structuralists argue, as a dichotomizing machine, constantly partitioning the world into dualities of raw and cooked [nature vs. culture], male and female, material and spiritual, and so forth). (p. 39)

However, it reveals dualism's implicit monism and pluralism to expose the truer impostor – the binary opposition. The binary opposition is really a premature monism – an assertion that a part *is* the whole, or at the very least, wholly superior to all other parts.

As previously quoted, Bourdieu's illustratively metaphysical injunctions – 'stand up straight' and 'don't hold your knife in your left hand' – offer a dyadic clue as to how we might begin to unlearn the Anthropocentric relationship with nature. The injunction to stand invokes the possibility of sitting. The injunction to be straight invokes the possibility of being crooked. And, the injunction not to use the left hand invokes the possibility of not using the right hand. Herein lies a formulation that may help us to frame the binary oppositional excesses of the Anthropocene. Unlearning for the wicked problems of the Anthropocene requires a reimagining and reconfiguring of established discursive dyads, more commonly but somewhat deceptively known as *dualisms*.

Table 3.1 lists common dyads that populate socioecological discourse and give us (as socioecological learners and educators) an insight into the wicked problems we face. The list is adapted from Adam's (2016) collec-

Table 3.1 Examples of dyads in socioecological discourse

Nature/culture	Nature/society
Ecological/social	Environment/organism
Practice/theory	Intuitive/rational
Value/fact	Ecological/technological
Body/mind	Organic/technical
Emotion/reason	Abstract/concrete
Spirit/earth	Lateral/hierarchical
Chaos/order	Mythical/logical
Spontaneity/control	Public/private
Metaphorical/literal	Urban/rural
Male/female	Subjective/objective
Darkness/light	Specific/totalised
Active/passive	Unity/diversity
Traditional/progressive	Organic/mechanistic
Fluctuations/permanence	Qualitative/quantitative
Dependent/independent	Holistic/reductionist
Soft/hard	Social/individual

tion of dyads in socioecological literature. It reveals how central they are to the ways we think and know about ourselves, for these dualisms create and reflect the category tropes of otherness that are so central to human social identity in a natural world.

What is evident from this list is that socioecological problems are deeply connected to more general ontological and epistemological problems. What are humans to do with the dyads they have learned? Haila (2000) offers one response, aiming to clear the ground for science by clearing the ground of dualism: “The common denominator of all the varieties is that culture and nature are opposite sides in a dualism. The culture-nature dualism is ultimately harmful and should be challenged” (p. 155). However, there are different ways of conceptualising and accommodating dualism. We argue for its accommodation in a form of monistic dualism or dualistic monism, rather than its extinction. Here, dualities are polarities that signal degrees of difference and express the most salient concerns of existence. They are the hands of bilateral symmetries that can be spread wide to indicate the expanding universe or brought close to hold a grain of sand – and everything between. Binary oppositions represent much less. They represent an imposition of the one on the many and a conflation of the part with the whole.

Perhaps the key to unlearning the binary oppositions of the Anthropocene is to begin in our human imaginations at the opposite ends of our positions and practices, and then to build, by degrees of difference, a bridge back to where we stand. By analogy, humans may do well to *sit* a while to understand their *standing* and hold their knives in their *left* hands for a time to know what is *right*. Only then can humans perhaps appreciate if and where they stand, which hand to use, and whether to continue in these ways of knowing and being at all.

The unlearning of a binary opposition can begin by affirming why it was learned in the first place, and that it may well be important to learn it again. Socioecological learners do well to remember that the culture>nature meme that has ruled the Anthropocene, may have origins as humble and practical as the swatting of a mosquito associated with sickness, the breaking of a branch for shelter, the lighting of a fire against the cold of night, or the starvation-induced eating of a rodent that had died a natural death. It can be too easy to extoll the benevolence of nature and lament the malevolence of culture from the relative safety of our concrete caves. One side (i.e. nature>culture) forgets where we came from. The other side (i.e. culture>nature) ignores where we are. Both 'sides' forget the sense in which they are contiguously connected and singularly united.

Unlearning may help us as socioecological learners to keep our understandings of the Anthropocene more dexterous and responsive than they would otherwise be. Yes, we need to unlearn the Anthropocentric privileging of culture, masculinity, matter and mind – but we would have failed as educators if future socioecological learners beyond the Anthropocene are defined by a reactive privileging of nature, femininity, spirit and body. We would have failed too, if learning after the Anthropocene was blindly dominated by some static middle position, an ineffable union, paralysing negation or chaotic multiplication of nature and culture. And yet a priori, and in-relation, all of these positions are of value and help humans to know and to be, in and of, the world. This is no simple 'hedging of bets' – it is a laying open of abstract possibilities from which to make real choices in changing contexts. As such, we now turn our attention to a more formal model of monistic dualism to assist unlearning by a 'laying open' of possibilities.

A Heuristic Model for Unlearning Binary Oppositions

There is a need for new models, modes of thinking, and ways of knowing to comprehend the relationship between the social and the ecological in an Anthropocentric epoch characterised by wicked problems of unprecedented scale. As Gardner (2004) enumerates, modern learners require:

1. Understanding of the global system;
2. Capacity to think analytically and creatively within disciplines;
3. Ability to tackle problems and issues that do not respect disciplinary boundaries;
4. Knowledge of and ability to interact civilly and productively with individuals from quite different cultural backgrounds – both within one's own society and across the planet;
5. Knowledge of and respect for one's own cultural tradition(s);
6. Fostering of hybrid or blended identities; and
7. Fostering of tolerance. (pp. 253–255)

Arguably, the need for such learner abilities is as old as culture, its conceptualisation of nature, and the meeting of its tribes. However, the scale, frequency and consequences of the meeting of tribes in the Anthropocene – with each other and with nature writ large – remind us of their value at this time.

The abilities will need to be fostered with new scaffolds, theories, models and metaphors. Such models will be co-constructed by learners and teachers who recognise the paradoxical unity and duality of learning and teaching. These models could also help move the pedagogical dialogue beyond polemic and opposition (e.g. traditional vs. progressive, positivist vs. interpretivist, teacher-centred vs. learner centred) without diluting real and important differences (Adam & Chigeza, 2014). More so, as Ross-Holst (2004) argues,

What educators and policy makers need are models that can more readily take advantage of the challenges and opportunities offered by globalization . . . These new opportunities suggest to me that educators are more relevant

to the project of education than ever before: to scaffold new ways of knowing; to help children and youth reach higher levels of understanding, and to guide students to achieving greater appreciation for cultural complexity and diversity. (p. x)

This is a significant and ongoing challenge, as such models must be simultaneously simple for communicability but able to generate and represent immense complexity.

At first glance, the heuristic model proposed in this section (Fig. 3.1) is easily recognised as ‘bi-relational’ (Adam, 2016) or dualistic, that is, it represents relations between two constituents (e.g. A/B). However, closer inspection will show that this *duality* only makes sense in relation to concepts of *negation*, *unity*, *synthesis*, and *multiplicity*. Thus, the model simultaneously represents nihilistic, monadic, dyadic, triadic and multiplistic ways of knowing. It represents a dualistic monism or a monistic dualism. It is a model that encourages unlearning learnings and to see them in relation to other learnings on grander scales – so that we may better locate and understand our positions in-context and on smaller scales. More specifically, the model encourages identification of the salient dyads (e.g. social/ecological, nature/culture) that reside in the wicked problems; to imagine the possible relationships between them in order to know what relationships have been learned; and to identify the most probable relationships that will help to (re)solve the wicked problems in the contexts they arise.

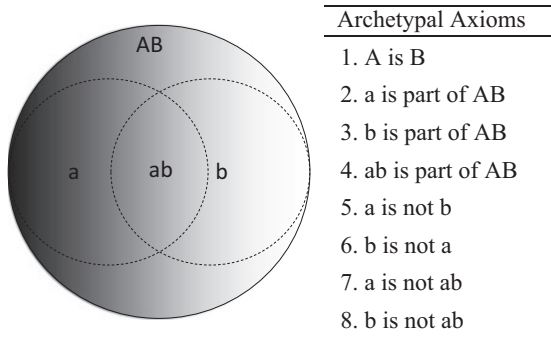


Fig. 3.1 A heuristic model for unlearning and learning dualisms. This model represents dualism as a relational and contextual way of knowing

Consider the nature/culture dualism in relation to the model (Fig. 3.2). As socioecological learners we have life experiences that construct subjective or necessarily partial understandings of nature and culture. One person's or group's experience of *nature* may be more 'red in tooth and claw' or 'snips and snails and puppy-dogs' tails'. Another person's or group's experience of *nature* may be more 'green in thumb' or 'sugar and spice and everything nice'. Tipping the constructs from both experiences into one bucket is a difficult logical and semantic task.

A key premise of the model is that socioecological problems are, in part, made wicked by their semantic complexity, their hidden relationality, and their logical trickiness. There is a deception to discussion that arises from the problem that a word may not only mean many things but may encompass a lesser or greater number of things. This is particularly tricky when discussing grand constructs like *nature* and *culture*. The task requires a sort of relational and contextual logic (Reich, 2002) or bi-relational knowing (Adam, 2016) that can move dexterously between a priori and a posteriori, general and particular, concrete and abstract, and subjective and objective ways of using the 'same' words. To this end we use upper and lower-case forms of the same letter (i.e. aA, bB) to denote similarity and difference between part and whole. Unlearning, de-learning and relearning dualisms relies on a logic that can contain, but not be exclusively constrained by binary logic (e.g. nature vs. culture). Such a logic represents a metaphysical approach to understanding the possible

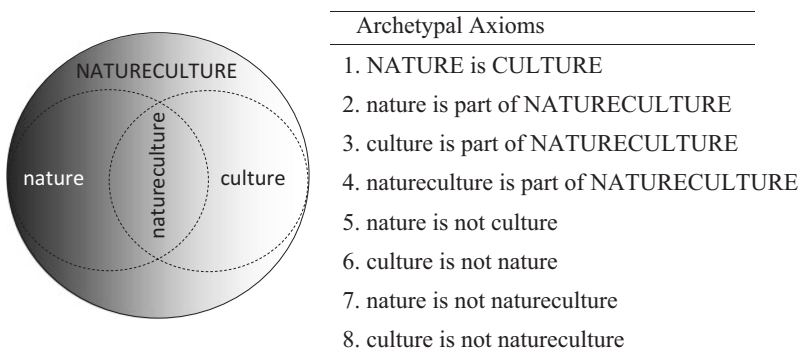


Fig. 3.2 A heuristic model for unlearning and learning nature/culture dualisms

and probable relationships between the constituents of socioecological dyads. It is a logic that allows the socioecological learner to see commensurability *through* conflict between the archetypal positions.

Perhaps the most common understanding of dualism denotes a separation and disconnection between dyadic constituents, for example, the separation of *mind* and *body* in Cartesian dualism. This separation enables another common understanding – that dualism is synonymous with binary opposition, where the naming of two separate entities is seen to denote a conflict between them and a preclusion of degrees of connection and complementarity between them. The confusion concerning dualism stems from its seemingly contradictory relation to monism. Are we many or are we one? While a nuanced philosophical discussion of this question is beyond the chapter's immediate scope, it is important to note that its approach to socioecological dualisms is based on the premise that without them we cannot recognise monisms, and without monisms we cannot think about dualisms. We are one and we are many. *Two* is the most basic division that reveals this paradox. We are irreducibly *nature/culture* and *natureculture*. Educators need models and metaphors that help us to unlearn ourselves in relation to others, including non-human others.

Unlearning does not have to begin and end with the destruction of socioecological dualisms like *nature/culture*. The irony of exclusively monistic approaches to the *nature/culture* problem is that they rely on an implicit dualism. Oneness is meaningless without the divisions it seeks to reconcile, such that dualism too, is an inescapable structure of thinking and acting. So long as we seek to know, dualism will raise its wings from the ashes of its negations or split the atom of its unions. However, dualism only exists in-relation to these negations and unions – “the human mind must overlook unity once we begin thinking at all . . . we must re-discover it if we continue thinking clearly enough and long enough” (Wilson as cited in Scarfalloto, 2003, p. xiii). Lovejoy's (1930) early defence of dualism is still worth quoting here,

[T]he way of thinking so named by philosophers [i.e. *dualism*] is no accidental or artificial product of seventeenth-century metaphysics, no sophistication of speculative minds; it is simply the account which man [sic], grown capable of holding a number of facts together in a single view and

drawing what seem plain inferences from them, will normally give of the situation in which he [sic] finds himself [sic] when he [sic] is engaged in what he [sic] calls 'knowing'. From these roots the same conclusions would, in all probability grow again, though Descartes were not only dethroned but forgotten. (p. 24)

And yet, the gendered nature of this defence (i.e. *he, man, his*) also cautions as to how easily one side of a duality may come to dominate and subordinate another (i.e. male>female) with the illusion of its totality. The Anthropocene can almost be defined by such dominations including nature<culture, social>ecological, mind>body, cognitive>affective, and intuitive<rational. In beginning to restore a less one-sided totality – often recognised as *monism* – it is worth noting that many of these dominations were reversed in the pre-Anthropocene. The challenge for educators of the post-Anthropocene is to stop swinging pendulums and start coordinating hands and minds.

Unlearning the Socioecological Dualisms of the Anthropocene

There is a place for educators to gently and playfully disrupt binary oppositions. Naive dualisms create categories of opposition (the 'us and them' over there) that suppress rather than signal the degrees of difference and interpenetration between them. Their categories of value opposition (e.g. white>black, good>evil, beautiful>ugly, civilised>primitive, advanced>backward, coloniser>colonised) create a relation of dominance wherever there is difference. Naive dualisms create hierarchies out of the ways different groups make sense of the world, regardless of their contexts. The chapter's general approach aligns with others (e.g. Adam, 2016; Adam & Chigeza, 2014; Reich, 2002) who argue for a way of knowing and learning about the polarities of a dyad that evaluates their strengths and weaknesses in context; acknowledges their relationality and interdependence; and acknowledges the degrees of difference and continuity that connect them.

Unlearning is a necessary part of this challenge to better coordinate the seemingly irreducible two hands of the human mind that generate socioecological dyads. It is not the only part but it can help to recognise what has been learned and where this learning is positioned in relation to the possibilities at, and between, the poles. It does not destroy the poles of dualism or deny the sense in which they are one, rather, it reverses, squeezes and expands them to point out the possibilities between them and confront the choices made, the positions taken, and the learnings learned. Unlearning socioecological dualisms pushes into wonderful and terrible places. It can clear from the clatter of selves, make all one, pair together, join in the middle, or multiply. However, it can also annihilate, squash into a corner, tear in two, trap in a third space, and shatter into infinite pieces. These are the seemingly contradictory possibilities for the post-Anthropocene after an age of tearing ourselves in two.

The essence of this chapter reflects Adorno's (1993) view of dualism as a construct for contemplative learning where, "contradiction itself—the contradiction between the fixed concept and the concept in motion—becomes the agent of philosophizing" (p. 70). Arguably, learners are most free when they can dexterously coordinate the two hands of philosophical dualisms to work, play and even constructively wrestle, in the infinite divisions between them. This play will give socioecological learners time and cause to wonder what learnings lie beyond their reach, and what unity of origin and purpose they may serve, if any. This recognition of opposition and engagement with division can lead to deeper understanding, or at least, better management of conflict and difference. Such an approach is characterised by a dexterity that can evaluate and coordinate the constituents of a duality, with a sensitivity to context and their relationality. This coordination is appreciative of the relational equality of the socioecological dualisms of the Anthropocene but recognises that context can demand particular choices that can change over time for the most effective unlearning or learning. Such an approach is conscious of the abstract paradoxes between the socioecological dualisms of the Anthropocene; and yet it is informed rather than paralysed by them, in contexts that require real choices and actions.

The heuristic model represents a metaphysical stance that emphasises the *contiguity*, *relationality* and *contextuality* of dualisms. Here, unlearning through *contiguity* highlights degrees of difference (i.e. shades of grey) to counter the disconnection that encourages binary oppositional learning. Unlearning through *relationality* highlights the interdependence and co-sensitivity of positions. It reveals the multiplicity of relationships that can exist between polarities (e.g. negation, unity, dualism, synthesis, multiplicity). Unlearning through *contextuality* reveals the timeliness and placefulness of binary oppositional learning to question its place and relevance in new or expanded contexts. Pedagogies and resources that embrace these principles can help socioecological learners to unlearn the dominant binary oppositional dualisms of the Anthropocene (and avoid their superficial reversals) by revealing new ways of relating old constituents. Used wisely, these pedagogies and resources can playfully disrupt our learned and taken-for-granted dualisms, by raising our awareness of them.

Contiguity

Socioecological (un)learners can also disrupt binary oppositions with examples that reveal contiguity between polarised constituents of a dyad. In terms of the heuristic model (see Fig. 3.1) this disruption is akin to incrementally expanding and merging the two circles (i.e. 'a' and 'b') to create a third category (i.e. 'ab'), and eventually a more differentiated continuum or spectrum altogether that is served, rather than obfuscated by, dichotomising categorisations.

Sowards' (2006) analysis of Orangutans as a symbol for complicating the nature/culture dichotomisation is one example of a resource for unlearning binary gaps by learning contiguity.

Orangutans, an endangered species found in Indonesia and Malaysia, enable individuals to bridge, connect, and identify with a seemingly separate natural world. Through identification with orangutans, humans come to reevaluate their own perspectives and dichotomous ways of thinking about their relationships with nature . . . Ultimately, orangutans are an effective rhetorical metaphor for bridging nature/culture dualisms by rep-

resenting the natural world from which we have become rhetorically separated. (pp. 45–46)

Experiential pedagogies coupled with reflections on experience can help to see a continuity between humans and Orangutans that challenges the extent of the divorce of human selves from the rest of nature. We will struggle to unlearn our dichotomisations if we do not have concrete experiences of what lies between them and time to reflect on these experiences abstractly to understand how they might contribute to views of the world. However, the very plight of these Orangutans as well as the conflicts within our own species suggests that the recognition of continuity and close proximity is not enough when grouped together in cages with finite resources. Contiguities can still be learned and formulated as hierarchical ‘chains of being’ that inspire subordinations of nature to culture, non-human to human, and even human to human. Pedagogies and resources that help to unlearn the barriers we have constructed between the social and the ecological, nature and culture, human and non-human must be complemented by resources that facilitate an appreciation of relationality.

Relationality

Socioecological (un)learners can further disrupt binary oppositions with examples of relationality and interdependence between the otherwise polarised constituents of a dyad. Ritchie (2013) identifies *relationality* as “our lived relation to other human beings, other living creatures, and to the non-living entities with whom we share our spaces and the planet” (p. 307). Arguably, the *posthumanist* (Snaza & Weaver, 2015) and New Materialist turns are essentially counterbalances to the anthropocentric view of humans as separate, independent beings outside of nature.

In terms of the heuristic model (see Fig. 3.1) this disruption towards relationality is akin to showing that there is a certain symmetry between ‘opposites’ (i.e. ‘a’ and ‘b’); the effort to push them further away from each other on a line, paradoxically reveals their looping circularity and co-dependency. This is a well-recognised dynamic that is related to a

number of concepts, including *relational reasoning* (Reich, 2002), *enantiodromia* (Jung, 1971), *aufheben* (Hegel as cited in Adorno, 1993) and *immirrotation* (Adam, 2016). For socioecological learners, these concepts describe the relationality between nature and culture, social and ecological, male and female, living and non-living, birth and death, predator and prey. Such relationality is a central assumption in the conceptualisation of sustainability.

Learning that is participatory and relational is dependent on a community of learners that is “minimally distorted by power relations” (Wals & Dillon, 2013, p. 257). A major challenge of such learning in relation to socioecological issues is negotiating the dyadic tension between consensus and social cohesion, on the one hand, and power and counter-hegemonic positions, on the other hand (Wals, 2010). This needs to occur without diluting real and important differences of interests, needs and values by recognising that opposition and engagement with division can lead to deeper understanding, or at least, better management of conflict and difference.

There are many examples of relationality that can be used to unlearn the fiction of disconnected opposition in relation to socioecological dualisms. Feedback loops concerning industrial ecology are particularly useful in showing relationality in closed-loop systems. As Ehrenfeld and Gertler (1997) reflect,

Environmental thinking has recently focused on a consciousness of the intimate and critical relationships between human actions and the natural world, and reflects limits in the current reliance on command-and-control regulation in much of the industrialized world . . . Moving from linear throughput to closed-loop material and energy use are key themes in industrial ecology. (p. 68)

Thus, the industry that exploits its resource-base will eventually fail. The farm that contaminates its own soil or water source will eventually fail. Examples of long-term closed-loop relationality help to disrupt the short-term separations that characterise the most destructive dualisms. There are many other ways to complicate the falsely dichotomous solutions that exacerbate the wicked problems of the Anthropocene. For

example, predator-prey relationships between snowshoe hares and lynxes, and wolves and moose; and symbiotic relationships as between cleaner wrasse *Labroides* and groupers, the hummingbird hawkmoth and the *Dianthus* flower, can help socioecological learners to appreciate the relationality of ecological systems, which disrupt binary oppositions between nature and culture. As socioecological learners, we need access to multiple relationships between dyadic constituents before we can unlearn or reimagine [or de-learn or de-imagine] the relationships of dominance between the social and the ecological, the built and the natural environment.

Contextuality

Socioecological (un)learners disrupt dualisms by asking, ‘What place and time does this practice or belief come from?’ and ‘How does it fit here, now and into the future?’ *Contextuality* reflects a sensitivity and responsiveness to the time, place and space of a belief or practice. In terms of the heuristic model, contextuality is the appreciation that there are different ways of relating the constituent parts of a duality (i.e. ‘a’ and ‘b’) and that these ways, even extreme oppositions (e.g. $a > b$, $b > a$) may have legitimate expression in a particular context. However, socioecological (un)learners are particularly sensitive to the dominance and imposition of beliefs and practices beyond their time and place. They are willing and able to see that almost any belief and practice, originating from left or right or even the middle of the spectrum, can evolve into self-protective dominance beyond its legitimate context.

To unlearn and to encourage unlearning, educators may need to move away from habituated practice and adopt a more *reflexive* stance that raises awareness of context. Reflexivity is the ‘practical sense away from automatic or habituated practice to a more aware and evaluative relation to oneself and one’s contexts’ (Shirato & Webb, 2002, p. 255). Reflexivity involves a critical awareness of the social self in relation to the ecological other. It recognises that socioecological language, assumptions, social practices and discursive positionings are embedded and contextual; and that this embedded positioning informs the relationships and knowledge

production central to educators' work (McNay, 2004). Unlearning reflects a commitment to regularly re-position oneself, if only to strengthen one's commitment to a particular position in context. Collectively, these characteristics are important for re-imagining more sustainable ways of thinking, relating and acting beyond the Anthropocene.

Conclusion

This chapter has offered a unique synthesis of concepts (i.e. *unlearning, wicked problems, binary oppositions, Anthropocene*) in the context of socio-ecological learning. The rationale for this synthesis can be summarised as follows: The Anthropocene is defined by the scope and scale of human impact on nature; this influence has been supported by a metaphysic that positions culture and nature in a binary oppositional relationship; this metaphysic does not reflect the 'wicked' nature of the problem of being human; these ways of knowing and being human must be unlearned; dualisms are a fundamental structure of human learning; therefore, new metaphysical models are needed that accommodate dualisms yet facilitate the unlearning of binary oppositions. To this end, the chapter introduced a heuristic model of monistic dualism for unlearning the binary oppositions of the Anthropocene.

We conclude where we began – with Scranton's (2014) poignant question: 'Are ancient Greek philosophers, medieval theologians, and contemporary metaphysicians going to keep Bangladesh from being inundated by rising oceans?' (p. 234). Metaphysics may not abate the rising oceans in the short term but it may help humankind to *unlearn* what they must have learned to raise them in the first place.

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4

The Risky Socioecological Learner

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Abstract Children and young people flourish when opportunities are provided for scaffolded risk-taking in learning settings. However an overly cautious risk-averse attitude to learning has emerged in many

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schools, one that ironically presents a significant risk to the learning process itself. A fundamental misalignment seems to be developing between the risks schools are trying to ameliorate, and other real risks many students encounter in their wider lived reality. In this chapter we explore the idea that current curricular demands can be met in deeper and more powerful ways by engaging with the principles of socioecological learning, including creating a deliberate space for students to practice autonomy and managing their own risk-taking rather than trying to avoid it altogether.

Keywords Risk taking • Socioecological • Learning settings • Common worlds

Overview of the Chapter

If we take risk out of education, there is a real chance that we take out education altogether (Biesta, 2013, p. 1).

Chapter 1 explored the notion of common worlds being deeply embedded in our relations with others and with nature, with foundations built on inclusion, and on the somewhat confronting idea of ‘more than human others’ (Common Worlds Research Collective, 2015). As educators our challenge is to find the place where our thinking and practice converge around this conceptual touchstone, and as Taylor and Giugni (2012) expressed it, to seek pedagogical opportunities for practicing a non-human-centric ethic of inclusion in our teaching and learning practices (p. 108).

Consistent with the common worlds touchstone as explored in Chap. 1 (this collection), in this chapter we argue that when the impacts of risk and risk aversion in learning settings is considered, educational systems, and schools in particular, would do well to consider ‘nature-culture’ relations in a more nuanced way, and move towards an expanded, multi-faceted concept of risk, as opposed to the current narrowly defined version. Further, we explore how school curricula might be delivered in deeper and more powerful ways by applying the principles of socioeco-

logical learning to the design of learning settings. Among other things, this would involve creating autonomous spaces for children and young people to practise managing risk-taking by way of experiential learning (Owen, 2009), as opposed to risk-avoidance. Under such circumstances, an increased focus on learning settings would be better placed to encourage and develop resilience and agency, rather than attempting to prevent all conceivable physical and intellectual risks.

Furthermore, it need not necessarily be the case that educators have to make mutually exclusive choices between ‘safety’, and ‘engaged learners’. In order to expand the literature presented in this chapter, we also offer our collective personal stories as educators, in both secondary and higher education learning in the form of vignette.

Introduction

There seems to be a fundamental misalignment emerging between the ‘risks’ educational institutions are trying to ameliorate (most notably accident prevention), and the other real risks many students will encounter in their wider lived realities. The latter types of risks involve, but are not limited to, physical challenges and risk-taking in life circumstances. These include travel and the play adventures children experience and the wide range of multifaceted social risks as well as other ‘intellectual’ or attitudinal risks that can also have long-term negative effects, such as disengagement with education.

Notwithstanding the obvious fact that the physical safety of children in schooling should be of paramount concern, education systems can and do at times demonstrate an overly cautious attitude towards the prevention of physical risk in areas where children gather for social play, children’s clubs and school excursions. Where such a risk-averse culture develops in schools, it deserves scrutiny, as this stance is in itself presenting a risk to the quality of learning experiences.

In this chapter we seek to explore some of the ways in which education systems, and schools in particular, are currently manifesting a lack of foresight in their approach to ‘risk’, and how this position may be impeding the development of important life-long skills that help children deal

with new or challenging situations and navigate their present and future worlds. In educational settings, these skills are acquired when students have the freedom to practise being flexible risk takers and experiment with creative thinking processes.

It is not our intention here to construct a straw-person portrayal of the Workplace Health and Safety (WHS) compliant school. We acknowledge that there is considerable groundswell and appetite for reform, but at the moment, institutionalised structures, such as the WHS conception of risk (as distinct from the school itself) are acting as roadblocks to meaningful and timely reform. For example, the concept of providing the space for young children to develop as confident risk takers through play is being constrained by school safety policy designed to avoid injury. This is compounded by preconceived ideas about safety and possible litigation, which can interfere with important life learning experiences for students (Beate Hanson Sandseter, 2011).

Thus, in this chapter we seek to understand the following:

1. What have been some of the social and economic contexts that have contributed to the emergence of an over cautious risk-averse culture in schools?
2. What have been the resulting impacts on learners and learning settings?
3. What attitudinal shifts might be necessary for schools to move beyond being constrained by an overly cautious preoccupation with risk towards an arrangement where students learn to manage risk instead of seeking to avoid it completely?

The Rise of the Risk-Averse Culture

The term ‘risk’ can be expressed in various ways, depending on societal, cultural, economic and policy contexts. Giddens (1991) asserted that ‘risk’ is timeless as a driving force for new discoveries, technological and scientific innovation and market opportunities, while Douglas (2003) characterised ‘risk’ as being culturally determined through patterns of

historical continuity, couched in terms of enterprise through the transmission of ideas, meanings and values that expand and strengthen social and cultural relationships. Beck (1992, 2013) on the other hand defined risk as being ‘synonymous with ambivalence’, a condition of human existence that is impossible for individuals to avoid.

The idea of ‘risk aversion’ centres on avoiding exposure to risks and deliberately choosing less risky alternatives, coupled with opportunities to develop strategic goals (Riquelme, 2007). In a business context, the phrase connotes a safe pathway for investors to reduce the possibility of financial loss, but in an educational context, it is used to describe the ways in which schools seek to “shield themselves from legal exposure” and “attempted to eliminate every conceivable risk” (NewTak, 2013, para 3). ‘Risk’ has also been linked to the ideology of economic rationalism. Stanford (2010, p. 1066) states that “risk has been cast almost exclusively in economic as opposed to social terms and need has been re-moralised as indicative of individual failure”.

Beck (1992) argues that over time society in general has become significantly more risk-averse. Nichols (2000, p. 125) explains this movement as a consequence of an ever-increasing awareness of “risks we feel powerless to control”. The idea here is that the current ‘plugged in’ society is incredibly efficient at making humans aware of risks that lie outside their ability to ameliorate. If we as socioecological learners are not able to offset the increased risk-awareness by reducing risks in other areas, our overall emphasis on safety and risk aversion will inevitably increase.

This mechanism has been used to explain the rise in panic about social issues such as food safety, health and crime risks, which cannot be justified statistically. The result is a pervasive “culture of fear [that] can create an environment where anyone who does not ‘subscribe to the religion of safety’ will be criticized for putting themselves and others at risk” (Nichols, 2000, p. 128). Once such a culture takes hold, the ability to perceive risk as having both positive and negative outcomes is lost, and risk becomes something to be avoided, rather than balanced. Safety has become a core societal value, so that the concept of risk “positions individuals and governments and citizens in relationships dominated by suspicion, and attitudes and moralities of protectionism and responsabilisation” (Stanford, 2010, p. 1066).

This increased collective social awareness of contemporary risks, especially the ones outside of our control, makes a very powerful contribution to the shaping of public policy. The invisible nature of many contemporary risks magnifies the sense of public insecurity, and as a result, the public looks to governments to protect them from these risks through legislative regulation of various areas of societal life. Huang (2012, p. 1183) explains that hidden risks such as unhealthy diets, environmental pollution and financial crises “not only have a direct impact on most people, but have also become the topic of central debate in forming public policies, both nationally and internationally”.

Risk Aversion in Education

The structures described above by Stanford (2010) that have driven the rise of risk aversion in wider society, can be experienced especially sharply in the field of education, where the long-standing concept of *in loco parentis* (in place of the parent) has undergone significant changes in response to the increase in risk aversion in society. Originally conceived as a doctrine to justify and defend disciplining students, *in loco parentis* has evolved over a long period of time, until it has also come to include the idea of protecting students from risks to which their parents would not want them exposed (Stuart, 2010, p. 920). The manifestation of contemporary risk aversion in education has been so pervasive that the concept of ‘risk’ has been used to effectively subjugate other legitimate needs of the learner in an educational experience. The following section briefly identifies some of the main causes of risk aversion in the field of education.

Causes of Risk Aversion in Education

Neoliberal Governance Structures in Education

Nichols (2000) states that the field of education in particular has experienced increased risk aversion as a result of the dominance of neo-liberal governance structures in school management. Such structures are often

seen as the most effective way of reducing the risk and fear of potential litigation from parents and relatives in the event of a student being harmed. The often uncritical adoption of entrepreneurialism in hierarchical educational institutions has witnessed a rapid increase in regulatory activity across the field of education, such that schools must now demonstrate compliance with myriad policies, procedures and processes. Nichols describes the self-legitimising structures that take root once these regulatory bodies are called into being:

...because they are self-financing, [they] have to generate sufficient work to pay the wages of their staff. Once established on this financial basis they have a vested interest in increasing regulations, monitoring and enforcement. (2000, pp. 128–129)

The increased focus on regulation and compliance in school governance has also ‘filtered down’ to have a significant effect on educational pedagogy. In such environments, there is an overwhelming emphasis on being ‘risk-led’ as opposed to ‘learning needs-led’ in the way learning experiences are designed. In turn, this has led to an ever-increasing emphasis on the use of positivistic, ontologically monovalent forms of empiricism that focus on metrics and “calculative regimes” in an effort to “offer certainty, facticity, predictability and stability” (Webb, 2006, p. 126). These methods of conceptualising and measuring risk also have the additional function of acting as a ‘forensic resource’ through which blame can be apportioned when things do not work out (Douglas, 2003). Striving to understand how this position has been arrived at in schools, Phippen (2017, para 3) observed that, “rather than exploring the way the curriculum tackles social development, resilience and emotional wellbeing” school systems in the United Kingdom have become diverted by safety inspections and accident policies.

Gill (2007) has referred to concerns raised by the UK Education Select Committee regarding the unnecessarily detailed duplication of risk assessment practice in schools. This has had the effect of an overblown reaction, creating a sector that is heavily burdened by extreme bureaucracy and blame coupled with “a distorted perception of risk that is not supported by the facts” (Gill, 2007, p. 66).

The media is also heavily complicit in the rise of risk aversion in education by reinforcing the adoption of neoliberal governance structures. The backdrop to this circumstance is formed by a common and perhaps understandable overreaction in the past to some schools failing to perceive safety shortfalls (often through intense media coverage) by a number of small incidents.

The predictable result of educational institutions adopting the above array of neoliberal strategies is that the notion of risk in education has come to be “associated entirely with negative consequences rather than also with the potential to achieve something positive” (Nichols, 2000, p. 121).

Teachers as a Risk-Averse Cohort

A related, but lesser-known contributor to the rise of risk aversion in education is that of the ‘risk preferences’ of teachers themselves. Bowen, Buck, Deck, Mills, and Shuls (2015) compared the risk preferences of new teachers with people entering other professions, and found that “individuals choosing to teach are significantly more risk-averse” (p. 470), suggesting that “risk-averse individuals are sorting into teaching careers” (p. 472).

Drawing upon the work of Dohmen et al. (2011), risk preference is a personal underlying trait, and because teaching jobs are more likely to have tenure or civil service provisions, employment in education is more secure than employment in the private sector. “Public sector careers are likely appeal to individuals with greater propensities for risk aversion given the reduction in uncertainty even if the expected pay is lower” (Bowen, Buck, Deck, Mills, and Shuls, 2015, p. 471). In fact, other research has corroborated this hypothesis (e.g. Bellante & Link, 1981; Hartog, Ferrer-i-Carbonell, & Jonker, 2002; Masclat, Colombier, Denant Boemont, & Lohéac, 2009). Their results showed “that those who opt to pursue teaching careers are more risk-averse than those pursuing careers in business or law and that this finding is not simply attributed to the teaching profession disproportionately attracting female employees” (Bowen et al., 2015, p. 478). The implications of Bowen’s research for the pedagogical and learning reform choices teachers make is obvious, despite the fact that there will always be notable excep-

tions to any general characteristic. It is possible to change the context such that individuals can consciously choose to act independently from their underlying personality traits.

Consequences of Risk Aversion in Education

The unnecessarily risk-averse culture in education created by the above factors manifests a range of negative consequences for students, and influences the quality of learning experiences with which they are expected to engage. We feel the main argument that emerges from the above literature is that there is a need to regain some awareness of the other risks children face as a result of an overly cautious approach to physical risk in education. Rather than continuing to reinforce the current dominant narrow focus on physical risk, as teachers we need to be talking about a wide range of other risks, such as a lack of physical exercise; obesity; a lack of spontaneous play opportunities, and more importantly “reduced independent mobility resulting in a lack of a sense of connection to the local environment and community – a lack of a sense of place” (Tranter & Sharpe, 2007, p. 186). In other words, the current dominant concept of risk in education is myopic, and allows other types of risks to students to go unexamined. The next section outlines some of these consequences.

Disembodied Learning

Recent analysis in childhood studies indicates researchers have readily framed childhood as a social or cultural construct devoid of nature (Wattchow et al., 2014). White (2006, p. 295) has observed that the design of many contemporary playgrounds reflects a preoccupation with “surveillance of children, ease of maintenance and to have a break from the children”, with the result being barren childcare environments, “where there is neither shade, shelter nor opportunities to interact with[/as] nature”. Similarly, McKendrick, Bradford, and Fielder (2000, p. 295) have observed that because of particular attitudes towards risk, many playgrounds “provide primarily for the needs of adults (for themselves

and with respect to how they want their children to play), and, to a lesser extent, for the needs of children”.

Calling for a ‘sense of perspective’ in relation to risk management in wider social settings, Gill (2007, p. 78) cites a 1999 British Mental Health Foundation report, which warned that concerns about children’s safety (governments, parents, various pressure groups), have curtailed vital activities such as outside play and travelling alone on public transport, and have generally diminished the abilities of children to develop their own ‘coping mechanisms’ and ‘to do things their own way’. Tranter and Sharpe (2007, p. 186) have observed that well-meaning ‘stranger danger’ awareness campaigns have ironically had the collective impact of making “every child worse off, both in terms of traffic danger and stranger danger”.

The disembodiment of learning from the natural environment is especially concerning, given that the endeavour of education has its very roots in nature, where over 250 years ago Rousseau recognised nature as the child’s best teacher (Taylor, 2013). Caught in the current risk-averse milieu, many educational systems have forgotten these roots in the face of increasing litigation, and educational trends that marginalise the connectedness between nature and children [or children as nature]. This situation is common across many countries where schools, local education authorities and government departments have developed policies and procedures for individual protection purposes, rather than working collaboratively with the school community to mitigate risks in a more holistic and effective way (Hryshko, Luengo-Prado, & Sørensen, 2011; Jung, 2015; Owen, 2009).

How can learners develop, innovate and express themselves and their identity in nature-based settings when ‘risks’ are positioned as obstacles to nature-based learning opportunities? We argue such an approach disembodies the learning experience, by separating the learner from nature-based and design-based learning activities, thus risking the future of environmentalism, sustainable design enterprise and the planetary health of Earth.

It is not possible to separate learning from the contexts in which it takes place (Wattchow & Higgins, 2014, p. 174), and as a fundamental principle of socioecological learning, place-based education is key. Place-based education, where the students’ learning through their own learning

experiences and problem solving is activated, also enables teachers to fashion a “place-responsive pedagogy” (Wattchow et al., 2014, p. 215), vital for the development and nurturing of children and young peoples’ connections with/as environment, locality and community.

Disempowered Students

Children and young people need exposure to experiences involving scaffolded calculated risk-taking, as these experiences allow them to improve their “decision making and cope with the unexpected” (Department of Education, Employment and Work Relations, 2009). Without the basic skills of judgement, confidence, creativity and the capacity to embrace failure as a learning tool, young adults will “be a liability in any workplace if they do not have those basic skills to exercise judgment and take responsibility for themselves” (Hackitt, 2016, para 5).

Renaud Gaultier, an entrepreneur, artist and a designer, observed that innovation requires a culture of difference and risk taking, yet the one-size-fits-all approach to learning that results from risk-averse educational policy permeates western education systems from kindergarten through to university (Adieda, 2018). Gaultier discusses the ‘zero risk’ mentality of French educational institutions that has had the effect of penalising failure,

We’re often surprised at the difficulty of generating innovation but we’ve never done anything to reward being different and risk-taking, which are two fundamental aspects of innovation. In our education system today we find a ... culture where people’s ambitions are crimped, where we try to cut students down to size and bring them into line with all the others ... where everybody has to learn the same things and imbibe the same knowledge and yet at the end of the day find a way to differentiate him/herself (Adieda, 2018, para 1).

Phippen (2017) warns that secondary school culture has morphed into a cocooned world of cotton wool, eliminating failure in the learning process so as to avoid low self-esteem developing in students, rather than using failure as an opportunity to learn and grow. This cushioning effect feeds risk aversion in students, rather than offering learning experiences

that encompass “resilience and grit” (para 1) through real and imagined risk-related activities. Stanford (2010, p. 1068) claims that in many learning settings, fear and the “undermining of trust and the need to control have overtaken and undermined discussions about the creative impetus and courage required to take risks”. This fear and lack of trust permeates the design of many learning activities, especially those requiring teachers to take students “outside the gate, outside containers [schools]” (Bone, 2014, p. 132).

The consequences of students feeling disempowered to take the reins of their own learning process are long-term, and wide-ranging. Among the most concerning of these is the outcome described by Nichols (2000, p. 131) as an overall reduction in “the capacity of young people to take responsibility for themselves in situations that involve real risks”.

Vignettes: Risk Aversion and Negative Educational Outcomes

Many classroom teachers will have stories to tell of instances where a risk-averse bureaucracy effectively stifled a meaningful learning encounter with/as nature. The vignettes below are offered as practical illustrations of how the mechanisms and structures described above permeate schools, and impact upon student learning.

Vignette 1: Judith

In a situation experienced by the first author of this chapter, what should have been an opportune moment to see and touch some curriculum content in the real world became a bedraggled trudge to look at dirt in the rain:

My senior Geography class was learning about soil profiles and at one point during the lesson I had the great idea to have the students to observe a soil profile in a road cutting located 2–3 metres outside the school boundary. The five-minute walk across the school grounds did not require crossing any roads. However, in order to gain permission for the students to undertake the walk, I was required to fill out five different forms, as the walk was technically an ‘excursion’ outside

the property of the school. I had to seek school executive approval via Risk Assessment paperwork, secure signed parental permissions and source a first aid kit, sun protection and protective clothing. Not to be deterred, and for the sake of the students I persisted, following all the administrative requirements. Two weeks later, when the necessary paperwork was signed by all parties, the students were eventually permitted to walk down to the soil profile. The problem was that with the inexorable march of the curriculum, the class was now well past thinking about soil profiles, and had moved on to another subject! Given the amount of time and paperwork involved, to cancel would have been a waste of time, so I dutifully marched the class down to the location (now in the rain), where the excitement of seeing the soil profile was almost extinguished by the delay, the administration, and now also the weather. Are we having fun yet?

An institutional response to the above might be that ‘proper’ lesson planning would have avoided this situation had the teacher thought far enough ahead. However, this way of thinking does not take into account the nature of the teaching enterprise where ‘teachable moments’ can arise spontaneously and fortuitously, and then disappear just as quickly. Gill (2007, p. 83) asserts that teacher professional judgements should be informed rather than “undermined by draconian safety initiatives”, but in most school systems the latter dominates any trust that might be put in teacher judgement.

Vignette 2: Angela

My teaching expertise is in Design and Technologies. Students who study this subject (whether secondary students or pre-service teachers) are required to be technologically literate, and demonstrate self-understanding as human agents on designing and communicating creative and sustainable solutions to identified authentic problems and situations. To do this, I believe certain types of risk taking are vital for sustaining stimulating imagination and intellectual development. By providing the learner with access to the mental tools based on the principles of socio-ecological learning, a space can be opened up where calculated decisions can be informed by ethics, values, justice and democracy (Keirl, 2006). Thus the touchstone of ‘common worlds’ is mutually inclusive of human agency –

where students think for themselves and in turn shape their own experiential learning through trial and error learning experiences.

This vignette demonstrates a commonly shared teaching preference toward direct instruction by many teachers, rather than encouraging design through experiential learning where knowledge is created through the transformation of experience (Kolb, 1984):

Design and Technologies in NSW, Australia is a discipline learning area across Years 7–12. The subject largely draws on the concept of environmental sustainability, which is embedded across all disciplines as a cross-curriculum priority. Ideally, my subject calls for higher order thinking skills, focused on real world problem solving scenarios, coupled with creativity, innovation and calculated risk taking. However, the subject is constrained in the junior years by over-scaffolded teaching approaches that draw on a formulaic, step-by-step approach. Design in the real world of designers is iterative in nature and where ‘risk taking’ is aligned with, if not necessary for, creative approaches to design. However, the risk is often seen as too high for the school teacher to manage individual and very different design projects, so it is more manageable for the teacher if students all ‘make’ the same project. The only glimmer of design autonomy many students have is to add their own logo design to, for example, a small wooden box, a fabric pencil case, an apron or a pair of boxer shorts. These are common projects across most NSW secondary schools that aim to ensure students do not ‘fail’. However, because most students have not been exposed to an authentic design process, or experienced learning through a trial and error approach, these projects ironically set the students up for failure in the senior years where they are expected to demonstrate individuality, innovation and enterprise in project work (a core syllabus rationale).

Both of the above scenarios offer an example of the different ways the learner can be ‘bound’ by conventional understandings of the learning process and classroom management. The first showed how excessive administrative requirements could kill the spontaneity of the ‘teachable moment’, and the second showed how the reality of actually delivering a curriculum contradicts the discipline rhetoric that appears in the syllabus. Below we examine the shifts in educators’ thinking that may be necessary to challenge such conventional understandings of socioecological learning and learners.

Where to from Here with Risk?

We have argued from the perspective of ‘risk’ and ‘risk-aversion’ in schools in Western minority nations. What we are proposing in this context is that a shift is necessary from one of individual responsibility to one of communal responsibility, especially in relation to accountability for the learning process. We are aware that the risks children and young people face in majority nations are far more acute, such as “war; poverty; displacement; access to food and water. These things threaten the very lives of millions of children around the world” (Gill, 2007, p. 23). Such a reality notwithstanding, the effects of risk-averse educational systems on students in developed countries still merits thoughtful exploration.

We suggest that the risk-averse position of schools can be dialectically transposed as an unexamined ontological privileging of physical over intellectual risk. It curtails the intellectual development of students on the basis that the physical risk to the student is unacceptable. This assumption needs to be re-examined. There is no such thing as a learning experience that is completely devoid of risk. In fact, some element of risk is a necessary precondition to learning. Educators need to understand that physical risk is not the only sort of risk that exists when considering socioecological learners and learning. Being unaware of the very real risk of not engaging in certain learning experiences, can itself become an unacceptable risk.

Ironically, we are not arguing for risk in education to be ignored or minimised. Instead, we are advocating for an *expanded* definition of risk to be applied to the field of education in order to avoid other significant risks going unexamined. As an antidote to the narrowly-defined economic rationalist definition of risk in education, we echo Nichols’ (2000, p. 123) call to consider Priest’s definition of risk in education as “the potential to lose something of value” (Priest, 1991, p. 115). The loss may lead to harm that is physical (e.g. broken bones), mental (e.g. psychological fear), social (e.g. peer embarrassment) or financial (e.g. loss of equipment). This more nuanced, multifaceted notion of risk that we are arguing for is a reclamation of the other, less-emphasised facets of risk.

Students flourish when opportunities are provided for scaffolded risk-taking through the provision of safe intellectual and physical spaces (Vyas & Napoli, 2015). Such spaces act as enablers rather than constraints to socioecological learning. This approach supports students' capacity-building associated with emotional and social wellbeing, and the attendant resilience and cognitive growth as well as the motivation that these attributes bring. Learning settings that encourage a measure of mitigated risk provide opportunities for students to "communicate with others, persevere through challenging tasks and take ownership of their learning" (Vyas & Napoli, p. 28). Furthermore, they demonstrate that challenging, yet safe experiences build the learner's cognitive capacity for the bigger challenges to come or that have already arrived; viz. the Anthropocene. Little and Sweller (2015) note that learning experiences in life nurture a student's place in the world, and how to interact with others through our senses. Our interpretations from those experiences determine our values and shape how we think. Kolb (1984) explored the association between feelings and emotion that students bring with them in the learning activity, for example, personal values, free and informed choice and internal commitment. He viewed these attributes as a part of the learning cycle. However, where there are barriers to learning contexts, factors may inhibit learning and a learner's ability to reflect rationally with the view to learn from the experience (Boud, Cohen, & Walker, 1996).

We also urge teachers to take risks in their teaching practice if their practice is to expand. Such expansion includes recognising individuals as unique and thus pedagogy can expand around this belief (Koh, Yeo, & Hung, 2015). This approach has profound social, economic and personal benefits given there are risks to the social fabric, to social cohesiveness and to economic activity if large numbers of people are, or feel, disconnected and alienated.

Embracing the risky business of teaching and learning means being able to provide and be provided with flexible yet scaffolded boundaries (Pearson Inc., 2011). It means the ability to conceptualise and apply ideas to unfamiliar settings and flatten boundaries through collaborative problem solving. Such desirable skills also include the ability to identify and exploit cross-knowledge or cross-domain patterns, also known as transfer and abstraction skills (Australian Government Department

Education Science Training, 2003; Fee & Seemann, 2002; Kenway, Bullen, Fahey, & Robb, 2006).

As educators, we need to find better ways to encourage children and young people to confidently connect with their communities and environments, to take 'safe risks' through exercising their judgement about a range of matters and situations (Iveson, 2008; Malone, 2007; Morrow, 2001). Moreover, Iveson (2006, p. 107) proposed that a belief system has been constructed around children and young people in terms of their 'protection' and 'preparation', portraying them as "citizens in waiting". Tranter and Sharpe (2007, p. 191) also express concern about this and predict that, "if we continue to see children as consumers and trophies, or as vulnerable and incompetent", then there will continue to be 'negative outcomes' for children. They argue that children should be theorised as, "competent beings and capable social agents", capable of making "creative 'functional' contributions within environments". James, Jenks, and Prout (1998) also argue that the views of children ought to be listened to, insisting that they are capable social actors in their own right.

A concerning and fundamental misalignment is emerging between the 'risks' schools are trying to ameliorate, and the real risks many students encounter in their wider lived reality (Katyal, 2012). As a result, there is a need for educators and parents to push back against the risk-averse forces characterising bureaucratic policies and procedures, and instead embrace more experiential learning experiences across different discipline and real world contexts. The notion of 'experiential learning' as a critical relationship between physical learning experiences and the mind has been well documented (Owen, 2009). It was Dewey (1938) who hypothesised knowledge was not passive, but perceived through interaction and experimentation using the method of science and ethical, reflective thinking. He argued that the organism (human) interacts with the environment (world) through self-guided activity where sensory and motor responses are assimilated. In this way, it is acknowledged that children and young people are indeed part of nature and the world. For educators this may mean that we need to develop an "explicit philosophy, ethos or set of values about the role of risk, (and) experiential learning and autonomy in children's lives" (Gill, 2007, p. 74), and thereby shift the focus from "adults' duty of care to children's agency" (p. 84).

Whatever direction taken, the current reality that many older students are now navigating between two learning worlds ought not be ignored. They create one learning world for themselves through their own lived experiences and go through the motions to comply with institutionalised conceptions of what education should be in the other world, involving school-based accreditation and compliance (Katyal, 2012). The existence of these two contrasting learning worlds indicates there is a significant disconnect between what students are interested in and want to learn about, and what the educational institution thinks they need to know. We suggest responses such as McAuliffe and Winter's "academagoc" approach have potential here, as they seek to ensure students engage in authentic learning by offering "more deliberate and meaningful learning experiences and opportunities, where students can see the connections between new material and their own experiences and real world applications" (McAuliffe & Winter, 2014, p. 165).

It is precisely this powerful connection that mainstream educational systems are neglecting as they try to ameliorate perceived institutional risks. Too often there is a dissonance between what is important for students and conversely what the school requires of them. The potential risks presented to students' learning via the existence of these two disconnected worlds is far greater than many of the risks schools are trying to address with layer after layer of policy and practice based on 'risk assessment'.

What Can Be Gained from an Expanded Concept of Risk in Education?

Beneficial outcomes for learners can be met in powerful and meaningful ways by deliberately building in scaffolded risk-taking in learning settings, but perhaps we need to first ask ourselves how much we trust our students to take safe risks and make good judgements. Indeed, how much power are we willing as educators, to actually share with our students? (Wattchow et al., 2014).

A completely risk-proof curriculum creates unengaged and passive citizens, an outcome that carries with it negative 'welfare' and 'consumption'

connotations. Children and young people need the freedom, confidence and capability to be able to nurture risk taking in learning settings so as to expose them to, and to learn through failure. In this way we can promote the development of resilience and the agency necessary for making good judgements and a purpose around choice making, as Gill (2007) puts it, “resilience means finding ways to function in a world in which bad things happen” (p. 83).

While the current risk preoccupation persists, the risk-averse stance that accompanies learning activities carried out both within and outside school grounds will continue to negatively impact on designing creative and engaged learning outcomes for students. The difference between the dominant approach to risk, and the one we are arguing for, is that one sees risk as a cancer to be cut out and eliminated completely, while the other sees risk as a necessary generative mechanism for meaningful learning, where there are clear and explicit connections made for the learner between their daily lives and aspirations, and the curriculum.

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5

“It is not a question of either/or, but of ‘and ... and’”: *The Socioecological Learner as Learner-Teacher-Researcher*

William E. Boyd

Abstract Conventional roles and responsibilities of the learner have placed the learner in a singular position within a hierarchy of authority and power – as the passive recipient of learning, of being taught. The socioecological learner, however, holds a special position in relation to this convention, a position mediated through a socioecological approach to understanding the world. A socioecological model provides a multi-dimensional perspective on social and ecological systems, in which interconnectedness, flow of energy and materials, linkages, relationships and feedback play central roles. It follows that the roles and responsibilities of the learner should reflect such an ecology. The demands of the Anthropocene – both as global crisis and as opportunity – present an

Braidotti (2017, p. 88)

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urgent need to shift the relationships between the currently siloed hierarchical, socially constructed categories of ‘learner’, ‘teacher’ and ‘researcher’. The emergence of posthumanism provides stimulus that unsettle these conventions. The category of ‘socioecological learner’ challenges long-held presumptions around relationships between teacher, researcher, learner, participant, knowledge and data. An alternative vision is one of a post-modern and posthuman future, a future in which a milieu-contextualised shift of learner to learner-teacher-researcher encompasses a crucial shift from learner-as-human-in-society to learner-as-posthuman-in-zoe.

Keywords Socioecological learner • Posthumanism • Anthropocene • Common worlds • Milieux

Introduction

In their overview of environmental learning, Rickson, Lundholm, and Hopwood (2009, p. 98) identify a significant role for the learner as “active agents in environmental learning situations” (p. 98). Learners, they argue, “play a significant role in shaping the process of environmental learning ... [as] powerful filterers of environmental content and tasks in terms of what they attended to, what they saw as relevant, what they ruled in and out, what they did, how they did it”. The significance of such observations lies in drawing attention to “the importance of what students bring to the learning situation in terms of ideas, preferences, interests, value positions, emotional concerns and viewpoints ... [which] all play out within the learning process through a range of in-the-moment judgments students make about the relationships between themselves, their peers, their teachers, subject matter, task and learning outcomes” (Rickson et al., 2009, p. 98). Here, matters of learner agency, authority, tension of authority, and relationship building are alerted to.

More poetically, Kassem (2011) notes the role of nature as teacher, alerting the need for learner and teacher to be as one, to foster a symbiotic nature of the learner-teacher. “Learn from animals [other-than-human] for they are there to teach you the way of life,” she encourages, “There is a wealth of knowledge that is openly accessible in nature. ... Much of

human behavior can be explained by watching the wild beasts around us. They are constantly teaching us things about ourselves and the way of the universe, but most people are too blind to watch and listen." In an oft-quoted poem, Munia Khan (2018) expresses this need thus:

Let my toes teach the shore
how to feel a tranquil life
through the wetness of sands.

This chapter – and indeed the entire book – commences, therefore, from an urgent need: a radical de-imagining and re-imagining in what it is to be a learner. Conventional roles and responsibilities of the 'learner', however, have placed the learner in a singular position within a hierarchy of authority and power. This position is as the recipient of learning, often in the passive role or mode of being taught. To follow the leads of Rickson et al. (2009), Kassem (2011) and Khan (2018), for example, a clearing is needed, a de-imagining, and an unsettling of this conventional singular role of the learner. The socioecological learner offers a way forward, holding a potentially special, and expanded, position in relation to this convention. The socioecological learner's position is one mediated through the nature of a socioecological approach to understanding the world, one in which the learner's toes may "teach the shore ... through the wetness of sands". A socioecological model provides a multi-dimensional perspective on social and ecological systems – and most importantly on our engagement with them – one in which properties of interconnectedness, flows of energy and materials, linkages, feedback, relationships, and agency play central roles. It is a perspective borne of Deleuze and Guattari's (1987) concept of milieux, the relational and energised aesthetic of the interior-exterior-middle, of the flow of energy, of the inter-relatedness of everything, and of the potential for constant growth and change, in which learning is all encompassing and ceases to be pedagogically – and disciplinarily – bound. In practical terms, it is one mirroring Rickson et al.'s observations. Importantly, it is a perspective that allows a meaningful and combined intellectual-behavioural response to the urgent demands of the Anthropocene. How might the ground be cleared to

make way for a significant change in the relationships between humans, nonhumans, the world and the zoe¹?

In this chapter, possibilities for progressing to a situation that may provide meaningful and genuine agency to the socioecological learner are examined. While the chapter is positioned within a contemporary context of shifting intellectual and sociocultural power, authority and ownership of knowledge, its ultimate destination is a posthuman future, in which the binaries of human-nature, adult-child, person-animal, public-private, for example, are rendered obsolete. It is a future in which the concept of milieu asserts its relational self as an honest framework for a productive response to the Anthropocene. It is a future of real, continuing and experiential learning, by all parts of the world, located in the interstitial space (Bhabha, 1994) that is the Anthropocene world. This chapter, therefore, represents a first few stumbling steps towards a world that is, simultaneously, learner, teacher and researcher (Fig. 5.1).

Before commencing on an exploration of potential paths towards a socioecological learner, it is helpful to ask about the need to explore such possibilities. The important springboard is the Anthropocene. The Anthropocene is a redefining of a conventional geological framing of time, place and space, a recognition of the central role of human agency as geological process. It has, despite potential ambiguities (for example, is it simply a scalar widening or “a breakup of conventional frames and relations” (Clark, 2015, p. 1)?) stimulated a raft of critical responses. It is, in its simplest incarnation, a critical threshold concept (Clark, 2015). As such, it demands responses, and it is receiving responses. They range from such understatements as, “given the state of the planet, human-centred approaches ... may not be enough” (Ulmer, 2017, p. 833), to more provocative comments that, for example, science educators need to build “anti-hegemonic bridges over cultural divides that arise from different ways of attending to the world” (Aikenhead & Ogawa, 2007, pp. 586–587). Claims of order of magnitude change, however, seem more apposite. Braidotti (2017) suggests an urgent need for ‘qualitatively new discourses’. In doing so, she draws attention to “the urgency of the Anthropocene condition, which I read ... as being environmentally,

¹ Zoe is viewed as the dynamic, animating life force of the whole universe effectively decentering bios (Braidotti, 2017).



Fig. 5.1 Opportunities for de-learning learning – the Anthropocene; Man bites dog. What are the possibilities of mutual learning? Is it too late? Clockwise – tree of life, human-nonhuman mutuality; in the embrace of nature; fallen gods; tension and revitalisation (Cambodia, 1999; images by Boyd. Reproduced with permission)

socioeconomically, and affectively and psychically unprecedented... [in which] the exacerbation of economic and social inequalities ... makes for a multifaceted and conflict-ridden situation” (p. 84). In Bauman’s (2007) view, the emerging world has become a “hotbed of uncertainties” (p. 1), as it shifts from solidity to liquidity, as power and politics separate and divorce, and, amongst other key changes, responsibility for resolving matters shifts to individuals.

The Anthropocene may, in short, be viewed as a changing world in which established order and social structures are breaking down. This situation is becoming known as the posthuman condition (Ulmer, 2017), one in which the primacy of ‘Man’ [sic] is set aside, in which agency of environment and the global system as a unitary entity is revalidated, and in which critical thinking is essential. It is an intellectual environment of new thinking that does not “coincide with the traditional humanities’ disciplines but are rather hybrid crossover formations” (Braidotti, 2017, p. 84). It demands changing roles for the teacher, learner and researcher. Knowledge remains power, but the locus of that power has shifted significantly, from a singular, bounded centre to an all-pervading and eternally fluid presence. In short, the learner becomes intimately bound up with, and inseparable from, the teacher, the researcher, and knowledge itself.

The posthuman condition takes many potential shapes – it seeks to understand the world through experience, acknowledging that “phenomena are multiple, subjective, and produced from a series of complex relations ... moving away from empirical models of science ... towards material ways of thinking and being” (Ulmer, 2017, p. 839) (see Fig. 5.2). It stimulates what, in another setting, Denzin (2006) describes as, “a methodology of the heart, a form that listens to the heart, knowing that “stories are the truths that won’t stand still” ... [from which] in writing from the heart, we learn to love, to forgive, to heal, and to move forward” (p. 422).

Such possibilities have a long tradition; the late 19th Century writings of anarchist geographers such as Kropotkin and Reclus, for example, talked of symbiotic relations between people, plants and animals, and of relational notions of the commons (Springer, 2016), or common worlds. The anarchist vision was one of an essential foundation of non-centralist,



Fig. 5.2 Opportunities for de-learning learning – posthumanism. What is it to be human? What of the others? Who are the teachers, who are the learners? Is there any learning happening? Top – queuing. Middle – power beyond human; international mango travel; human serenity; robotic dinosaurs; here be dragons. Bottom – guarding the future? (China, 2012; images by Boyd. Reproduced with permission)

non-empire geography. While the majority of 20th Century geographers hung onto the coattails of the empire, a minority maintained a discipline that would sit comfortably within a postmodern critique.

Considerations of human relations with animals (read ‘domination over’) may also be recast to “guide a more moral, ethical and responsible perspective of [for example] leisure interactions with wild animals” articulating a “depth of concern for the welfare of [wild animals] *in their own terms, not human terms*” (Yerbury & Boyd, 2018, p. 8; Yerbury, Boyd, Lloyd, & Brooks, 2017, p. 11; emphasis added). Readings of prehistory may also veer away from the hegemonic fetish of human power, the centre and authority, and the inevitability of social progress and conflict with/

against environment. It may, for example, more productively reflect on “the landscape as a fundamentally socio-environmental construct, in which potentialities emerge, are expressed, and may be influential in changes in social and/or environmental behaviour” (Boyd & Chang, 2010, p. 291).

Whichever perspective one takes, both the Anthropocene and posthumanist turns demand that society must “decenter the role of humans altogether”, as a matter of urgency (Ulmer, 2017, p. 836). This chapter explores decentering of the teacher, learner and researcher, as a process towards recentring the learner-teacher-researcher. The intention is to advance towards to a nascent and potentially posthuman socioecological perspective. In short: what would a socioecological learner, or more likely, the socioecological learner-teacher-researcher, look like?

Learner as Teacher

Despite an apparent dominance of the concept of learner as merely being the recipient of learning – characterised sometimes as, for example, learners being defective communicators, with whom communication is merely information transfer from one head to another (Firth & Wagner, 1997) – it does not take long in any examination of the ways in which the categories of ‘teacher’ and ‘learner’ may be conceptualised to recognise a wide diversity of inter-related identities. De Guerrero and Villamil (2002), for example, in their socioecological exploration of metaphorical conceptualizations of teacher and learner and of teaching and learning, record nine metaphors for ‘teacher’. These are: “co-operative leader, provider of knowledge, challenger/agent of change, nurturer, innovator, provider of tools, artist, repairer, gym instructor” (p. 95). Importantly, these align with an equally diverse array of socio-cultural constructs of ‘learner’, inhabitants of the learner milieu, the “field of relational potentials and decisive actualisations” described in Chap. 1 (this collection) as: active participant; recipient of knowledge; object of change; developing organism; resistor; constructor; raw material; defective individual; and gymnast. In concluding their study, De Guerrero and Villamil (2002) make the following important statement:

[The] teachers' mental framework is socio-culturally constructed and affected by popular metaphorical beliefs ... [C]onceptual metaphors for [the] teacher ... entailed views of the ... learner and the teaching/learning processes ... Teachers were most frequently represented in the classical roles of leader, provider of knowledge, agent of change, nurturer and artist, whereas learners were conceived in a range of roles, from the most active (player, musician, constructor) to the least active (TV viewer, piece of clay). ... [T]eaching appeared as a multifaceted activity which involves guiding and assisting; providing knowledge, tools, or opportunities; bringing about change; fostering development; moulding and correcting behavior; and keeping abreast of new methods. Learning ..., in turn, was seen from multiple perspectives: as information or input processing; practice; being moulded, guided, and corrected; and constructing ... knowledge. (pp. 113–114)

To be true to the socioecological nature of this perspective, it follows that the roles and responsibilities of the learner should also reflect such a social ecology. The consequence of such an argument is that there is an urgent need for a shift in the relationships between the related, but formerly hierarchical socially constructed categories of 'learner' and 'teacher', and of other related knowledge categories, notably 'researcher' and 'expert'. In unsettling these conventions, the emergent category of 'socioecological learner' challenges long-held presumptions around the relationships between teacher, researcher, learner, participant, knowledge and data. It begs questions around ownership and authority of voice, knowledge, decision-making, and, ultimately, the purpose of scholarly research and teaching: it unsettles the flow and directionality of learning and teaching.

This chapter will explore later this unsettling environment through the lens of the child as researcher. However, to get there, the discussion commences from a consideration of the roles of the 'learner'. What are the conventions of what a learner is? In parallel to, for example, De Guerrero and Villamil's work, the relevance of learners as absorbers of knowledge might be explored, as developing mastery of skills and principles, as passive or active agents, as apprentices, and so on. In doing so, a re-evaluation of understandings of the roles of the teacher is called for, again, questioning the conventions of what a teacher is: instructor, facilitator,

mentor, guide, didactic instructor, etc. In doing so, the focus now shifts to the learner as a socioecological learner. There is, therefore, a need for an exploration of the rhetoric of ‘learning/teacher centred’ and ‘student-centred’ education, learning, and so on. Has the field come further than Farrington’s (1991) claim that there is more rhetoric than reality in student-centred learning? Yes, although the environment is challenging and that – in keeping with the socioecological ethics – is expressed in a diversity of interrelated ways.

The challenge lies in many dimensions. Are educators, for example, situating themselves on a bi-polar scale, being forced to select a position of one or the other of teacher – and learner – centredness? Are they transitioning from one to the/an other? Are they able to accommodate more than one position? Are they creating something new? Are they prepared to move from “either/or to and ... and”, as challenged by Braidotti (2017, p. 88)? The implications are profound, and they echo discussions around the broader, but not unrelated, consideration of disciplinarity. Jensenius (2012), for example, defines key modes of disciplinarity as follow. Parallels with modes of learning are clear. The following should not be read as a commentary in disciplinarity *per se*, but as a reminder of the breadth and complexity of the milieu in which learning resides – and are appended by the author to Jensenius’ definitions.

- *Intradisciplinary: Working within a single discipline.* For teaching and learning, teaching within one tradition only, and, probably, resisting the validity of others. The outcome is a reinforcement of tradition. It remains a claim from the centre; the learner’s social and intellectual boundaries are solid and immutable.
- *Crossdisciplinary: Viewing one discipline from the perspective of another.* For teaching and learning, evaluation of one tradition from within another, that is, not against the other’s own rules, concepts or terms. The outcome is the maintenance of tradition, with some opportunity for the advancement of a new or evolving tradition. It remains, however, a predominantly solid reassertion of the centre and the resistance of progress. The learner may gain a glimpse of the other, but only on the centre’s terms.

- *Multidisciplinary: People from different disciplines working together, each drawing on their disciplinary knowledge.* For teaching and learning, allowing an educational system with multiple or parallel modes of delivery. This might be viewed as an elementary mode of socioecological education, in that the recognition of 'other' provides opportunity for diversity in the educational approach. The dominant assumption, however, remains that of the centre. The learner may be allowed to be more collaborative or cooperative, but only within the rules.
- *Interdisciplinary: Integrating knowledge and methods from different disciplines, using a real synthesis of approaches.* For teaching and learning, this mode provides for integrated, multi-method approaches, requiring a balancing act, and acknowledging tensions in roles, responsibilities and authorities. This is further down the path to true socioecological education, and allows for potentially respectful and productive debate and discussion. The centres are fading, while the potential for an integrative whole emerges. The risk is the rise of a new centre. The role of the learner may be able to expand as boundaries diffuse.
- *Transdisciplinary: Creating a unity of intellectual frameworks beyond the disciplinary perspectives.* For teaching and learning, this implies a new, fully integrated mode of education, in which authority and power does not need to be contested or balanced, but is shared in a singular enterprise. The possibility of a postmodernist or, even, posthumanist assertion of authority from the whole – rather than the centre – is strong. Boundaries around the learner may dissolve as responsibility replaces authority.

This approach – touching on the milieu of learning – to understanding the potential for the socioecological learner can be further examined by consideration of disciplines as knowledge systems. In a series of papers examining multidisciplinary, interdisciplinary and transdisciplinarity in health research, services, education and policy, Choi and Pak (2006, 2007, 2008) provide important insights. These are directly relevant to a critique of the nature of the knowledge systems from which the socioecological learner emerges. To reinforce Jensenius' differentiations, Choi and Pak (2006) note that:

... the common words for multidisciplinary, interdisciplinary and transdisciplinary are additive, interactive, and holistic, respectively... (Thus) multidisciplinary draws on knowledge from different disciplines but stays within their boundaries. Interdisciplinarity analyzes, synthesizes and harmonizes links between disciplines into a coordinated and coherent whole. Transdisciplinarity integrates the natural, social and health sciences in a humanities context, and transcends their boundaries. (p. 351)

Of course, the world, posthuman or otherwise, is never clean cut: Jensenius himself says he is not clear on how to distinguish interdisciplinary and transdisciplinary, and Choi and Pak's description of transdisciplinary looks similar to Jensenius' notion of interdisciplinary. Nevertheless, the important lesson is that modes of disciplinarity – the (admittedly modernist) structures by which society orders and enacts knowledge – have the capacity to shift, and for boundaries to expand and dissolve, relationships with knowledge *per se* to migrate, and the degrees to which power, authority and responsibility may express themselves is malleable. This provides hope.

Braidotti (2017) notes, significantly, the “multilayered structure of power [read disciplinarity beyond, and possibly even including intradisciplinarity]: it is not a question of either/or, but of ‘and ... and’” (p. 88). She continues, usefully, to traverse further along the disciplinarity path: “whichever approach we may prefer ... the defining feature of the post-humanities ... is their *supradisciplinary* character” (emphasis added). In her argument, she is considering posthumanism as a complexity of “classical disciplines plus the transdisciplinary studies areas, plus ... over-coding flows of [many socio-personal conditions].” In short, complexity is the norm. Importantly, for a posthuman future, the disciplines, and all that they imply regarding knowledge, learning, and teaching become increasingly subordinate to the real world. The common worlds take over.

The point of this diversion into disciplinarity is not to promote a specific disciplinary structural constraint upon the socioecological learner, but to point to a context of liberation, the possibility of a learner-as-teacher having the freedom to pursue knowledge, as Ulmer characterises it (2017), “situated, material, interconnected, processual and affirmative” (p. 836). The Anthropocene setting of such a knowl-

edge agenda and the practical contingencies that it demands – disciplinary freedom or, rather, freedom from discipline – provides and demands an understanding of “how bodies are ethically and politically situated within material environments” (Ulmer, 2017, p. 837). It is clear that they are also, at present, disciplinarily-situated, and hence there is still a need to have all the disciplinary options on hand to enact and effect such situatedness.

Returning, however, to a world, posthuman or otherwise, requiring action, turning back to Choi and Pak is useful. They conclude that, “if a multiple disciplinarity is called for, eight strategies to enhance multiple disciplinary teamwork ... can be summarized in the acronym TEAMWORK – Team, Enthusiasm, Accessibility, Motivation, Workplace, Objectives, Role, Kinship” (Choi & Pak, 2007, p. E224). Such a focus on the social dimension of the enterprise is important, and reflects strongly on notions of the socioecological learner.

Finally, Choi and Pak (2008) note the importance of practitioners understanding their epistemological position, while noting the potential for disciplines with greater epistemological distance between them providing the potential to achieve new insight to a situation. The role of such disciplinary distance lends hope to the possibility of the learner emerging as teacher – Braidotti’s supradisciplinarity (2017) offers the ultimate post-human disciplinary distance, lifting the learner-teacher to a higher plane. A supradisciplinary stance liberates inclusion, allowing the de-coupling of the divisive distinctions between human societies and natural environment, so required of a socioecological learning environment, advocated by proponents of Latour’s common worlds (Common Worlds, 2015; Latour, 2004). It allows the uncommon events common to everyday life to be included as normalities, to be not marginalised and extra-disciplinary, and therefore to be potential points of significant learning (see Fig. 5.3).

How might this translate into educational terms? Returning to the concept of student-centred learning, but adding to it the concepts of multiple disciplinary approaches, should educators be building educational practices and models of, for example, the learner-led classroom, the autonomous learner, the teacher as a lifelong learner, or student peer mentoring (See for example Betts, Kapushion, & Carey, 2016; Copley & Dave, 2014; Gilboy, Heinerichs, & Pazzaglia, 2015; Terrion & Leonard, 2007)?



Fig. 5.3 Opportunities for de-learning learning – Common Worlds; decoupling human societies and natural environments. Uncommon moments for common world insights. Doorways to new learnings? Top – Patagonia as expected. Middle – framing the coast differently; free flying – flying free; power; resource depletion depleted. Bottom – ecohut; the future of history past; why?; metal reeds. (Chile, 2017; images by Boyd. Reproduced with permission)

Before exploring such practice territory, however, it is instructive to return to the broader picture. An admittedly slightly old study at an Australian university provides interesting insights into the complexities and practicalities of adopting and transitioning to multiple-discipline approaches to education. Carpenter and Tait (2001), in testing claims of the student-centred and innovative nature of teaching and learning at their university, identified four key concepts and processes that help create a landscape which the socioecological learner may inhabit. First, they note that student-centred learning is “neither an historic inevitability nor theoretically problematic” (p. 191). This suggests that any transition to a ‘student-centred’ approach needs to be considered and actively engaged.

Secondly, Carpenter and Tait (2001) note the tendency, at least at their university, for progressive approaches to remain discipline-content based, regardless of any espoused progressive teaching philosophy. While it may be considered that things may have changed in the almost two decades since this finding, it seems unlikely. Most education systems, at whatever level, remain tied strongly to the disciplines. The emerging K-10 Australian curriculum (2018), for example, resists true inter- or transdisciplinarity. The New South Wales state education authority, BOSTES (now known as NESAs), while lauding cross-curriculum priorities such as creativity or intercultural understanding, Aboriginal and Torres Strait Islander history and cultures, and an understanding of Asia, concludes that "it cannot be overstated that in [New South Wales], learning is organised into subject disciplines, [and that] BOSTES does not endorse general capabilities and cross-curriculum perspectives as frames for delivery of mandatory curriculum content and outcomes" (Anon, 2014, p. 15). The empire strikes back, and a 21st Century curriculum looks remarkably 20th Century modernist.

Carpenter and Tait (2001) furthermore noted that 'progressive' approaches appear to be better suited to some disciplines than others, while, lastly, noting the risk that increasing technology in teaching – a move deemed and lauded across the education sector as progressive – often reinforces traditional modes. While the latter situation *may* have changed since 2001, the implications of these observations again lie in the need to be aware of the complexities of teaching-learning systems, reinforcing Choi and Pak's (2008) attention to the importance of practitioners understanding their epistemological position. Interestingly, as early as 1988, Fay was drawing attention to a then lack of awareness of processes and ideologies of the "conversion of 'traditional' to 'open'" (p. 3). Despite the reactive tone of his article, Fay does draw attention to the crucial identity of student-centred learning, that it should be focussed on human interactions and driven by the principle of interdependence – as opposed to independence – in learning. The parallels with Choi and Pak's (2007) TEAMWORK model are clear.

Such an approach is expressed in a variety of ways throughout the literature, providing colour to a case for a growing socioecological learner and their environment. Lea, Stephenson, and Troy (2003), in advocating

an ‘outside in’ approach to education where learners’ expectations are researched and serviced, noted that students are generally positive towards student-centred learning, despite concerns about whether the institutions can deliver. This may reflect an understanding of student-centred learning as a humanist agenda, possibly not well suited to conventional institutional structures. Tangney (2014), for example, highlights a “more holistic conception of student-centred learning ... [which includes] ideas such as personal self growth, consciousness raising and empowerment” (p. 266), while McCabe and O’Connor (2014) draw attention to the pragmatic process that, as students take more responsibility for their learning, the system relies on teachers’ “professional confidence to ‘let-go’ of traditional teaching responsibilities” (p. 350). Whether a posthumanist awareness or letting-go would, in these latter examples, be accepted, remains a moot point.

Is it, however, as simple as the teacher ‘letting go’? Or, as simple as shifting from a discipline-centred curriculum to some more ‘progressive’ or humanistic approach to content? Fay’s early (1988) attention to the principle of interdependence in learning suggests not. An exploration of the relationships between teacher- and student-centred learning environments (Elen, Clarebout, Léonard, & Lowyck, 2007), likewise suggests not, and usefully identified three core relationships. They called these the ‘balanced view’, the ‘transactional view’ and the ‘independent view’. The balanced view posits an inverted relationship between teacher- and student-centred approaches – the more of one, the less of the other. This results in a commonly-held view about the shift in roles and responsibilities, especially when emphasising the need for students to be active, that may cause uncertainty amongst educators (Fullan, 2001). As Elen et al. (2007) state, “Because in this literature student-centred and teacher-centred learning environments are portrayed as the opposite poles of a continuum ... the teacher may get the impression that the introduction of more student-centred learning environments implies a reduction of their own responsibilities and roles” (p. 114). Students are “claimed to be their own teachers, must select learning goals, select appropriate support, and monitor and assess their own learning ... result[ing] in the denial of the role of the teacher” (*op. cit.*). Such is the nature of modernist thinking

and the power of the concept of a singular authority; here rests a victory of “either-or” over “and ... and”.

In contrast, the other views, described by Elen et al. (2007) as being less radical, appear to provide a more constructive way forward. The transactional view, focusing on learning as an active and constructive process, emphasises the continuous mutual adaptation of the teachers’ and learners’ responsibilities and tasks. Alternatively, the independent view identifies the teachers’ and learners’ roles as being clearly distinguished; this acknowledges that both parties have distinctly different but complementary roles. As Elen et al. (2007) describe this, “the students’ role [is] to actively engage in learning processes ... [whereas] the teachers’ role [is] to actively engage in supporting that learning” (p. 108). They elaborate thus: “This implies that changes in the tasks and students’ responsibilities do not affect the nature of teachers’ tasks and responsibilities but only alter the nature of their interventions” (*op. cit.*). “And ... and” is becoming a possibility.

Learner as Researcher

The exchange of scientific information was institutionalised in the 1660s with the establishment of the Philosophical Transactions of the Royal Society of London ... accessible only to elites ... [while] the notion of collaboration amongst scientists does not seem to have taken hold until the 1800s ... (Hampton et al., 2015, p. 2)

Thus Hampton et al. (2015) introduce the history of science. Hampton et al.’s focus, however, is not on the past, but on the future, at a time of fundamental shift in research. That fundamental shift is in thinking, from “I own the data” to “I collect and share the data on behalf of the scientific community and society” (p. 6). Such a shift is, in Hampton et al.’s view “essential to the transparency and reproducibility of the open science framework” (p. 6).

Hampton et al.’s vision, however, is not unique. There have been, are, and will continue to be, significant shifts in the nature of science and its practice, otherwise known as ‘research’. These have taken many directions. The practices of action research, action learning and related practices emerged in the

1980s and 1990s as a collective of modes of research and enquiry represented a significant shift of power, authority and relationships between the academy and community (Greenwood & Levin, 1998; McNiff, Whitehead, & Laidlaw, 1992). They directly related to social and environmental change, and were designed to engage communities as equals, in facilitating communities to conduct their own research. Their relevance continues (Stevenson & Robottom, 2013). More recently, the growth of citizen science, the assertion of Indigenous science, the global relevance of postcolonial science and the exciting possibilities of poststructuralist research, for example, have forced a spotlight on the nature of power, authority, relationships and knowledge in the world of scholarly and scientific research (Boyd, 2014a, 2014b, 2016; Gough, 2013; Lowan-Trudeau, 2013; Shava, 2013).

Such emerging modes of research share one thing. They challenge conventional understandings of the concept of science and the sociocultural mores of scientific research. Citizen science, as “the co-ordinated engagement of volunteer citizens, usually amateur scientists or natural history enthusiasts, as observers, data collectors or analysts in large-scale observational or experimental research ... usually distributed throughout the community, [and] work[ing] as collaborators with researchers” (Boyd, 2014a, p. 98), calls into question the traditions of the expert authority of highly and conventionally trained scientists who may be considered the guardians of scholarly and technical research and expertise. It equally places demands on researchers to reconsider their roles and responsibilities in relation to the public they are (generally) employed to serve, especially in acknowledging the capacity of non-experts to observe, record, synthesise and analyse complex socioecological information. Indigenous science extends this critique of, and challenge to, conventional scientific research. In acknowledging long-established intellectual traditions outside the conventions of Western minority science, it not only places scholarly research into the hands of those formally considered unqualified as scientific authorities, but simultaneously shifts the core epistemology of science and its purpose in society. Boyd (2014b) summarises these significant shifts as follows:

Indigenist research is a form of social enquiry based on the principles and philosophies of indigenous peoples, adopted by indigenous people and designed to be conducted by indigenous people within their own commu-

nities. Its primary purpose is to allow indigenous people to represent their worlds in ways they can only do for themselves, using their own processes to express experiences, realities and understandings that are unique to indigenous society, history and culture. It achieves this purpose by drawing on indigenous philosophical understandings of the world and places itself against what is seen as an imposed (Western) view that does not acknowledge indigenous ontology and epistemology. It is an inherently political activity that critiques the assumptions of colonial constructions and understandings of indigenous society and culture. (p. 429)

The required change in thinking around research is eloquently articulated by Verran (2002), in describing what she calls the 'postcolonial moment':

Postcolonial moments are made where disparate knowledge traditions abut and abrade, enmeshed, indeed often stick fast, in power relations characteristic of colonizing, where sciences usually line up on the side of the rich and powerful. Postcolonial moments interrupt those power relations, redistributing authority in hope of transformed contexts for the exercise of power. A postcolonial moment is not about retrieving a lost purity by overthrowing and uprooting an alien knowledge tradition. Rather, it might effect an opening up and loosening. Increasing possibilities for cooperation while respecting difference, postcolonial moments can lead to making amends for past injustice. Elaborating a postcolonial moment involves both making separations, and connecting by identifying sameness. (p. 730)

There are four key lessons from this brief history of the evolution of research: (i) collaboration in research can expand beyond the established authorities and experts; (ii) people other than those in position of conventional power are able and capable of conducting intellectual and scholarly research; (iii) shifts in power and authority are political and will threaten the *status quo* and the establishment; and (iv) the emergence of new epistemologies and ontologies of research magnifies the capacity for intellectual and scholarly research to contribute to socioecological wellbeing and advancement.

These lessons demand an overcoming of what Jickling and Wals (2013) call "normativity anxiety" (p. 73). Part of this overcoming may be articulated through a nexus of learning and researching, perhaps in parallel to the emerging teaching-research nexus practiced at universities (Boyd

et al., 2010, 2012). If the logical trajectories implied by the socioecological roles of action research, citizen science, Indigenous and postcolonial science, and poststructuralist research are to be followed, then an emergence and merge of the learner as researcher makes sense. That sense may be articulated in what Cutter-Mackenzie-Knowles et al., in the opening chapter of this collection, refer to as a flat ontology, an ontology that “ensures that learners (and all the materials, spaces, environments, histories [etc.]) are acknowledged and engaged”. Greenwood (2013), in a slightly different context, argues for a “critical pedagogy of place [that] proposes the twin aims of decolonization and reinhabitation as inquiry-oriented entry points into identifying and shaping place relations” (p. 99). Greenwood’s context is the exploration of “the dynamic connections between place, geography, culture, and education ... to envisage a liveable future that is authentically integrated with its past”. This seems to be a significant socioecological agenda. Decolonization and reinhabitation are not, Greenwood posits, just political goals. They are educational – in the sense of living and learning – goals. As Greenwood (*op. cit.*) concludes:

What needs to be restored, maintained, transformed, or remembered is ... as much a project of self-discovery as ... of discovery of place. The point of a critical, place-conscious education is to discover/recover/reconstruct self in relation to place. Learning to listen to this complex relationship of self and other, human and nonhuman, is the ultimate educational challenge. (p. 99)

Into this landscape logically steps the learner as researcher. Research has a long tradition as a pedagogical tool, with, for example inquiry-, problem- and project-based learning modes being common from the earliest school experience through to the loftiest university education (e.g. Kolmos & de Graaff, 2014; Lazonder & Harmsen, 2016). Given the line of argument so far, it will come as little surprise that potential issues will be posited concerning the evolving role of the learner as researcher. This move will be unsettling, notably for all the implication in its transfer of authority: the shift of power, control and authority from adult to junior, adolescent, child; the shift of status for the student from apprentice to master; the acknowledgement of the student as expert rather than necessarily novice; the unsettling moment from singular authority to shared or communal authority.

None of these shifts are, however, new. All have been rehearsed in the contexts of citizen science, Indigenous science, postcolonial science and poststructuralist research. As Gough (2013) concludes, poststructuralist research aligned with a partnership ethic is fundamentally concerned with liberating nature and people. Gough's goal is "to work towards a socially-just, environmentally sustainable world" (Merchant, 1996, p. 222), and in working towards this, she channels Foucault's (1990) exhortation that it is time to stop trying "from the outside, to dictate to others, to tell them where their truth is and how to find it" (p. 9). "By engaging in feminist and poststructuralist research in environmental education," she concludes, "we can come closer to achieving this goal, because we will have less partial and less distorted stories" (p. 381). In adopting such an agenda, a decolonization and reinhabitation of research would also challenge the role of knowledge, posing queries over multiple identities of knowledge: as received, authoritative, and emergent; as fact, process, and principle; as pure, applied, pragmatic, scholarly; and so on.

This returns us to the beginning, the concept of 'socioecological'. What purpose does research serve (Boyd, 2009): scholarship, conceptual, technical, social, community engagement, activism, political? Whatever purpose is selected, it is clear that culture intersects all the major stages of research. The researcher needs, therefore, to be fully aware of the socio-cultural context of the research through every step of the research, and actively make decisions that result in what Hughes, Seidman, and Williams (1993) term "a culturally anchored methodology that balances the demands for rigor and sensitivity" (p. 687). 'Rigour and sensitivity', in cultural terms, demands a full engagement in research. The learner as researcher ceases, in this context, to be merely the 'observed', the 'object', the 'participant' or the 'informant'. The learner is the observer, aware to the potentials of the common and uncommon moments, sensitive to the milieux in which the learning is living (see Fig. 5.4). Such redefinition represents what Stevenson and Robottom (2013) describe as the "imperative of active authentic participation ... [and] of relational practice ... where learning is valued ... and relationships of trust, openness, and transparency are established" (p. 476).



Fig. 5.4 Opportunities for de-learning learning – creative milieus: uncommon friends. Unexpected synergies. Clockwise – Hawai'i expected i.; Hawai'i expected ii.; bamboo forest singing trees; uncommon danger; local totem; Kauai rooster – global visitor; coffee art. Centre - intersecting worlds (Hawai'i 2017; images by Boyd. Reproduced with permission)

Formalising the Socioecological Learner as Expert: "Toward Young Children as Active Researchers"

Green's (2015) critical review of methodologies and methods in early childhood environmental education provides valuable insight to the practicalities around the types of shifts recognised in this chapter. With a focus on a movement towards the young child becoming an active researcher (Barratt Hacking, Cutter-Mackenzie, & Barratt, 2013), Green (2015) outlines an environment of scholarship in transition. Barratt Hacking et al. (2013) note that this topic has received limited attention to date, and consequently throw out a challenge to environmental education researchers to "further consider, discuss and critique children's roles in research ... [and focus on] the potential of children as collaborators in research rather than objects of investigation or discussion" (p. 456). Barratt Hacking et al. provide a solid basis for this challenge to be taken up, and reflect the recognised need, identified a decade or so previously, for "re-theorisations of identities and power as fractured, dynamic and contextual ... [to support] developing empowering research relations [by] involv[ing] negotiating [research moments] in ways that contest, or transform, dominant societal relations between children and adults" (Holt, 2004, p. 13). The need is to move from research that is "influenced and constrained by expectations placed upon adult and child practices in society and institutional spaces, and by researchers' own unconscious reproduction of dominant identities" (*op. cit.*). There is now little excuse for "unconscious reproduction of dominant identities".

Green's (2015) review is predicated on a continuum, articulated in full by Barratt Hacking et al. (2013), from "traditional, research *on* children approaches, to alternative, research *with* or *by* children designs" (p. 209, emphasis in the original). Research *on* children, Green argues, is predicated on objective measures of child behaviour, in which adults become the "primary interpreters of children's physiological patterns and psychological behaviours as they progress through developmental stages towards adulthood" (p. 209). As such, children are considered vulnerable, in need of protection, and incapable of understanding, and the researcher

consequently avoids risks. Research *with* children is more likely to acknowledge children as contributors. While they are, however, more likely to be listened to, what they do and have to say remains mediated, interpreted and reported by “adult interpretations and understandings” (Barratt Hacking et al., 2013, p. 439). The research is predominantly adult-led, albeit with potential or real, if usually only partial, collaboration with children. The children are identified as being able to express themselves and capable of making social contribution. Finally, research *by* children respects the children as “competent social actors” (Green, 2015, p. 210), who are engaged as researcher or co-researchers. They may lead the inquiry, holding positions of responsibility, and playing significant roles in the design, implementation and reporting of the research. Researchers (i.e. adult researchers) still, however, debate issues of ethics around such a role.

While this continuum reflects positively on the trends in learning and research canvassed in this chapter, Green’s (2015) critical review identified that most research runs under quantitative design “informed on positivist research *on* children approaches” (p. 213). Setting aside the diversity of qualitative research methods done on children, Green notes a small number of examples in which research was conducted *with* children, and one that tended towards research *by* children:

Eleven of these qualitative studies embraced participatory research *with* children frameworks, informed by acknowledging children’s participatory rights ...; engaging children in environmental design ...; and holistic learning approaches focussing on relationships and dialogue between researchers, children, teachers, and community members Alternatively, Caiman and Lundegård (2014) sought to understand the agency of young children by completely removing the researcher from data collection. (Green, 2015, p. 216)

What might research *by* children look like? Green (2015, p. 214) notes that methods “are framed around honouring children’s agency”. They cite Caiman and Lundegård’s study (2014) as the example of trying – note, trying – to remove the researcher from data collection. The study involved four- to five-year-old children, in one case with the teacher present, and

in a later case without the teacher. The methodology was qualitative, and comprised video-recording sequences of the children's behaviour, children's conversations with each other and with teachers, and children's drawings and representations. The focus is on agency (e.g. Bandura, 2001). The cases involved children anticipating problems around plant growth and a conflicting environmental decision. The first case required the children to make "several choices and in relation to a number of problems that emerge along the *course of action* ... [and find] a suitable solution for protecting growing peas from possible downpour [that] can be characterised as contingent, explorative and open" (Caiman & Lundegård, 2014, p. 453). The teacher's role was to reiterate the children's statements and provide positive value judgement, thus reinforcing and supporting the children's anticipations and expectations. The second case engaged the children in anticipating and "bringing energy into a problem concerning birds and a disturbing working-place" (Caiman & Lundegård, 2014, p. 454). In this case, however, the problems escalate and deepen as the children are confronted with a conflict of interest: on the one hand, they receive new bicycle stands, while, the other, the noise scares away the birds. They "solve the problem by removing the nest to a quieter and more suitable place and in that way *fulfil* the event ... a process [that] can too be characterized as contingent, explorative and open" (p. 454, emphasis in the original). In other words, they are commencing an engagement with common worlds, the "hybridised collective understanding of nature-culture" (Cutter-Mackenzie-Knowles et al., Chap. 1 in this collection), learning to eschew what Taylor (2013) describes as "exclusive choices between the assumed-to-be-purely-natural or the assumed-to-be-purely cultural" (p. xix). The curious juxtaposition between making decisions on behalf of bicycles and on behalf of birds generates a flow of consciousness and an energy of engagement previously absent. Caiman and Lundegård (2014) close with a valuable observation that applies more broadly to the matter of research *by* children:

By receptiveness and attentiveness towards the children's anticipations, the choices they live through and the aesthetic value judgments they bestow upon, it became possible for us to show how agency was constituted. [W]e want to recall Dewey's discussion about the vital force in having an

experience. This requires highlighting the value of giving children multiple opportunities to experience situations where they are in the power of the entire process. The achievement of ‘agency for change’ is something that children explore and constitute together in close relation to the environment. This dynamic movement is also an experience, which teachers and researchers if they practice the ‘ethics of an encounter’ ... carefully might be invited to. (p. 455)

Green (2015) revisits Caiman and Lundegård’s “value of giving children multiple opportunities to experience situations where they are in the power of the entire process”, drawing attention to a key methodological matter, in her case, with regards to research *with* children, the need for alternative forms of verbal communication. Green notes a range of possibilities, including: less formal conversations, peer-to-peer interactions, group discussions, verbal and non-verbal modes, walking tours, talking-while-doing, walking interviews, representational options, including drawings, maps, photographs and other artistic forms. These provide for what Gambino, Davis, and Rowntree (2009) call “mutual commentary and flow of ideas, while still obtaining individual standpoints” (p. 85).

So, to paraphrase Green, what might a full embrace of research *by* children look like? Green’s response is to identify four key issues around child-centred research: child assent; child positioning; data interpretation; removing the researcher. The latter two matters have been introduced above. It remains here to consider issues of ethics and assent, and of the positioning of children.

In terms of child assent, Green notes that a few researchers are developing appropriate protocols for obtaining assent from children. Spriggs’ (2010) guidelines for understanding consent in research involving children makes it clear that there is not a problem *per se* about obtaining assent from children for research that may involve them. Indeed, Spriggs’ approach indicates that, in spite of a popular ‘normativity anxiety’ around child consent and assent – commonly a view that children are incapable of providing informed consent or assent – some children can actually provide consent. Others can provide assent. While the term ‘assent’ is not used formally in the Australian human research ethics world, it is used elsewhere to define “affirmative agreement to participate ... [which] gives recognition to the

role for children that lies between no involvement in discussions and full decisional authority" (Spriggs, 2010, p. 7). While not fully reflecting the ethos of research *by* children, this does open possibilities for an increasing level of decision-making by children in research. Green (2015) notes the growing experience of researchers in child-friendly protocols, including various verbal modes and use of alternative narratives.

More recently, Spriggs and Gillam (2017) reviewed ethical complexities in what they call 'child co-research' – they define the child co-researcher as "participating in a study or is a peer of the participant population [and] ... actively collect[ing] data from other participants (their peers)" (p. 6). They note a diversity of definitions and conceptions of 'child co-research'. These again reflect contemporary normative anxieties, and reinforce the view posited above that shifts in power are intellectually political (or politically intellectual), and that they will threaten the *status quo* and the establishment. Having said this, Spriggs and Gillam (2017, pp. 9–10) raise six 'ethical complexities' whose discussion may contribute to a real move towards genuine research *by* children: (i) taking advantage of children's relationships/networks; (ii) children co-researchers gaining access to knowledge they would not otherwise have about people in their network; (iii) child co-researchers pressuring participants to take part; (iv) participants pressuring child co-researchers; (v) child co-researchers' exposure to distressing information; and (vi) possible burdens for child co-researchers. These, of course, are all adult issues or complexities. Spriggs and Gillam make suggestions on how to address these challenges, commenting on the provision of support and careful guidance, and the need for training as, for example, an "efficient way to prepare co-researchers before they interview their peers" (p. 11). Much more importantly, Spriggs and Gillam call for (non-child) researchers to be reflexive. Willumsen, Hugaas, and Studsrød (2014) note that the level of reflexivity in child co-research varies from high to nil, that some researchers appear to take child co-research for granted and read it as simply being a good thing. Such researchers, Willumsen et al. observe, require more ethical awareness due to the inherent risk of exploiting the child as a co-author.

This brings us to a final point: child positioning (and therefore adult positioning): "Power differences between adults and children are one of the biggest ethical challenges for researchers seeking to include children

in research” (Graham, Powell, Taylor, Anderson, & Fitzgerald, 2013, p. 41). Child positioning in research is, according to Green (2015), complex. “Positioning children to act on environmental sustainability issues”, states Green, “means something different from engaging children in research design, implementation, and data analysis. The former represents most researchers’ current philosophy, and the latter represents the philosophy some researchers are moving toward” (p. 224). She discusses an example of research which attempts to create a whole-of-center project with children, staff, and families working together on local water conservation issues, reflecting the particular early childhood center’s ethos as being “child-centered, holistic, and future-oriented where rights, respect, and trust permeate the culture and curriculum” (Davis, 2005, p. 48). While not devaluing this initiative, especially noting the importance of this work in terms of fostering relationships of respect and healthy relationships within the community as a means to moving towards a sustainable future, Green (2015) notes the crucial absence of children as active agents in the research process. She notes that while children play a significant role in this and other work, other participatory studies are designed similarly, “representing children’s action for sustainability, but not necessarily children’s actions related to the research design” (p. 225).

From ‘Socio-’ and ‘-Ecological’ to ‘Socioecological’: From ‘Learner’ and ‘Teacher’ and ‘Researcher’ to ‘Learner-Teacher-Researcher’

Change is afoot. The Anthropocentric turn at de-scaling/re-scaling and de-centring/re-centring of human-environment relationships, and the potential escape from disciplinary constraints, and hence unsettling of normative power arrangements that are implicit in the posthumanist embraces of transdisciplinarity and hybridity of thinking and doing, both demand a refreshment of the concepts of teacher, learner and researcher. By harnessing the eccentricities thrown up by the Anthropocene, by post-

humanity, the uncommon moments embraced by common worlds, and by the ebb and flow of milieu as an organising framework, it is possible to let the world become a teacher, to let the learner become the world. What, if we look around, can the experience of Cambodia, China, Chile and Hawai'i (for example – see Figs. 5.1, 5.2, 5.3, and 5.4) tell us about unsettling, being human and becoming posthuman, decoupling and recoupling, harnessing flow and energy?

This chapter has taken a step-wise approach to probing the question of what the Anthropocentric or posthumanist socioecological learner or learner-teacher-researcher might look like. Such probing is likely, at present, to better represent a contemporary sociocultural endeavour perhaps better framed by postmodern, postcolonial, poststructuralist or other approach to sociocultural critique. The threshold over which we [as humans] need to step is an inherent conceptual one, a potential tripwire: as introduced in Chap. 1, there is need to clear the ground. This implies a process of re-learning or, perhaps more importantly and challengingly, de-learning: learning what it is to become part of the zoe, to become an integral part of the world's living matter, not as another, let alone a dominant, biological entity, but as something more, something more respectful of the rhythmic energies, movements, flows and synergies of the milieux that provide an empowering interpenetrating and integrating context for being human. In honouring Janz's (2001) observation of the possibilities of "reflective habits that show us for who we are [to] continually re-think our place in all its forms, reconfigure it to be adequate for the times" (p. 394), educators need to strive to become part the "geocentered process that interacts in complex ways with the technosocial, psychic, and natural environments and resists the overcoding by the profit principle (and the structural inequalities it entails)" that is the zoe (Braidotti, 2017, p. 87).

In the light of this need, Braidotti (2017) goes on to ask: "What is an embrained body and embodied brain capable of becoming?" (p. 91). To clear the ground to allow a truly socioecological learner-teacher-researcher to emerge, do we [as humans] yet have the capacity or the intellectual tools to de-humanise the human role? Snaza and Weaver's (2015) acknowledgement of the current impossibility of a meaningful 'saturation of humanism' is pertinent. In practical terms, therefore, this chapter accepts as a given, the concept of socioecological, its inherently problematic nature, and its equally

inherent core relationship with the posthumanist ethos. Complexity in such a truth claim sits comfortably within the milieu of multiple, multiplying and transcending disciplinarity implied as the cognitive landscape above. Accepting such an equation also authorises an acceptance of the contingent nature of the putative socioecological learner, and of the socioecological learner-teacher-researcher inhabiting a space of (simultaneously) tension and liberation. Importantly, such acceptance places the socioecological learner-teacher-researcher in a position of becoming a material embodiment of the dissembling of human dominance in education that is necessary for a clearing of the ground.

So, to practical matters: given the liquid nature of the emerging socioecological world, to borrow from Bauman (2007), how can a fluid socioecological framing be built that eschews development and systems as asserted by Cutter-Mackenzie-Knowles et al. in Chap. 1 (this collection)? This book suggests a pragmatic framing via three touchstone concepts: Anthropocene; Posthumanism; and Common Worlds as Creative Milieux.

To commence, an intellectual acknowledgement is needed that the worlds of learning, of teaching and of researching have relied heavily – and continue to do so – on a pre-Anthropocene construction of society and power. Learning, teaching and research have relied heavily on the conventions of the authority. These are: articulated as socially constructed norms; conceptualised into behaviour; and authorised and institutionalised through traditions of education, qualifications, rites of passage, rituals of recognition, identified through totemic labelling ('Dr', 'Professor', 'Scientist') and the social construction of categories such as 'learner', 'teacher' and 'researcher'. All are thoroughly adult constructs. Indeed, as Foucault might argue, all are fundamentally more imposing constructs, constructs of a larger (supra-learner/supra-child/supra-adult) agency – that is, modern society in its powerful entirety (Foucault, 1977; Gutting, 2005). Regardless of source, all are ultimately funnelled through a cult of expertise: the expert is all-powerful. The actions, behaviours, norms, language, rituals, all reflect the explicitly humanist and establishment expression and articulation of power.

There are, however, cracks in the system: collectives of scientists, for example, warn of "widespread misery and catastrophic biodiversity [requiring that] humanity must practice more environmentally sustain-

able alternatives to business as usual" (Ripple et al., 2017, p. 1028). While mainstream warnings are fine, they tend towards a modernist and humanist solution – more science, more science communication and more public acceptance of the science. These make logical sense where the Anthropocene is conceptualised as just another geological era. However, where the Anthropocene provides a vehicle for a radically reconsideration of the changing relationship between the human and the non-human (Braidotti, 2017), real change is possible. Other cracks are more encouraging of such real change – action research, citizen science, indigenous and postcolonial science, poststructural research, the “exuberant growth of posthuman knowledges” (Braidotti, 2017, p. 84). In these, the agency of the non-expert, and notably of the non-human, gains increasing recognition. Here the traction of posthumanism required to address the Anthropocene may be found. It is amongst these cracks that the roots of a truly socioecological learner-teacher-researcher will be found.

This chapter has explored implications around the ascendancy of the putative socioecological learner as a conventionally viewed non-expert, notably the child, as teacher and researcher. By unsettling such normative concepts of power, relationships and authority over knowledge, the category of ‘socioecological learner’ challenges conventions around the nature of knowledge and its ownership. Ironically, while there is an emerging, if slight, (adult) acknowledgement of shift, it is currently only critiqued from adult perspectives. The Anthropocene is yet to be engaged on its own terms. So-called issues, concerns or ethical complexities surrounding the growing role of the child in research *by* children, for example, still reflect the dominant (pre-Anthropocene) power relationships. They remain, in essence, adult issues, adult concerns and adult complexities. Worse, in Foucauldian terms, they remain social issues, social concerns and social complexities, in which social equality and equity is, and continues to be, trumped by social power and authority. The possibility of moving from this wicked problem – how to define a socioecological learner in post-pre-Anthropocene terms – may be remote. However, an alternative vision in which the real agency of the learner is acknowledged and respected, and a true integrative and transcendent transdisciplinarity emerges – perhaps a supradisciplinarity – may liberate teaching and research from the traditions of the academy. It will allow learners to

become socially engaged and relevant while maintaining intellectual rigour. It may even allow learners to recognise themselves as members of the zoe, smaller, and more equal, parts of a greater entity than humanity. This is a grand vision and, it is acknowledged, a significant challenge for the socioecological learner. In a rather gentle manner, Davies (2013) captures the challenge thus: “Learning to listen and moving beyond individualized, hierarchical, globe-making modes of identity is central ... to the specific demands of environmental education” (485).

This brings us to the second touchstone: posthumanism. Admittedly, this chapter has skirted around posthumanism. It is always present, but currently just out of reach, a desirable but (possibly) unobtainable chimaera. Implicit in the sociocultural critique provided here is a fundamental precept, a re-thinking of what it is to be human. This is not a biological question, but one of power and relationships, of identity and authority. In terms of an Anthropocentric socioecological learner, it is a question of questioning a traditional view of a human as an individual, separate from nature but romantically and functionally related to nature for human good. It is a question of embracing the notion that humans are not separate from nature, but are nature. However this is articulated, it demands that how learners learn and how teachers teach and how researchers research be de-assembled and be re-assembled. This chapter recounts putative steps towards a true posthumanist reassembly. For the moment, socioecological learning in the Anthropocene demands an awareness of human impact on nature – partially under way – and of human interconnection with non-human others, and of the interrelationship and consequence of human actions – just commencing.

Such awareness cannot thrive in the learning system that spawned the issues requiring such awareness. It demands a convergent human as a learner-teacher-researcher. And it demands a revision of the concepts and binaries of child/adult – another key questioning of what it is to be human. It demands a new syllabus, but must start with an ability – some would say a child’s ability – to observe the uncommon, the unexpected and the seemingly irrelevant, and to join some of the dots to understand a greater whole. It would be possible, for example, to understand our position [as humans] in the world better when the real world of Hawai’i (Fig. 5.4) provides evidence of our interrelatedness in warning signs of

the dangers of golf, in sticker art on national park signage, of roosters and bamboos invaders becoming local icons; or when the real world of Chile (Fig. 5.3) inhabits its public spaces with flying people, hanging strength, metal reeds. Or when queues of people in China huddle under umbrellas, protection emanates from stone lions and dragons, and mangoes travel on trolleys in international airports (Fig. 5.2).

This chapter has only gently ventured into the world of common worlds. This trajectory, however, should intersect with Taylor’s (2013) call for scholars to “pursue ways of studying childhood that do not require mutually exclusive choices between the assumed-to-be-purely-natural or the assumed-to-be-purely cultural” (p. xix). Polarity has little to do in a post-human world, and polarity is unlikely to play a useful role in the actions of a socioecological learner-teacher-researcher. In seeking to destabilise polarity, this chapter has drawn on an unexpected strength in the common world: the effect and import of the uncommon moment in revealing insight into a common world, for those who are able to see it, and especially for children and learners (Rousell & Cutter-Mackenzie-Knowles, 2019) – this provides a basis for a new syllabus. In contrast and in complement, the concept of creative milieux provide contextual relevance for the socioecological learner-teacher-researcher. As Cutter-Mackenzie-Knowles et al. note in Chap. 1 (this collection), it is important, in a socioecological world, to understand the “nexus or interpenetrating series of socioecological milieux [accounting for both] the external environment and atmosphere of “home”, [and] the internal states and biophysical responses ... condition[ing] the lived experience of relationality ...”.

While, likewise, the full implications of creative milieux are not explored in this chapter, the underlying current of a shifting biophysical, social, cultural and intellectual landscape emphasises the importance of a milieux-contextualised shift of learner to learner-teacher-researcher – the shift from learner-as-human-in-society to learner-as-posthuman-in-zoe demands an ability for flow and change, for contingency, for responsiveness and responsibility, and for what *can* be learnt and taught. It gives permission to dishonour boundaries, the merge the interior and the exterior, and to activate agency. It recalls Rickson et al.’s (2009) “active agents in environmental learning situations”; what might they look like? With apology to Rickson et al. (p. 98), the following draws on

their descriptions of their proto-socioecological learners, expanded with what may flow naturally in an Anthropocentric and/or posthumanist world:

Socioecological learners play a significant, unbounded role, with a responsibility to engage the world on its own terms, to be a shaper of learning, a filterer of content, a bringer of ideas, preferences, interests, value positions, emotional concerns and viewpoints to the learning situation, an experiencer of the world, embodying in-the-moment relationships between themselves, their world, peers, teachers, subject matter, task, learning outcomes, a solver of real problems and a member of the global – in the true sense – and Anthropocene community: to be a seamless learner-teacher-researcher.

In short, they will be, to paraphrase Munia Khan's poem, the learner whose toes will teach the shore how to feel a tranquil life through the wetness of sands.

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6

The Socioecological Learner in Big History: *Post-Anthropocene Imageries*

Marilyn Ahearn, Amy Cutter-Mackenzie-Knowles,
Brad Shipway, and Wendy Boyd

Abstract The purpose of this chapter is to critically examine socioecological learning within the context of the evolving scientific story of the universe through Big History. We orient the reader to an overview of Big History in the context of the post-Anthropocene. Big History promotes antidisciplinary boundaries, beyond siloing, to forge new connections within an increasingly complex universe. Incorporating the experiences of fifteen students, we represent their post-Anthropocene imaginaries revealing five distinct themes/concepts. These include: Big History is More-

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than-Human; Big History Metanarratives; Antidisciplinary Learning through Big History; Whole-systems and Worldviews in Big History; Agency and Possibility of Transformative Thinking in Big History.

Keywords Big History • Socioecological learning • Anthropocene • Post-Anthropocene • Whole systems • Antidisciplinary

Prologue *The emerging story of the universe*

Now, my dear Earthlings, make yourselves comfortable and let's begin at the very beginning.... (Morgan, 2002, n.p.)

And now ... this is what I want. I want my grandson Daniel...and his generation...to know the story of Big History...that they understand both the challenges ...and the opportunities that face us...at this threshold moment in the history of [this] beautiful planet. (Christian, 2011a, n.p.)

Introduction

The purpose of the chapter is to critically examine socioecological learning within the context of the evolving scientific story of the universe through the Big History Project (<https://school.bighistoryproject.com/bhplive>). The idea of Big History is that it seeks to explain the past, present and possibilities for the future. The Big History Project (2018) was originally designed for high school students. Table 6.1 presents a summary of the nine Big History thresholds, where thresholds are taken to mean: “the situation where conditions are just right for the creation of complexity...At each threshold...it's more difficult to create complexity” (Christian, 2011b, n.p.).

The final threshold of Big History is the ‘Future’ or what we coin Post-Anthropocene. The Anthropocene is the current geologic epoch, which has been caused by human activity and their anthropogenic impact on the planet. It is important to acknowledge that the International Commission on Stratigraphy has not yet defined it as a geologic era. However, there is overwhelming scientific evidence of the Anthropocene that is now widely supported across scientific and social science research communities (see Crutzen, 2006; Crutzen & Brauch, 2016; Taylor, 2017). Notwithstanding, understanding the Earth's history, its

Table 6.1 Big History thresholds. (Adapted from Big History Project, 2018, n.p.)

Big History thresholds	
Threshold	Description of each threshold
1 The Big Bang: Creation of the Universe – 13.8 Billion Years Ago (BYA)	Big History begins with the Big Bang, the current explanation for how the universe came to be. This view has been continuously shaped by theories built through new technologies and observations over thousands of years
2 Stars light up: Creation of stars – 13.6 (BYA)	The universe was a dark and cold place 200 million years after the Big Bang. Then stars emerged which were hot spots of light and energy which transformed the universe and set the stage for further change
3 New chemical elements: Creation of chemical elements in dying stars – 12.8 (BYA)	Scientists speculated that the heavens and earth were made up of a basic group of elements. Invisible to scientists was an ongoing, intense process of chemical production that resulted in almost everything around us
4 Earth and the solar system: Creation of planets and Earth – 4.5 (BYA)	Leftovers usually are not that interesting. However the leftovers that orbited the young Sun are another story: they formed all the planets in our Solar System. Earth had just the right conditions for amazing new developments to unfold over its dynamic 4.6 billion year history
5 Life on earth: Creation of life on Earth –3.8 (BYA)	What makes life so special? How did life emerge? And what explains the diversity of life on earth? We know that life is fragile in the face of gradual and sudden changes to the environment: Just ask the dinosaurs
6 Collective learning: Creation of our species –250,000 years ago	Humans are unusual. We all walk upright and build cities. We can invent medicines. Why can we do all these things that other creatures cannot do? The answer is in our ability to learn collectively
7 Agriculture: Creation of agriculture –11,000 years ago	If everyone had to survive as foragers there would not be enough to feed the Earth's 7 billion people. Farming sustains us and it is easy to assume that it has always existed, but it has not. Humans invented agriculture, paving the way for complex civilisations and altering our relationship with Earth

(continued)

Table 6.1 (continued)

Big History thresholds	
Threshold	Description of each threshold
8 <i>The modern revolution (the Anthropocene):</i> Creation of the modern revolution –since the industrial revolution	With the rise of global exchange and commerce, particularly in the 200 years since the start of the industrial revolution, collective learning has accelerated. Humans have gained control over much of the biosphere
9 <i>The future – Post-Anthropocene</i>	Big History is not finished. How does knowing so much about the past change the way we (as humans) think about the future? How might human innovation [or simplicity] ensure that we [as one of many species] continue to thrive?

deep time, is fundamental in socioecological learning as it allows for new post-Anthropocene thinking and imaginaries.

What might a post-Anthropocene world look like? In responding to this question, we represent fifteen children’s experiences of a Big History pedagogical intervention. Before doing so though, we discuss the scientific origin story in the context of Big History, education and socioecological learning. In this discussion we also consider the concept of antidisciplinary education and whole systems thinking. Thereafter we discuss the research methodology, before turning to the data representation.

Placing the Scientific Origin Story in Education and Socioecological Learning

It is one of the many odd features of modern society, that despite having access to more hard information than any earlier society, those in modern educational systems...teach about (our) origins in disconnected fragments. We seem incapable of offering a unified account of how things came to be in the way they are.
(Christian, 2011b, p. 2)

Crumley, Laparidou, Ramsey, and Rosen (2015) refer to deep-time as an “interdisciplinary perspective on the Anthropocene and signals the

importance of the Anthropocene concept in past, present, and future human-environmental relationships” (p. 1721). Concepts of deep-time are central to what is referred to as The Big History Project (Big History Project, 2015, 2018) which is defined as:

Big History examines our [collective multispecies] past, explains our present, and imagines our future. Big History is an interdisciplinary course that spans 13.8 billion years. It weaves insights from many disciplines to form a single story that helps us better understand people, civilizations, and how we are connected to everything around us. (Big History Project, 2018, n.p.)

Presenting a coherent metanarrative of the history of the universe, where the learner monitors and experiments with new knowledge in a non-disciplinary or antidisciplinary environment, gestures the learner towards a sense of awe and wonder. Big History though is not without its criticism and Big History as a closed narrative is challenged (Fleming, 2015; Jackson & Finn, 2015). Big History learning counteracts such criticism of closed narrative in its promotion of transience¹; the Big History narrative is presented within a state of impermanence or evolving change is a necessary underpinning of the interdisciplinary Big History Project (IBHA, 2012) where learning is ‘nested’ in nine thresholds (see Table 6.1), beginning with a scientific narrative about the beginning of the universe.

The extent that socioecological learning is permeated by a society’s historical metaphor, alongside values embedded in that culture’s story, impact worldviews (Beringer, 2007; Bowers, 2010, 2012). The deepest ‘metanarratives’ of a social group, as described by Bowers (e.g. that the environment is seen as a resource, not for its own intrinsic value), strongly influence the education of children (1994). We relate Bower’s thinking to Christian’s contemporary understanding of metanarrative in Big History, where “history and literature and biology and cosmology are not separate intellectual islands, but parts of a single, global, and interdisciplinary attempt to explain our [collective] world” (Christian, 2010, p. 25). In a

¹Selby (2006) argues “We are more likely to achieve the transformations that sustainability processes and goals require if we have a disposition that embraces transience in everything” (pp. 262–263).

deeply interconnected earth community that is searching for a deeper understanding of an evolving cosmos, the need for interdisciplinary methodology, concepts and skills is an essential prerequisite, where individual disciplines inform each other of past and present findings that in turn address future possibilities for learning.

We therefore argue that centring on the metanarrative/grand story would belie its integrity, if it were placed in silos of individual education disciplines. Rather, socioecological learning needs to be studied from an understanding of values in environmental education,² within a holistic, antidisciplinary perspective. Big History has built a framework of nine thresholds to teach the emerging new story, as outlined in the prologue. Christian (2011b) advocates “we need to move beyond the fragmented account of reality that has dominated scholarship (and served it well) for a century...to a grand unified story” (p. xx).

One definitive advantage of the Big History narrative is that it is not frozen in history but that it embraces current and future learning in that the story can and will change as more evidence and other ways of knowing become available. When introducing Big History to high school students, one crucial point Christian raises (Big History Project, 2014) is that Big History is the modern, scientific origin story, based on evidence that scientists and historians have compiled to date. As new evidence is found from interconnecting the knowledge and findings from a variety of disciplines, the story will need to be updated.

Antidisciplinary Approach and Big History

A socioecological learning framework affords collaboration across academic disciplines, attempting to break down discipline ‘silos’ that often pervade the climate of educational research (Wattchow et al., 2014,

²The Earth charter promotes a shared vision of basic values to provide an ethical foundation for the emerging world community. In its preamble the Charter endorses “a sustainable global society founded on respect for nature, universal human rights, economic justice, and a culture of peace. Towards this end, it is imperative that we, the peoples of Earth, declare our responsibility to one another, to the greater community of life, and to future generations” (Preamble, Earth Charter Commission, 2000).

p. 24). It is relevant to note here the terminology ‘silos’ is a common term in other scholarly work pertaining to the disciplinary nature of education (Christian, 2011a, 2011b; Leiserowitz & Fernandez, 2008; Lewis, 2012). Synthesis of interdisciplinary fields is complex, in that it transcends differences among those fields; therefore, within that integration, “a higher-order knowledge that is more than the sum of its parts” (Stein, Connell, & Gardner, 2008, p. 402) is required. This view of systems thinking is echoed in the Australian Education for Sustainability Alliance report as, “practices associated with comprehending and working rationally with complexity, uncertainty and risk, so that they can be managed effectively” (2014, p. 35). It relates directly to the thinking of Big History as preparing students, through interdisciplinary or what we call antidisciplinary, critical inquiry to deal with unknown futures of great complexity (Christian, 2011a),

One aspect of Big History that makes it stand out is its interdisciplinary approach and focus on collaboration. Big History challenges teachers to teach outside their comfort zone, learning and teaching with students rather than to them. (Macquarie University, 2012, n.p.)

Critical inquiry necessarily places values in environmental education within a broader holistic educational framing. Sterling (2011) has written widely on sustainable education from the educational perspective of the need for change that embraces, rather than isolates environmental education into its own disciplinary silo. Lieserowitz and Fernandez (2008) contend, from an environmental education stance, this is a necessary direction as “many researchers can no longer understand the breadth of their own discipline, much less how their discipline might intersect with others” (p. 20). They add credence to the argument of the need for transdisciplinary or antidisciplinary learning in their acknowledgement that holistic and systems perspectives are beginning to be viewed as important in the era of the Anthropocene, albeit that the funding is lacking (Leiserowitz & Fernandez, 2008). We contend that Big History embraces such a vision through applying “various disciplines to analyse, evaluate, and justify one’s own and others’ claims about the past and the present” (IBHA, 2012, p. 6).

Whole Systems Thinking and Worldviews in Big History

In exploring the socioecological learner, it is necessary to locate milieu and place, as outlined in Chap. 1 (this collection), within whole systems thinking and an expansive worldview. Such a broad view of education in local or macro environments requires a holistic educational approach, involving networks and relationships across a variety of disciplines (Laszlo & Krippner, 1998). This approach is guided by values inherent in environmental education to enable decision-making and the ability to act on that understanding (Laszlo & Krippner, 1998; Sterling, 2010; Stone, 2010).

An encompassing, inclusive perspective of curriculum reinforces the validity of adapting the secondary-based, interdisciplinary Big History Project (Big History Project, 2018; Christian & Gates, 2011; IBHA, 2012) to primary education. The Big History topic outcome of “one’s own place...one’s community and humanity as a whole”, locates the individual’s values within a worldview where the 13.8 billion year old metanarrative allows for reflection on how Big History is capable of framing the past, present, and future (IBHA, 2012, p. 6), encompassing human and nonhuman (or more-than-human) history, within thresholds of increasing complexity.

To overcome deeply entrenched anthropocentric, cultural paradigms, Sterling advocates a holistic vision of whole systems thinking, where there is a blending of both ecological views of the world and methodology of systems thinking. Such a blend results in “critical thought and a sense of connectedness, yielding what might be termed ‘systems as worldview’” (Sterling, 2003, p. 38). Benjamin (2009), believes that, in integrating studies to teach a ‘big’ history of the universe, allows the teacher to meet students where they currently are, taking into account both faith and non-faith backgrounds. The implications of learning within a local cultural setting are therefore imperative to education.

In the PhD research Ahearn undertook, the understanding of place from this perspective, necessarily meant embedding Big History learning within the Catholic ethos of a local school, alongside its identified

values of peace, respect, honesty, justice, empathy, compassion, tolerance and love. In this sense, the learner milieu of internal responses was opened up to being viewed in relation to the external place of local environment.

A wider worldview across disciplines is imperative for a dynamic and broader perspective of the importance of the learner in the local setting. A course in Big History, as suggested by Collins, Genet, and Christian, (2013, p. 224), could augment a student's knowledge of whole systems thinking, providing the student with an even stronger sense of the interconnectedness of all things in space and time, beginning from their local cultural milieu.

Agency and Possibility of Transformative Thinking in Big History

Sterling's visionary whole systems framework is an ideal lens for studying Big History with its three core themes of collective learning, thresholds of increased complexity and interconnectivity (IBHA, 2012, p. 4). The Big History scientific narrative is seen as one that is emerging with increasing complexity; therefore, students enact their agency to use their learning concepts from the past and present to analyse, and to ask critical inquiry questions about where the short history of humans' collective learning fits into 13.8 billion years old universe's history. An ecological paradigm challenges how future needs of Earth "will be met with limited natural resources, and what role (they) and their peers (will) play in shaping the future" (IBHA, 2012, p. 10). The open and critical learning from Big History demonstrates Sterling's call for ongoing critical analysis to allow for changing paradigms to occur in learning and therefore student worldviews where needed. Paradigm shifts occur when a belief not only informs but also transforms how we (as socioecological learners) perceive whole systems and worldviews. This is Christian's concept for Big History in action (2011a, 2011b; IBHA, 2012).

Both socioecological and whole systems approaches call for a broader worldview of environmental education, situated within an inclusive educational model. 'Possibility' in transformative thinking in Big History

needs emphasis here, in that students will not automatically develop agency (Christian, 2011b; Sterling, 2011). In addressing this issue, Wattachow et al. (2014) call for a holistic framework in education that encourages agency, while providing “participants with the opportunity to critique and examine how the various layers of the socioecological framework constrain and enable agency more broadly” (p. 39). Sterling (2003), although writing at an earlier date, is conscious of needing a whole systems view from a “socioecological context” and suggests, “that the participation and full engagement of the learner is essential to transformative change” (p. 329). Inquiry learning, agency and participation underpin socioecological learning for critical thinkers, for a post-Anthropocene world.

Research Methodology

The research presented is derived from Ahearn’s PhD (supervised by Cutter-Mackenzie-Knowles and Shipway). The research involved an anti-disciplinary Big History pedagogical action research intervention, over 17 weeks in a single classroom (15 8–9 year old children) at a local Catholic Sydney primary school. The data collection and data analysis were carried out in three phases as represented in Table 6.2.

The participants (co-researchers) invited to partake in this study were primary aged children, approximately eight to ten years of age, in a Year Three class. The ratio of boys to girls was reasonably distributed across a class size of approximately thirty students. They participated in a 17-week inquiry-based approach to the Big History Project in their usual classroom setting with their classroom teacher and Ahearn as teachers and joint participants in the learning and research process (Loffland, Snow, Anderson, & Loffland, 2006; McNiff & Whitehead, 2010, Ch. 6).

The chosen school setting was a city based Independent Catholic primary school where the Sydney Catholic Education Office Religious Education curriculum is taught alongside the New South Wales, Board of Studies Australian Curriculum (ACARA, 2014; Catholic Education Office: Sydney, 2012, 2013a, 2013b).

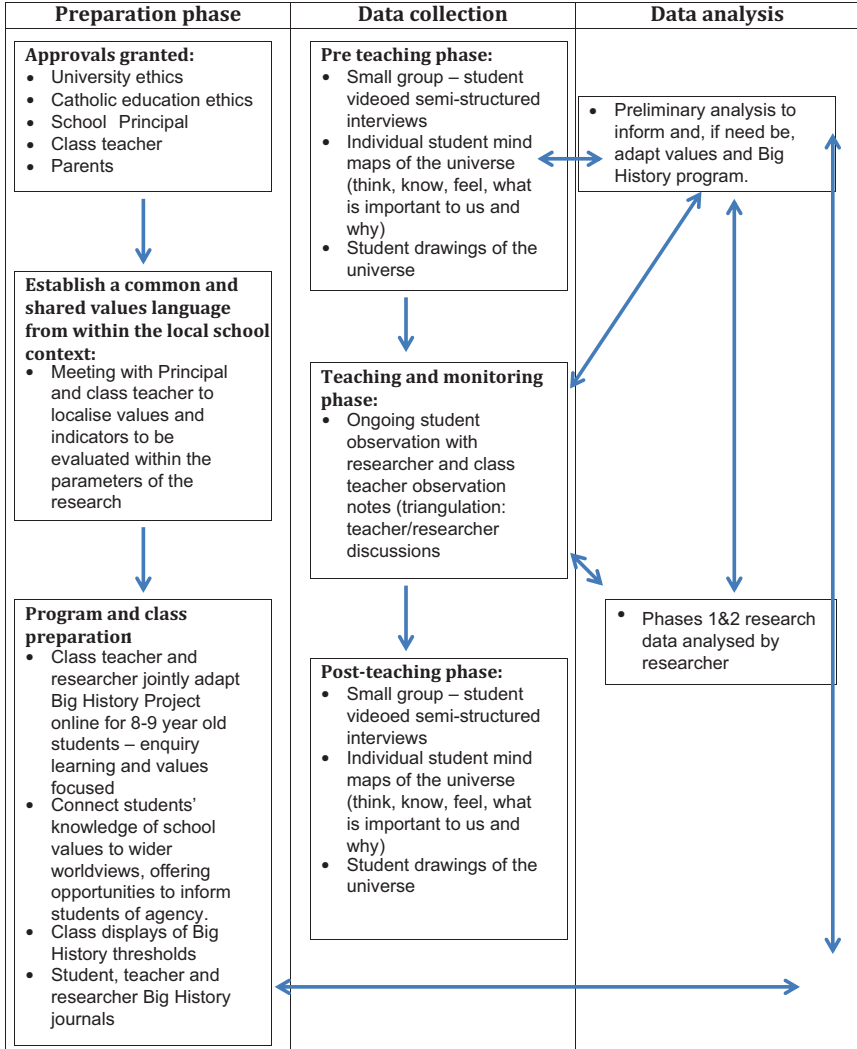


Table 6.2 Big History pedagogical intervention data collection and analysis phases

The methods applied for collecting the data consisted of:

- Pre-pedagogical semi-structured video recorded small group interview;
- Observations and student written comments from a 17-week interdisciplinary and transdisciplinary class-based pedagogical teaching intervention;
- Ongoing researcher journal, recording both children and teacher co-researcher observations and recommendations;
- Four semi-structured recorded small group interviews during the pedagogical intervention;
- Post-pedagogical semi-structured small group interviews, followed by a written assessment at the conclusion of the pedagogical intervention; and
- A post-pedagogical semi-structured recorded co-researcher teacher interview at the conclusion of the pedagogical intervention.

An inductive approach to data analysis was applied where emerging themes in the interviews and pedagogical intervention materialised allowing for the possibilities of new storylines and imaginaries. Through this process five themes or concepts emerged. The concepts were treated as part of a unified structure, thus enabling us to “connect different codes [concepts] with larger wholes ... a conceptual web” (Miles, Huberman, & Saldana, 2014, pp. 84–85).

Post-Anthropocene Imaginaries

The data generated from Ahearn’s doctoral thesis is extensive. What we represent here are the children’s and classroom teacher’s collective post-Anthropocene imaginaries. We do so across five themes or imaginaries, namely (1) Big History is More-than-Human; (2) Big History Metanarratives; (3) Antidisciplinary Learning through Big History; (4) Whole-systems and Worldviews in Big History; and (5) Agency and Possibility of Transformative Thinking in Big History.

Imaginaries One: *Big History Is More-Than-Human*

The students involved in this doctoral research (Ahearn, 2018) were encouraged to view the world as transient, rather than within set cultural and environmental paradigms. The following interview excerpts from 15 eight to nine year old students demonstrate students' responses to the 17 week pedagogical intervention regarding Big History, as outlined above. We deliberately represent these excerpts, with minimal commentary, for the reader's own interpretation, thereby illustrating the empowered stance of these socioecological learners presented from their antidisciplinary learning opportunities. The chosen excerpts from students' Big History learning cycle portray a deep understanding of the interrelationship of human and more-than-human:

Charlie: *Is water a living thing? If the water was polluted you don't feel what the water is feeling...*

Amy: *It would be sad.*

Marilyn: *Who is sustainability for?*

Jack: *Everyone*

Emma: *Everything.*

Marilyn: *Jack said everyone; you're saying everything, Emma?*

Emma: *If it's just everyone, it means every one of us, but we need to look at the plants and animals as well.*

Jemma: *By not only caring about everyone but you should care for everything. That's how we can have a sustainable future. :)*

Students also demonstrated a growing awareness and compassion for every "thing", as opposed to their initial understanding of every "one".

Charlie: *An ecosystem is an animal or a plant or any living thing. If you destroyed it all, there's this web thing, it is all going to be ruined. And if one of them becomes extinct, there will be ... a lot of animals dying*

Georgia: *Like the dinosaurs, they were extinct. Maybe, the pandas will be extinct and the tigers.*

The final observation summarises students' socioecological learning through the pedagogical intervention, from the classroom teacher's perspective:

They have awe and wonder for all the different things that they've learned and seen, but I think because they have respect for it, that intensifies the awe and wonder. They have empathy and compassion for the creatures of our earth and people that rely on the earth. We talk a lot about respect for people and using respectful words, but I think they now have respect for our environment.

As students became increasingly aware of their new learning about the interconnecting relationships of humans and more-than-human they were then able to identify the transience of the Big History narrative and the importance it played in empowering them to see a wider worldview, as demonstrated in Imaginaries Two.

Imaginaries Two: *Big History* Metanarratives

As the students reflected on their Big History learning they found empowerment to use the metanarrative they had learnt, alongside the newly learnt, shared vocabulary. Students' growth in knowledge and understanding was apparent through the wider worldviews they had developed as the following comments from Imogen, Jack and Aidan demonstrate:

Imogen: *The first Threshold (the big bang) is important to humans because that's how the world was made and that's why I thought it was important the first time I heard about it.*

Jack: *The Earth's core keeps our planet from freezing into an icy planet like Uranus so that's why life is on Earth. If we didn't have our core, we wouldn't be here.*

Aidan: *We (Earth) are perfect. If our planet gets moved we either freeze or burn, so that's why we need to be the third planet from the sun. ... Too hot, too cold – like the Goldilocks story.*

The students, Jack, Aidan and Aaron, explained changes in their thinking and a shift towards socioecological learning, demonstrating the intrinsic importance of nature, indeed to the extent of empathy at times:

Jack: *(Referring to the storybook 'Just a Dream' (Van Allsburg, 1990) read in class) Walter at the end felt what the plants felt when ... (he) felt sad, he felt just like how the trees felt, so when he went back home, he fixed the future by planting a tree and cleaning everything he's done.*

Aidan: *I really enjoyed (Big History). I thought it was amazing. When you first came in and you were like "We're going to learn about Big History" I was like "What's Big History?" Then you said "The big bang" and I was like "What's the big bang? Is it like a big bang went off and everyone woke up? Then they just thought I should build a building!"*

Jack: *It's more complex.*

Aaron: *We need nature, but nature doesn't need us, yeah, because if nature faults we fault, and if it all collapsed, we collapse.*

The classroom teacher verified the importance of the unfolding of the Big History metanarrative to students' new learning:

The use of the thresholds and only disclosing a certain amount of information at a time was really important to consolidate that it started with the Big Bang ... and (the students) really grasped the sequence of the universe and its creation. Giving them the opportunity to use the vocabulary and to use the storytelling concept in the Big History lessons was really valuable.

As the students gained empowerment, through the shared knowledge and vocabulary that Big History offered, they grew in awareness of the depth of learning that could be gained beyond solitary disciplines as exemplified in the following excerpts.

Imaginaries Three: *Antidisciplinary Learning Through Big History*

As emphasised earlier, the synthesis of antidisciplinary fields needs to be transcended, thus enabling socioecological learning to occur. The students, Charlie and Aidan's comments from their Big History learning demonstrated their awareness of the integration of subject silos:

Charlie: *We know what agriculture means, civilisation means, authority means, and anthropology.*

Aidan: *You can learn lots more and Big History's part of different subjects ... You can't just learn one subject because if you just learn one subject, when you do a test or when something comes to light that you need to do with other subjects, you won't know it and so you should know lots of subjects so then you'll be ready for life's challenges.*

Theo and Gabby demonstrated insight that Big History achieves integration that informs all their learning:

Theo: *If you would know any (one) subject then you won't be that smart to do anything in Science or History or any subject.*

Gabby: *I'm wondering why we are learning, doing this – shouldn't we do it at Year 6 or university because it's really hard stuff to do and maybe we can't get it all – **but we can!** (expressed with strong emphasis by Gabby)*

The classroom teacher's perceptions also validated the transdisciplinary nature of Big History learning:

It's such a rich topic that we've been able to either integrate or at least complement Big History in almost every area (including) – creative arts, Mathematics tasks, some graphing and data analysis, which was amazing, science broadly, and geography; history side of it as well.

The integration of Big History learning across subject areas, expanded student learning to access a whole-systems, wider worldview approach to

their understanding of topics, including a sense of awe and wonder and the integration of values, inclusive of the environment.

Imaginaries Four: *Whole-Systems and Worldviews in Big History*

A wider worldview perspective was apparent from students' comments on their Big History learning, where they were empowered to grapple with the concept of increasing complexity as the universe evolved as Gabby, Imogen and Jack's comments demonstrate:

- Gabby:** *They're (elements) the building blocks of the universe.*
- Imogen:** *It's like it's going on top of each other to go deeper to investigate more. It would be getting more complex*
- Jack:** *If Threshold 4 didn't happen, then Earth wouldn't have been made and our Solar System wouldn't have been. Just the Sun would be alone with maybe a few other planets but just the ones close to the sun, not like the ones that are perfectly Goldilocks Conditions, they would be destroyed or they wouldn't have existed if the Sun had taken more elements than it should have.*

The students recognised that this has implications for their ongoing learning, as shown by the students' comments:

- Molly:** *I used to think that everything was already made, like space was already made, the stars were already made; all the planets were already made – just already made. I used to think that all of Earth was already made. I used to think that humans were made and then the humans just started off really tiny and then once it got into a future, they (would) just somehow grow. Now, since I've been learning about Big History, it's made me learn that that's not what happened. Space was made, it started off like a speck of dust and then it was...made.*
- Aaron:** *(We need) Respect because we have to respect animals, plants and everything.*
- Mia:** *(We need) Tolerance and empathy because all of the living creatures need to be fair with everything.*

- Jack:** *When we love we will be close to nature and not destroying it.*
- Aaron:** *If you didn't know the future, you wouldn't know what you are going to do... It tells you what the future is going to be like when you're older, and like Big History tells us about stuff that we can't see.*

The students readily transferred their understanding of whole systems, relating back to their own cultural setting of place and familiar local school values as the following student comments highlight:

- Gabby:** *It's hard to believe that we have our own origin story...and it's like, how did that happen in 13.8 billion years?*
- Imogen:** *We found out how to plant berries, and then we started going off by ourselves and planting them and breeding animals, and that was agriculture.*
- Gabby:** *Collective learning. We wouldn't have threshold six, because it's an ancient civilisation.*
- Imogen:** *Agriculture.*
- Molly:** *If we didn't have Threshold 1, we wouldn't have anything, because the world has started up as one little tiny cell. Then it became, and expanded into elements, and some elements and the gravity fused them together to make bigger even bigger elements, and then it grew even bigger. Then it went to Threshold 2.*
- Gabby:** *There would be no gravity. There would be no space. There would be no time. Nothing would be fusing, no stars, it would just be all dark, and nothing.*

As reiterated by the comments of their class teacher, the students as socioecological learners were able to expand on those familiar values to incorporate them into a broader understanding of sustainability that encompasses past, present and future responsibilities:

They (students) would make connections, bring in things to share. Love of learning through questioning and deep thinking was very evident. I think they have really taken on the word 'sustainability' because they've seen where we've come from, that everything started and we have what we have, and we can't make more of different things. They've got a greater sense (that) we're responsible for the future. If we don't respect each other and respect the environment, then parts of the environment will disappear.

The students' growth in incorporating critical social and ecological perspectives from their Big History learning, encouraged them to investigate the past, present and future possibilities and in turn to engage in informed discussions around the possibilities of transformative, post-anthropocene thinking.

Imaginary Five: Agency and Possibility of Transformative Thinking in Big History

The critical learning that Big History promotes through its transdisciplinary or antidisciplinary focus creates opportunities for transformative thinking was evidenced in the students' comments:

- Aidan:** *If Earth didn't have any air or anything, dinosaurs wouldn't survive. The only things that would survive would be nothing. Only like rocks, dirt. Maybe nothing would be created yet because there's no living being. **That's one of the greatest mysteries I've ever thought!*** (Amazed expression at his thinking)
- Amy:** *I think that you need to learn Big History in Year 3 because... you need to know more about the environment, so that you can respect your environment and tell others about it.*
- Molly:** *And we wouldn't know about the thresholds, because if we didn't know about (Big History), we wouldn't know what happened in the past or we wouldn't know how the world was made.*
- Gabby:** *Yeah, and then we wouldn't know science, and everything.*

The following commentaries from students demonstrated their understanding of affective values of awe, wonder and empathy for the more-than-human that had evolved from their new learning:

- Imogen:** *Imagine if you were nature, and people were building things on you, and cutting you down. How would you feel?*
- Gabby:** *I think sustainable is also part of our values, because, we have to be fair, justice, and it could be like ... It's like sustainable means like all of our (school) values.*
- Emma:** *Civilisation and modern revolution wouldn't have happened if it wasn't for the big bang to make the people who had the ideas.*

Jack: *If you want to be a big historian when you grow up, if there's a new threshold you can study it and you can maybe add new information to the other threshold.*

Mia: *(We need to) show peace, not just to humans, not just to animals, but like grass, soil, trees.*

As the class teacher stated, the students learnt to apply learning to new situations, including connecting Big History to future sustainability:

I think that there has been transformative learning for many of the children, in their demonstration and their thinking. I think that they're motivated to use their learning of Big History and apply it in different situations. They have written personal responses that showed that they could make the connection between their learning in Big History and caring for the environment.

The students' insights from socioecological and antidisciplinary-based Big History learning were significant in that they proffered a common learning platform to critically reflect on environmental values within a post-anthropocene paradigm and to query their previous assumptions of sustainability.

Conclusion: Aligning the Big History Story to the Socioecological Learner—An Evolving Story

As Aidan was packing up his school books (last day of the school year), he voluntarily said as he packed his Big History journal:

Oh, my Big History journal: Big History was my most favourite subject this year. It was awesome and my Mum is going to be amazed at what I have learnt when I show her this book. She's going to say, "Good job Aidan. You've learnt so much". I've already told her so much about Big History.

Jack and Aidan continued a conversation about their favourite subject this year:

- Aidan:** *I didn't know anything about how the world was created and how it was so complex. We did so many interesting things too.*
- Jack:** *Yeah, Big History was my favourite too... my most favourite thing this year was the beak activity where we had to pretend to be birds with different beaks and try to pick up food, then we had to do graphs and things to work out how different beaks worked.*

The scientific universe story resonates with socioecological learning in that it encompasses all aspects of environment, 'human' and 'more-than-human'. Big History, within a whole systems approach is presented as a valid interpretation of increasing complexity, interconnection and collective learning. Big History empowers learners to critically understand ecological relationships. The antidisciplinary nature of knowledge is emphasised and set within a holistic and socioecological approach to learning. In reaching beyond disciplinary boundaries, or silos, Big History forges new connections within an increasingly complex universe. The learning incorporates opportunities for reformative learning and possibilities for exploring transformative agency for the learner from within the place of a local cultural setting.

Transience and transformation of paradigms are important understandings for this research, which used the lens of Big History, the transient narrative it tells and its core themes of increasing complexity and interconnectivity of the universe. The threshold of the future or Post-Anthropocene necessitates critical inquiry and transient thinking with the possibility of transformation to new paradigms within environmental education, sustainability and whole systems, if students are to genuinely contribute to and imagine:

What life will be like in the future, how humans will use innovation to meet our growing energy needs with limited natural resources, and what role will students and their peers play in shaping the future, among others. (IBHA, 2012, p. 10)

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7

Site/Sight/Insight: *Becoming a Socioecological Learner Through Collaborative Artmaking Practices*

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Abstract This chapter explores collaborative Arts practices as critical and creative vehicles for assembling a figure of the socioecological learner. We focus on developing the sensorial and affective dimensions of learning

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through aesthetic engagements with place, drawing on Deleuzian concepts of the “larval subject”, “carte”, and “rhizome”. In doing so, we also forge connections with contemporary life sciences that reveal the permeability and plasticity of learning processes through dynamic interactions within developmental eco-systems. These conceptual and empirical resources inform our posthumanist methodological approach to collaborative Arts practices, which we describe in terms of a *c/a/r/tography*. Through the collaborative production of “site/sight-specific” images and poetic texts, we seek to produce a generative and visually critical exposé, which locates the emergence of the socioecological learner within a “bio-social ecology of sensation”. This opens up a field of potentials for sensing, thinking, feeling, and learning through collective aesthetic engagements with more-than-human worlds.

Keywords Socioecological learner • Collaborative artmaking • Deleuze • Posthumanism • Poetic texts • Visual essays • Larval subject • Carte • *c/a/r/tography* • *a/r/tography* • Anthropocene • Affect • Sensation

Orientation

In this chapter, we seek to explore and share site/sight-specific collaborative artmaking as a collective medium for socioecological learning. There are many ways to see and to know, and thus the term site/sight alludes to an assemblage of place, milieu and ‘seeing’, in ways that gesture beyond the privileging of the visual. Whilst the visual nature of this chapter is acknowledged, sight and seeing may also be philosophically positioned, as we have also accomplished herein. In doing so, we engage a methodology of *c/a/r/tography* (Rousell & Cutcher, 2014), which enables us to draw together approaches from *a/r/tography*, Deleuzoguattarian mapping, and affective and sensational pedagogies (Ellsworth & Kruse, 2010; Massumi, 2002).

This chapter also draws on recent findings from the fields of biology and ecology, which highlight the role of affect and sensation in modulating learning processes through dynamic interactions within developmental eco-systems (Frost, 2016; Protevi, 2013). Inspired by postgenomic conceptions of ecological milieux in which epigenetic material is inherited and exchanged across species (Meloni, 2015), we draw on recent develop-

ments in biosocial research to trouble persistent notions of the learner as a bounded individual subject (de Freitas, 2018). By thinking and working through posthumanist concepts, images and poetics, we aim to render a figure of the socioecological learner as a “larval subject” that emerges through affective and sensorial engagements with the more-than-human world (Deleuze, 1994). The notion of a larval subject that is always *coming into being* has significant implications for our understandings of Art,¹ design, education, and other creative practices of life-living. Rather than these practices simply yielding effects within a superficial and transient conception of ‘culture’, we argue that Art and aesthetic practices alter the biomaterial compositions and functionings of the affective body.

In the second part of this chapter, we bring visual form to these concepts in order to convey layers of meaning by engaging with ecologies of sensation and affect. We do so by creating a series of visual and poetic compositions which perform as visually critical exposé, and which seek to operate cathartically and synergistically with the intentions central to this chapter – that of assembling a figure of the socioecological learner through affect and sensation (Lasczik Cutcher, 2018). The visual passages that we compose in this chapter significantly replace traditional academic text. By this we mean that the visual portrayal of the inquiry is not merely descriptive or illustrative, but rather *expressive* of conceptual thought and creative action. The visual elements therefore operate *as* theory, *as* artwork, *as* exhibition, *as* action (Lasczik Cutcher, 2018). The portrayal is and is not itself (Cutcher, Rousell, & Cutter-Mackenzie, 2015), both immanent to, and embedded within, the images and the poetics. This is to approach the emergence of the socioecological learner as a fundamentally creative and aesthetic process, and thus one that is tied to a posthumanist vision of Art as a way of thinking, knowing and becoming-with the world (Haraway, 2016). Rather than seeking to represent the world in various ways, we take up Art as a collaborative “experimentation with the real” that produces new ecologies of sensation and affective bodily capacities (Deleuze & Guattari, 1987, p. 12). Specifically, and for the purposes of this foray, it is important to acknowledge that,

¹ The use of the capital signifier in ‘Art’, rather than the lower case ‘art’ is an act of political resistance against the marginalizing of the discipline in contemporary education contexts, and is used consistently in this chapter.

To make Art is to immerse oneself in research, in knowing and in theoretical framing. Using the evidence of one's research, the artist makes an image or object that exemplifies their theoretical dispositions regarding the object/subject under study. This is not a visual representation or re-presentation, but a critical text in its own right. It is a material and conceptual creation of an experience and artifact that is an aesthetic portrayal of theory. (Lasczik Cutcher, 2018, p. 95)

As framed by this notion of Art as a mode of critical and creative inquiry, we engage in site/sight-specific encounters with collaborative artmaking, engaging sensation and affect in order to walk and to map, record, and experience place through artistic expression. The expressive coupling of Art and Place produces unique opportunities for socioecological learning which are not beholden to discursive regimes of cognition and rationality. It is specifically through such aesthetic modes of sensory attunement and expressive response that we locate the emergence of the socioecological learner. Ellsworth and Kruse (2010) similarly describe their collaborative approach to researching an atomic test site in Nevada:

We invited our bodies' sensations to alter, materially, the highways of perception that others' words and experiences continued to generate within us...we created for ourselves a place of learning at the point where paths of sensation and perception/cognition cross. From this crossroads, our aesthetic responses make something concretely of our spectatorship: traces and signals of the forces we sensed in our bodies as they played out across—and reconfigured—our preconceptions. (p. 279)

It is within these “crossroads” between sensation and perception that we locate the socioecological learner as a figure that emerges through sensory and affective engagements with place.

A Biosocial Ecology of Sensation

In taking a posthumanist perspective, this chapter does not claim that the human learner is situated centrally within a nested system, as popularly characterised in Bronfenbrenner's socioecological and bioecological models (2005). Instead, we consider the human learner as one of many emer-

gent elements within ecologies of sensation that form a shared environment or site/sight, with no assumed preference or hierarchical privilege. However, we do explicitly acknowledge that the socioecological learner takes shape as an individual, albeit one that is always in the process of becoming-with others. Drawing on Deleuze (1994), we describe this socioecological individual as a “larval subject” that emerges through dynamic interactions with the various systems specific to a locale, and constructs embodied understandings through synthetic processes of sensory attunement and affective response. The dynamic network of sensory interactions that occurs between individuals is what we characterise as an ecology of sensation, which forms the basis for pluralistic and ongoing syntheses between human, non-human, and inhuman (e.g., inorganic) agencies.

Considering this position, we begin this chapter without a preference, but a focus on the learner situated in an environment interacting with, and influencing the developmental systems that make up but one of the many ecologies that exist in a specific place, context, milieu. While we acknowledge that a tension exists between a posthuman framing of this inquiry and the focus on the individual learner, *per se*, we also find it useful to dwell in such tensions as a generative space. To this end, we associate our approach with the recent (re)turn to the ‘problem’ of the human individual in posthumanist scholarship, including recent reframings of humans as “biocultural creatures” (Frost, 2016), “biosocial subjects” (de Freitas, 2017), “creatures of becoming” (Rousell & Cutter-Mackenzie-Knowles, 2019) and “biosocial becomings” (Ingold & Palsson, 2013). In doing so, we draw connections between the notion of the socioecological learner and the emerging field of ‘biosocial research’ in education and the social sciences more broadly (Ingold, 2013; Youdell, 2017).

This biosocial approach extends Brown, Jeanes and Cutter-Mackenzie’s (2014) conception of social ecology with respect to lived experience, place, experiential pedagogies/learnings, and agency and participation. All of these elements are engaged herein, but in a way that also acknowledges the biological and material dimensions of bodies within ecological systems, and how these dynamically intersect with aesthetic practices and social experiences. We thus see the socioecological learner taking shape within a *biosocial ecology of sensation* that operates through an economy of affect, as the capacity to affect and be affected through dynamic interactions. In order to develop this conceptualisation further, we draw on a

series of findings from contemporary biology and ecology that connect our conception of the socioecological learner with nonhuman organisms and developmental eco-systems.

New Life Sciences and the Larval Subject

The ability to learn through sensory and affective engagement is not restricted to the human, as contemporary research in the life sciences increasingly points to the pivotal roles of affect and sensation in modulating the learning capacities of nonhuman organisms (Shaviro, 2015). Citing recent scientific research in “enactivist” biology, Protevi (2013, p. 172) describes how *E. Coli* bacteria “continually reassess their situation” and learn to respond to dynamic changes in their environments by reconfiguring a “bacterial memory”. Drawing on Deleuze’s theory of difference and repetition, Protevi describes how this process involves a series of “syntheses”, including a “passive synthesis” of organic, biological, and chemical processes as well as an “active synthesis” of perceptual, affective, and sensory-motor responses. It is through these various syntheses of biological and sensory milieux that the living organism finds expression as a “larval subject” (Deleuze, 1994), a subject which is always in the process of sensing, learning, growing, and developing in connection with its environment and the interpenetrating syntheses of other organisms. As Protevi (2013) writes, “larval subjects are the patterns of these multiple and serial syntheses, which fold in on themselves ... producing a site of lived and living experience, spatiotemporal dynamism and sentience... a ‘primary vital sensibility’” (p. 165). The Deleuzian notion of the “larval subject” thus gestures towards an “organic subjectivity” and “vital sensibility” that is common (and yet uniquely individuated) across the entire spectrum of the living world, including single-celled microorganisms, aquatic and terrestrial plant life, and of course the lives of animals including the human.

The larval subject also makes a productive conceptual figure for understanding the biosocial configuration of the learner in relation to dynamically changing ecologies as developmental eco-systems. Contemporary research in the ecological sciences is helpful here, as Susan Oyama’s (2009) “developmental systems theory”, Lynn Margulis’ (1998) theory of

“symbiogenesis”, and Mary West-Eberhard’s (2003) notion of “developmental plasticity” provide robust models for understanding the ways that social ecologies collectively sense, learn, develop, and transform through distributed networks of dynamic interaction. While we lack the space here to describe these various ecological theories in any depth, they share an emphasis on the dynamic plasticity and permeability of organismic, cellular, and even genetic functioning with respect to socioecological processes and environmental conditions (Frost, 2016). With the rise of “postgenomic” biology following the complete mapping of the human genome, the field of epigenetics has had a profound influence on contemporary understandings of social and ecological systems (Ingold, 2013). Rather than genes being fixed and immutable biological components of a given socioecological system, there is now evidence that gene expression is dynamically regulated and even “exchanged” between organisms in response to changing sensory, social, and environmental conditions. For instance, West-Eberhard’s (2003) studies of developmental plasticity suggest that “different developmental processes change the pattern of expression of the genes” in a particular socioecological system (Protevi, 2013, p. 203). Creative processes of learning and development can thus actualise an “untapped potential” for gene expression in response to changes in the social and physical environment (Protevi, 2013, p. 204).

One of the radical implications of these findings is the idea that these epigenetic effects are *epidemiological* and *transgenerational*, to the extent that sensory, cultural, aesthetic, and developmental processes can be passed on and inherited by future organisms and eco-systems (Frost, 2016). In other words, our individual and collective experiences affect our genes in ways that can be inherited by our children, and their children, and so on. This means that affective and sensorial connections with places (such as the artful practices of Indigenous peoples) are passed on not only through language and cultural transmission but also through epigenetic variations at the interpenetrating levels of gene, cell, organism, and society (Meloni, 2015). Because our inquiry is situated in the affects and sensations of bodies, we are interested in learning as it is organically lived through movement, feeling, and creative expression, as a relational process of becoming-with. It is indeed our focus on learning through affect and sensation that makes collaborative artmaking such an appropriate method for this inquiry.

Collaborative Arts Practices

In an age of climate change and ecological catastrophe, artists are uniquely positioned to activate socioecological learning through the collective *experience* of place as an ecology of sensation. What is perhaps most engaging about collaborative Arts making is that collaboration itself is a creative and generative way of thinking, feeling, and making through and within a social ecology. In the Arts, specifically the performing Arts, collaboration is an essential ontological and epistemological structure that is situated within the social and ecological frameworks that generate it (Baguley, 2007).

Collaborative Arts practice also has a distinct route of inheritance within the feminist genealogy of community-based and socially engaged public Art (Lacy, 1994). Recent movements in Arts education have also responded to turns toward transdisciplinary collaboration, dynamic social processes, and environmental engagement in the contemporary Art world (Conomos, 2009, p. 114). The myth of the lone male artist labouring unaided in his garret has become as irrelevant as it is misogynist in contemporary educational and artistic practice.

Collaborative practice also allows for a flattening of siloed discipline boundaries, and encourages transdisciplinary modes of thinking and doing across the Arts, sciences, and humanities. As Gershon (2009) reminds us, collaboration generates previously unknown possibilities, through conflict, risk, disagreement, accidental happenings and unimagined possibilities for sensation. The outcomes are unavoidably transformative, and such complexities are rich spaces for socioecological learning. Further, Santamaria and Thousand (2004) argue that collaborative practices encourage inclusivity and an acceptance of diverse thinkings, knowings and doings (Cutcher, 2015). Art has become less a category or a thing, but rather a performance, a process, both generative and destructive at the same time (Wright, 2004); generative in its yields, destructive due to the artist's need for sole authorship. Yet it is important to acknowledge that there is no such thing as the lone practitioner, as the self is multiple, an ecology of flesh, sensation and thought, memory and experience. Artmaking itself is a relational practice.

This relational framing of collaborative Art is useful for Arts practitioners and Arts educators who are seeking to foster aesthetic engagements

with the more-than-human world. From a relational perspective, simply *being together in place* offers a space for becoming-with the site/sight as an ecology of sensation, which embraces an ecological aesthetics of the larval subject as an emergent form of life (Deleuze, 1994). We can also engage such understandings to merge together place, the human and nonhuman as a site/sight through which the blending, melding and weaving of creative research can emerge. Through this lens we as Arts makers can compose the mixed milieux of site/sight within new territories (Deleuze & Guattari, 1987; Naughton, Biesta, & Cole, 2018), in “a state of constant change where there is no beginning, or end, only a coming from the middle” (Naughton & Cole, 2018, p. 3).

C/a/r/tographies of Site/Sight/Insight

As our own collaborative Arts-based inquiry unfolded “from the middle”, we found ourselves returning to the notion of site/sight again and again: walking together and apart, documenting together and apart, writing together and apart, and creating together and apart. In this way, our collaboration allowed for an immersion in socioecological practices in the making, as we engaged with and through the human, the nonhuman and the inhuman, side-by-side, individually and together. The artworks and the artmaking themselves became a breathing ecology, a living inquiry (Irwin, 2004), which is inextricably entwined with place – the site/sight as ecology of sensation. It is this living engagement with site/sight as sensational milieu that forms the heart of our c/a/r/tography (Rousell & Cutcher, 2014).

The site/sight that is the focus of this inquiry is a coastal stretch of beach just south of the town of Kingscliff, on the east coast of Australia in the state of New South Wales. By its very nature, the beach is an ecosystem of wind, sand, water, nonhuman life forms, salt and air that merge, clash, fight, engage, align and intersect. South Kingscliff, or Salt as it is known, is part of a coastal zone management plan, largely due to the ongoing erosion of coastline and dunes. The previously large area of casuarina trees has been removed for major housing and infrastructure development, including a sprawling resort and an artificially constructed ‘village’ providing basic services and dining options for residents. All that is left of the coastal

vegetation is a narrow barrier of casuarina plants that hold the dunes. These are backed by landscaping and pathways for human traffic to and from the resorts to the beach, well known by the locals as a dangerous and largely unguarded swimming area—a rough constant swell, rich with constant rips, undertows, and shark activity. In front of the casuarina trees is an uninterrupted strip of golden sand so fine that it squeaks with each step, stretching from Cudgen Creek to the north down to Bogangar in the south.

We are aware of these geosocial tensions as we venture out to walk the site/sight and map it with our cameras, our senses and our bodies. In doing so we engage the methodology of *c/a/r/tography*, an approach with its genesis in the Arts-based educational research of *a/r/tography* and the Deleuzoguattarian notion of the *carte* or map (Rousell & Cutcher, 2014). Such cartographic methodologies are rhizomatic, speculative, productive, unpredictable and experimental rather than representational or reflective (Rousell, 2015). Deleuze and Guattari (1987) make a crucial distinction between the map that is “entirely orientated toward an experimentation with the real”, and the “tracing” that is a self-enclosed representation of the world (p. 12). Cartography is thus aligned with the biocultural figure of the rhizome, which is comprised of an ever-expanding entanglement of lines of growth and becoming, the components of which can be detached, rerouted and plugged into new assemblages of living matter, meaning, and sociality. Like grasses, bamboos or the microbiology of the brain, cartographies spread horizontally across the collective surface of experience by contagion, rather than by arborescent systems dependent on underlying structures of communication and signification. Hence, cartography can be described as a “distributive and transformative process without beginning or end, in distinction from that which is organised vertically, rooted to a single spot” (Young, 2013, p. 265).² Cartography involves mapping lines of becoming that always begin in the middle of

²This is to explicitly distinguish cartography from arborescent methodologies that are predicated on the image of thought, language and life in terms of a tree that germinates deterministically from a seed, and grows roots that descend into an obscure and yet entirely rational depth. In phenomenological and structuralist terms, this means that the seed always contains the underlying ‘essence’ or ‘presence’ of the individual tree it will eventually grow to become. Rather, for the rhizome-map there is no pre-existing individual essence for each thought, language or life, only the machinic production of difference (as individuation of a larval subject) through networks of dynamic interaction across scales and temporalities.

the cartography, in the milieu “from which it grows and overflows” (Deleuze & Guattari, 1987, p. 21).

A/r/tographic living practices also begin in “middling” spaces of relation. “Such practices acknowledge that “no one is ever an individual detached entity but rather continually affected by entanglement in the materiality of all things, human and nonhuman”” (Triggs, Irwin, & O’Donoghue, 2014, p. 253). Always in movement, mapping a/r/tography embraces the *carte* as both an event and an artefact and rethinks the concept of methodology in favour of a “living practice” (Irwin, 2004, p. 34). Living practices are never fully intentional and in this instance, find their theoretical framework within artistic practices and expression within artistic practices. Such living practices might be better described as “volitional” and “directional”, as they are initiated through movement and are open to the fluxes of affective experience within an ecology of sensation (Manning, 2016). It is here that we also focus on potential. “Potential situates everything as secondary to the movement of practice. Practice is no longer derived knowledge, but rather, the feel of new forms of vitality” (Triggs et al., 2014, p. 256). Thus, c/a/r/tography embraces the potential of artistic practices to pursue an embodied exploration of what is not yet known (Rousell & Cutcher, 2014).

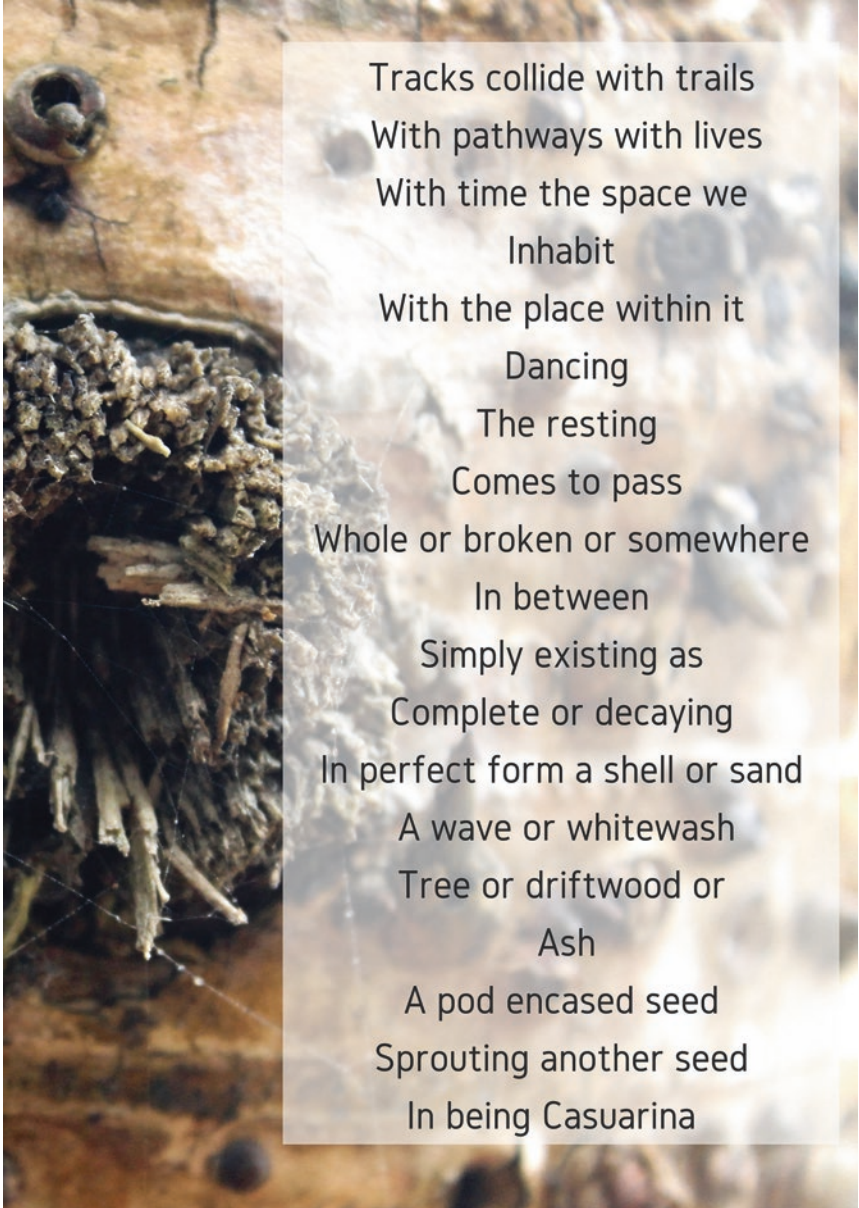
As we embark on wayfinding (Lasczik Cutcher & Irwin, 2018) in this historically, culturally, environmentally and aesthetically rich site/sight, we appreciate the affective and generative space for experimentation and collaboration that unfolds through our collective engagement with c/a/r/tography. Indeed, we experience layered mappings of our site/sight/insights (Irwin, 2003). Lingering in the folds of c/a/r/tography (with its forward slashes) opens up active spaces for engaging with the vitality of potential itself, where the in-between spaces of knowing and unknowing, seeing and unseeing, encourage ruptures. Knowledge creation is abundant and yet it is the vitality of the penetrating discernments of insights that invite us to delve into the spatial connections in the site itself as an ecology of sensation. As a collaborative, these site/sightings are our own as well as others’ creatively shared and critically considered, as we constantly experience mapping movements that are at once aligning, disorienting, yet redirecting us to see anew and to see again what we perceived. Embracing the site/sight/insight *métissage* may be a challenge, yet it

invites a layering of mapping encounters, processes and events. Indeed, in doing so we are attuned to the possibility of invention and poetic wisdom. We surrender to a dynamic coming to think, feel, and know.

What follows is the portrayal and critical engagement of the *c/a/r/tography* of the site/sight as an ecology of sensation. As mentioned, the visual operates as artwork, but also as a critical and theoretical engagement that produces socioecological insights. The viewer will note the poetic aesthetics of the visual essay. The poetry that breathes alongside the imagery can be considered both integral to the essay, and also as an exegetic. The reader is given the chance to read slowly, to linger with the images, to pause, revisit and find your way (Lasczik Cutcher & Irwin, 2018). In this way, the reader/viewer/audience joins us in a socioecological learning encounter, making and remaking their map of engagement as they go. In this way, you join us in the *c/a/r/tography*, in the wayfinding (Lasczik Cutcher & Irwin, 2018).

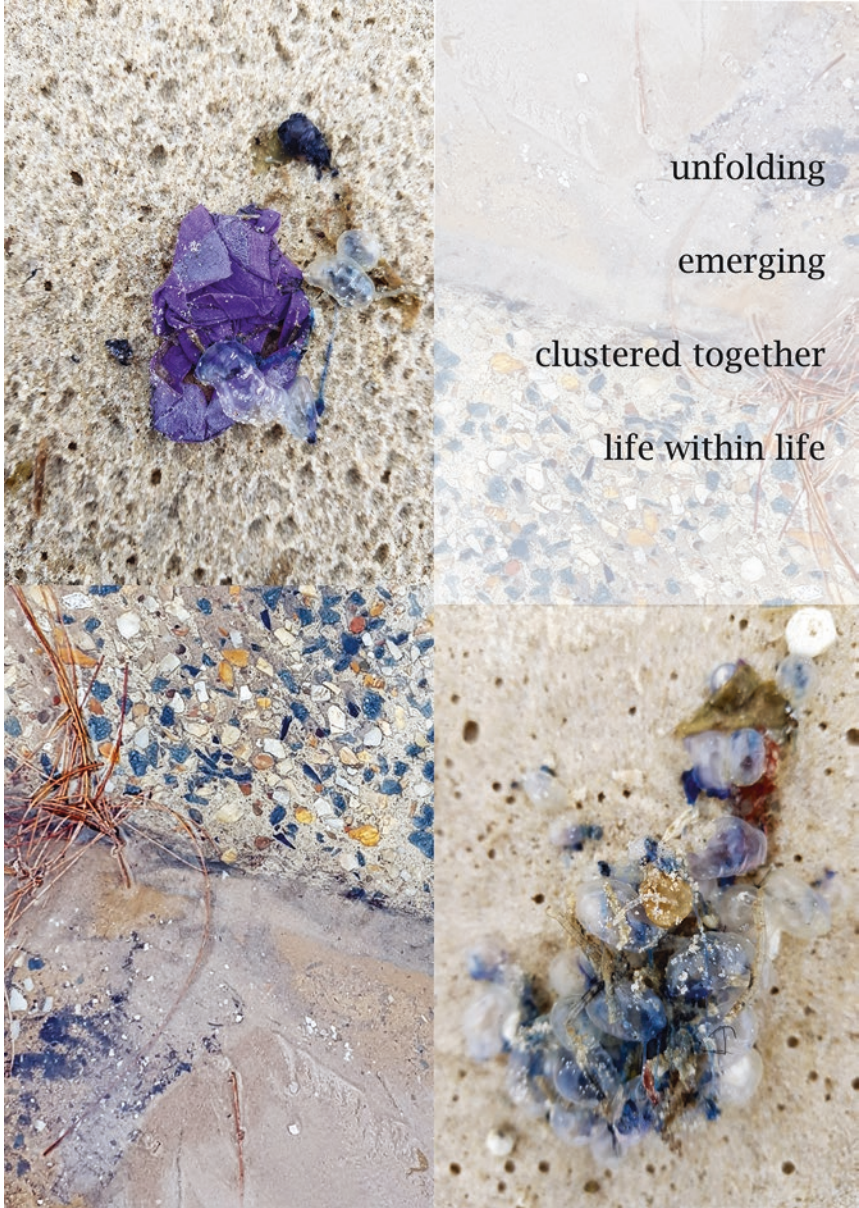






Tracks collide with trails
With pathways with lives
With time the space we
 Inhabit
With the place within it
 Dancing
 The resting
 Comes to pass
Whole or broken or somewhere
 In between
 Simply existing as
 Complete or decaying
In perfect form a shell or sand
 A wave or whitewash
 Tree or driftwood or
 Ash
 A pod encased seed
Sprouting another seed
 In being Casuarina







The beach is very generous to those who experience her
She offers me her breath, her salty kiss.
I often choose to be cradled by her wet embrace, or to run my feet along her
back, relishing her texture and curves.
She always offers me gifts to challenge me

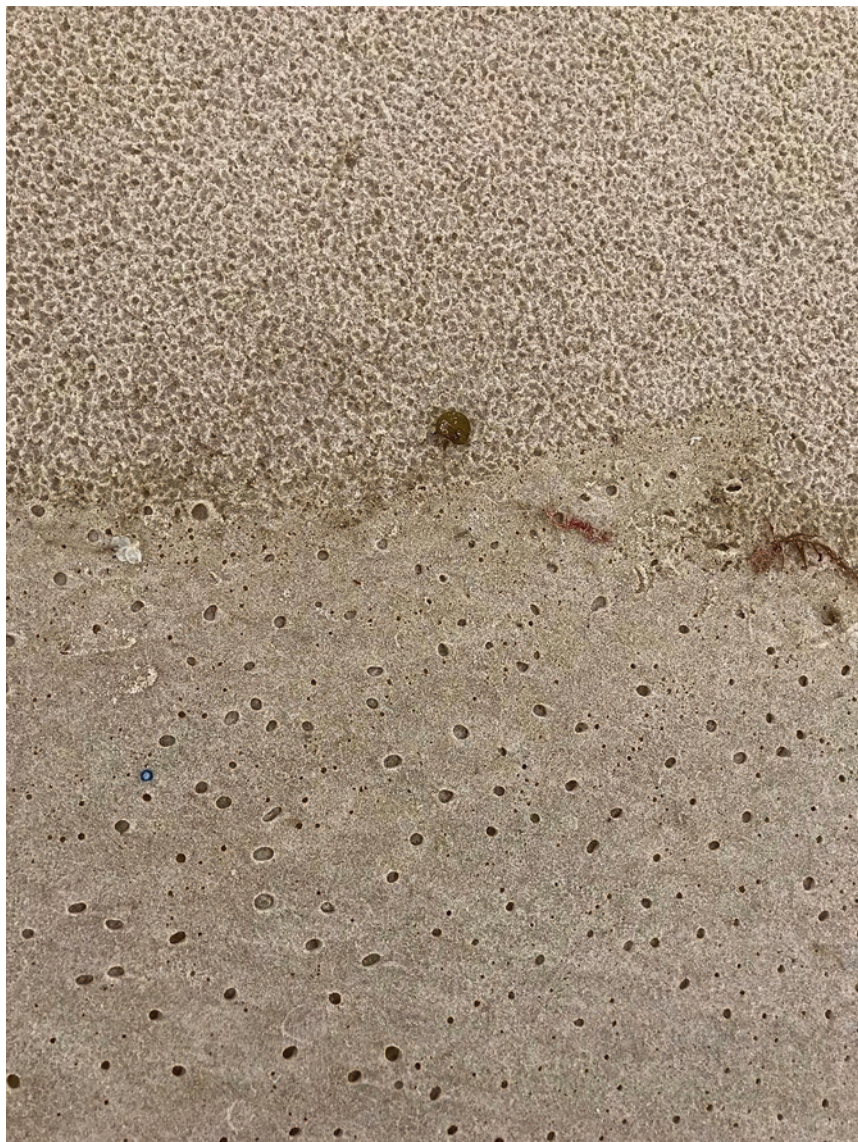
They are objects used and discarded, however
challenging me to shape, craft and reuse.

Today she offered me the lid from a takeaway
plastic container.
This one is easy, I say to myself in confidence.



I know this material and can take advantage of
its properties of flexibility and stiffness
I know it can be cut, drilled, bent and joined easily
I can value add to this, using a battery, LEDs and tape
I will use the flexibility of the material to bend over
itself and the stiffness to keep the circuit open,
acting as a switch
I will make a torch. What do you see in this gift?







shifting
standing, lingering, wayfinding
 grinding my passage, through the years
on the sand, of the sand, through the wind,
 the rain, the tears, the joy
with another living thing (with many living things)
 but this one will linger-with
the beach
always.





Conclusions: Learning to Be Affected

Each living practice requires bodily participation in order to immerse and disperse oneself within an ecology of sensation. By participating in such ecologies of sensation we unleash the vitality of potential to affect and to be affected by powerful and transformative experiences. We learn how to be affected by what we experience in ways that are not reducible to cognition and rational categorisations. We become larval subjects, emerging anew with and through each experience and relation. As such, it is important to remember we are not able to sense these potentials for learning if we are too controlled and desire a world of order (Triggs et al., 2014). Our capacities to sense our environments are not simply static or given, nor are they accountable to socio-cultural norms and political regimes.

They are dynamic processes, which are constantly being modulated, attuned, and sensitised in relation to the experiences of other bodies, both human and nonhuman, with whom we share our worlds. This is how we learn to be affected: to feel and think the world differently through the senses and through the affective capacities of the body. Learning is also how we come to proliferate creative difference through our participation in ecologies of sensation. “Learning to be affected means exactly that: the more you learn, the more differences there exist” (Latour, 2004, p. 8). Learning to listen, learning to speak, learning to write, learning to think, and so on, are all living practices that capacitate developmental processes through increased sensation and affectivity. The more you learn the more feelings you can feel, the more sensations you can sense, the more perceptions you can perceive, the more thoughts you can think, the more behaviours you can behave, the more you are capable of *producing difference within a biosocial ecology of sensation*.

Socioecological learners therefore need to think beyond traditional categories of knowledge production and historical identities, and instead, open themselves to living practices, where emergence of new knowledge is joined with a co-emergence of newly knowing entities interacting and connecting human and nonhuman. Indeed, the visual essays shared here are layered and entangled potentials mapping our encounters with site/sight/insight. Additional experiences will yield new potentials and new insights. A living practice of *c/a/r/tography* frames unimagined and untold potentials for sensing, feeling, and learning more than we can perceive.

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8

De-imagining and Reinvigorating Learning with/in/as/for Community, Through Self, Other and Place

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Abstract Perceiving learning with/in/as/for community enriches socio-ecological learning and encourages powerful interactions between human and non-human nature. The value and significance of community and collaboration is widely acknowledged, both within and beyond formal education, however perceptions of community have traditionally been human-centric. Furthermore, research and practice frequently indicates

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that community connections require greater consideration and effort in order to be effectively realised. In response, this chapter positions community as an authentic and essential foundation for socioecological learning, situating learning within the interconnected elements of social and ecological worlds. The authors grapple with the concept of community and situate community with/in/as/for socioecological learning. Their four diverse examples of community connection are shared through research stories, thereby expanding perceptions of community beyond teachers and students using their local social and ecological community as a resource for learning. This exploration illuminates the potential of community to enrich socioecological learning experiences. In essence, this chapter is a storied exploration of community with, from and about places, spaces, students, parents, teachers, researchers, community members and non-human nature.

Keywords Community • Socioecological learning • Posthuman

Introduction

It may be claimed, at least in much of the minority world,¹ that learning has become almost synonymous with schooling/formal education primarily directed by a teacher (i.e. pedagogy). We argue that learning is more than this: it is integral within life experience, and inextricably grounded in community, social learning, and self-determined learning (i.e. heutagogy). This chapter offers research stories that exemplify learning beyond traditional boundaries.

Despite documented successes in extending learning beyond the classroom, opportunities for this style of learning remain somewhat unrealised (Flowers & Chodkiewicz, 2009; Wals, 2012). In reality, lifeworlds are entangled. Just as the parts of an individual's life are not happening in isola-

¹We use the term minority to describe the influential countries that are often described as 'developed' Western nations. The term minority is used, as this is where the minority of the world's population resides. We view the descriptors of minority/majority as less judgmental than developed/Western and 3rd world/lesser developed. We do appreciate the heterogeneous nature of countries and communities, and the fact that any broad terms such as these cannot adequately represent these realities.

tion, the same can be said for the life of an individual learner that is in constant inter/intra-action (Barad, 2007) with human and non-human others. Our learning [human learning] is enmeshed and shaped by formal education, everyday experiences and our capacity and desire to learn from these experiences. In this chapter we de-imagine² traditional learning boundaries by exploring ways of being with/in/as/for community through self, other and place. Through both socioecological and posthuman (beyond human-centric) lenses, the authors seek to extend understandings of learning opportunities afforded by deep community connections. We hope this may contribute to challenging the compartmentalised, reductionist thinking that limits possibilities for socioecological learning with/in/as/for community.

Traditional perceptions of socioecological learning, for example the hierarchical, relational theorising about the interconnected influences of social and environmental factors on learning, development, health, and environmental issues (see for example Moos, 2003), view non-human nature as a distinct entity, a separate form from the human being. Early social ecology exemplars primarily espoused two ways to view the natural environment: anthropocentrically (as a resource for human use) or ecocentrically (intrinsic worth regardless of importance to humans) (Eckersley, 1992; O’Riordan, 1976; Sessions, 1974). More recently, social ecology has evolved from early models proposed by Bronfenbrenner (1979) and Bookchin (1980, 1991, 1998, 2007), to acknowledge and celebrate the relationships and interactions that occur between humans and the natural environment (see for example, Wattchow et al., 2014).

In this chapter posthuman perspectives are drawn upon to disrupt more traditional conceptions of socioecological learning, in the hope of repositioning learners “within the full, heterogeneous and interdependent multispecies *common worlds* in which we all live” (Taylor & Pacini-Ketchabaw, 2015, p. 507). The natural environment is viewed as an inextricable part of community and through this community is defined as including all the human-non-human elements and intra-actions as one whole (see Barad, 2007; Hart, Hart, Aguayo, & Thiemann, 2018; Malone, 2018). This posthuman framing of community aligns with Hart et al.’s (2018) call to reconceptualise onto-epistemologies informing envi-

²‘De’ meaning ‘from’ in Spanish.

ronmental education research. A call for exploring new and non-traditional ways of doing research that can go beyond traditional boundaries of ‘safe’ theory making with/in/as/for communities. In that sense, socioecological learning is framed with, in, as and for community as the messy, “interpenetrating fields of relationships” (see Chap. 1, this collection); and align with Indigenous philosophies and perspectives as enduring examples of such learning, for example the Maori concept of ‘Ako’ explored later in Claudio’s research story.

Defining Community

Our communities are complex tapestries of gender, age, race, religion, and lifestyles. We are urban, suburban, and rural; we are students, customers, workers, and visitors. We know differences in race, wealth, and poverty, ability and disability, language and culture, empowerment and disengagement. (North American Association of Environmental Education [NAAEE], 2017, p. 12)

Aligned with the above depiction of community is a corresponding diversity in contemporary conceptions of learning related to community, featuring a broad spectrum of interpretations from formal learning through to internships, partnerships, community agency and activism. While this definition of community is appreciated and its recognition of a broad spectrum of human diversity, it is problematic in its failure to acknowledge non-human elements. In this chapter we seek to tease out opportunities that may be realised by drawing upon socioecological and posthuman perspectives to explore community.

Accordingly, views of community with some of the principles of deep ecology and posthumanism are aligned herein. A central tenet from deep ecology that challenges the separation of humans from the natural environment and “recognises the intrinsic value of all living beings and views humans as just one particular strand in the web of life” (Capra & Luisi, 2014, p. 17; see also Devall & Sessions, 1985; Naess, 1986) is drawn upon. This view aligns with posthumanist thinking to decentre the “autonomous individual by emphasising our ecological interdependence and to retheorise human/non-human associations and agencies within the “natureculture”

collective” (Taylor, Pacinini-Ketchabaw, & Blaise, 2012, p. 81). Adopting a more practical application of these theoretical perspectives, Chawla (2008) asserts an all-encompassing view of community “where “community” is meant in an expansive sense of the plants and animals as well as the people and cultures of one’s locality” (p. 99). Leopold (1966) further broadens the concept of community to include living and non-living entities – “We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect” (pp. xviii–xix). This chapter also adopts such conceptions of self, non-human nature and the landscape as a connected, interacting community; a view of community that has long been reflected through Indigenous people’s ways of being (see for example Rose’s account of Australian Indigenous ways, 2013).

To acknowledge the entangled, multiple-perspective learning associated with community, the embracing term of ‘with/in/as/for’ is adopted to represent a position of learning enmeshed with community. Similarly, the use of the term non-human (as opposed to the often used more-than-human) reflects the aim to disrupt divisionary perspectives and to define the human and non-human parts of nature without hierarchy.

Background

The importance of utilising community to advance the goals and aims of education, and environmental/ecological education in particular, has been advocated repeatedly over the past four decades (see for example Aguayo & Eames, 2017; Earth Charter Associates, 2000; Eilam & Trop, 2013; Sterling, 2001; UNESCO, 1997, 2002, 2008, 2009; UNESCO-UNEP, 1977, 1992, 2012; Wals, 2012). As early as 1977, partnerships between the “home, school and the community” were identified as crucial in the facilitation of children’s learning about the environment (UNESCO-UNEP, 1977, p. 20). The UN’s *Agenda 21* for sustainable development insisted that education should draw upon local and community groups in order to ensure outcomes are relevant to the local context, thus increasing engagement, authenticity and meaning (UNESCO-UNEP, 1992). *From Rio to*

Johannesburg: Lessons learnt from a decade of commitment identified community education as an essential ingredient of “capacity building for a sustainable future” (UNESCO, 2002, p. 6). More recently, *The Future We Want* declaration from the UN Conference on Sustainable Development echoed earlier documents, calling for greater collaboration between schools, communities and authorities in order to enhance the provision of effective education at all levels (UNESCO-UNEP, 2012).

There has undoubtedly been a response to these calls for education to be more closely connected to community, and this is reflected in the various iterations of learning with/in/as/for community:

- **place-based learning** is contextual learning that uses local places as a basis for interdisciplinary learning and teaching (see for example Gruenewald, 2003; Smith & Sobel, 2010; Somerville, Davies, Power, Gannon, & de Carteret, 2012);
- **Indigenous/traditional ways** of knowing, doing and being have been the prime mode of learning in traditional communities for millennia (see for example Wheaton, 2000; Yunkaporta & Kirby, 2011) and are increasingly looked to for socially and ecologically just approaches to learning (Derby, 2015; Kahn, 2008);
- **everyday lived learning** incorporates the experiential, predominantly social learning of everyday life – ‘funds of knowledge’ – that is frequently disregarded in institutionalised learning (Bernstein, 1999; Zipin, 2009);
- **communities of practice** is a focused version of everyday learning predominantly situated in collective endeavours of practitioners (see seminal work by Lave & Wenger, 1991);
- **public pedagogy** is a newer field of education related to cultural, often activist-inspired learning through installations, social media and participatory action in the public arena (Sandlin, Schultz, & Burdick, 2010); and
- **distributed learning** refers to the notion of learning as a process occurring and residing beyond individuals – either at the community level and/or through online mediums (Engeström, 1987; Heylighen & Beigi, 2016).

There are many commonalities and intersections between these and other currents of learning with/in/as/for community. Relationally-based learning is at the foundation of such learning – learning with/in/as/through the interconnected social and ecological dimensions of community – enriching community connectedness and learning about self, other and place. Our research stories shared in this chapter will draw upon, trouble and extend these common conceptualisations of learning with/in/as/for community.

Recognised Benefits of Learning with/in/as/for Community

The importance and mutual benefits of community collaboration, connections and partnerships is widely recognised (see Evans, 2013; NAAEE, 2017; Sobel, 2004; Tilbury, Coleman, & Garlick, 2005). Collaboration between diverse partners enables the formation of mutual goals that often result in powerful shared successes. Benefits of such interactions may include increased academic, social and emotional development (Cutter-Mackenzie, 2009; Evans, 2013), connection with nature (Chawla, 2007), and community spirit and citizenship skills (Smith, 2007). Community partnerships also provide valuable support for teachers to implement innovative approaches to education, enabling the utilisation of invaluable local knowledge and expertise (Manteaw, 2012). Such local wisdom, increased access to resources, as well as “peer support and encouragement” (Ferreira, Ryan, & Tilbury, 2007, p. 48), all contribute to empowering learners’ agency, and developing personal and social capabilities (Chawla, 2008; Smith, 2007).

Loss of Community Connections

Despite the recognition of community as an important and beneficial site for learning, loss of communities, both human and ecological, is a contemporary social and environmental crisis. Natural communities continue to be eliminated and degraded (Jackson et al., 2016). Human communities are decaying through increasingly individualistic and

capitalistic ways of being associated with modernity characterised as a “disconnection disorder” (Arabena, 2006, p. 36) in a way of life that is “placeless” (Gruenewald, 2003, p. 8), indicating a perceived separation of humans from each other and from non-human nature. Schooling is also conceptualised as disconnected, with modern learning privileging the cognitive dimensions separated from embodied and affective learning (Orr, 2011). Such compartmentalised thinking does not prepare learners for our modern entangled socioecological-technological world (White, Rudy, & Gareau, 2016). For Sterling (2001), an “alternative educational paradigm” is required, one that supports and sustains “the ‘whole person’, communities, and the environment” (p. 11). White et al. (2016) concur, calling for us [humans] to be “interactive with and attendant to multiple knowledges, entities, and practices that compose our worlds” (p. 195).

The old adage *it takes a village to raise a child* signals communities as essential for learning. However, many ‘modern’ learning practices disconnect from both the human and non-human nature ‘village’. The lack of community connections in learning compels us to explore a deeper conceptualisation of learning with/in/as/for community. Yet we also see growing numbers of online and social media communities emerging and sharing common goals together, either purposely or not, and individuals and groups socially learning from such experiences. We acknowledge the tension between this loss of sense of community and the increase in online communities. The significance of these online communities is discussed below, both in our discussion around de-imagining³ community, and later in Claudio’s research story.

Calls to Strengthen Community

A wealth of research advocating community collaboration demonstrates the need for revised strategies to better support purposeful, authentic community partnerships and opportunities (Dori & Tal, 2000; Flowers

³We use de- meaning ‘from’ in Spanish, consistent with the rest of the *Touchstones for Deterritorializing Socioecological Learning* chapters, to highlight our aim to not only rethink but also to open up new territory and directions.

& Chodkiewicz, 2009; Green & Somerville, 2015; Monroe et al., 2015; Salter, Venville, & Longnecker, 2011; Tal, 2004). Monroe et al. (2015) suggested that despite the obvious merit of community-based projects, “this form of education is not the norm and many educators face significant barriers to organizing and facilitating such projects” (p. 1). Barratt and Barratt Hacking (2008) explored children’s perceptions of the importance of connecting with their school and local community in order to address local environmental issues. Children in their study argued for “a closer relationship between their home, school and the local community” (p. 288) because these are the places they are making sense of (occupying) as they navigate between them. These findings explicate the integral role of parents/caregivers, teachers, school staff and other stakeholders in facilitating opportunities for active, meaningful collaborations with each other, as well as for and with the children and young people in their care. Everyone has a role to play in opening up new and collaborative learning spaces for socioecological learners.

De-imagining Community Within Socioecological Learning

The Nature of Community

The term community in daily use has almost become synonymous within minority human social groups, while other elements of community are marginalised or ignored (non-human others, material elements and system-shaping inter/intra-actions). These other entities are both essential and potent in entangled socioecological worlds (Derby, 2015; White et al., 2016). New perspectives on socioecological assemblages and their vitality have challenged human-centred, reductionist thinking (see the seminal work of Barad, 2007; Bennett, 2010; Haraway, 2007; Latour, 2004). These new materialist, object-oriented ontologies portray reality as messy, nonlinear, hybrid and not always comfortable or risk free. Such thinking opens up spaces for insights into learning with/in/as/for community, decentring the human, and challenging dominant perceptions around what such learning looks like. There are, however, tensions within such

thinking. Humans are powerful agents in socioecological assemblages (White et al., 2016), so the shaping and focus of learning with/in/as/for community is predominantly human, however our research stories demonstrate attempts to trouble this anthropocentrism. By extending our perceptions of community beyond humancentric limits, we aim to de-imagine and reinvigorate socioecological learning with/in/as/for community.

Online Communities

Online mediums of communication offer a platform for interconnectedness and social interaction, enhancing and augmenting the potential social learning processes that can occur (Cochrane et al., 2013; Pachler, Bachmair, & Cook, 2010). Contemporary online social networks offer a 2-way communication mode between users, facilitating and promoting social learning, communication and networking (Nicolaou, Korfiatis, Evagorou, & Constantinou, 2009; Ravenscroft, 2009). One characteristic of online communities, particularly in non-formal and informal learning environments, is that the learning process itself can be self-directed and governed by an individual's learning needs and motivations (Aguayo, 2014; Falk & Dierking, 2002). Keeble and Loader (2001), coming from a human-computer interaction perspective, argue that "computer-mediated social relations are depicted as the conduit through which new forms of community structure and culture can evolve through spontaneous electronic interaction" (p. 1). In some ways, here are online communities, and the type of connected social learning they afford, as an example of posthumanism or *beyond humanism*, where the concepts of communities and online learning include an extended and extensive network of silicon-based hardware, computing codes, algorithms, protocols, copper wires and optic fibres as part of community. Extending perceptions of learning with/in/as/for community through such posthuman considerations unsettles traditional conceptualisations of such learning, radically expanding possible actors and influences. Posthuman thinking for identifying and generating new spaces for learning with/in/as/for community in these times of the social and ecological emergencies of the Anthropocene (Crutzen, 2002) is valued.

We now turn to sharing insights and observations from our own research into socioecological learning with/in/as/for community, research that grapples with issues and opportunities to enrich such learning.

Research Stories

As researchers, teachers, academics, parents, and socioecological learners, life experiences and research are drawn upon to inform understandings of community. This sharing of research are referred to as ‘research stories’, as they are stories about our research, stories about enriching possibilities and opportunities for socioecological learning.

Researchers have commented extensively on the gap between theory and practice, particularly within environmental and sustainability education, which has strongly influenced socioecological learning (see for example Edwards, 2016; Holland, Evans, & Hawksley, 2011; Robertson & Krugly-Smolka, 1997; Stevenson, 2007a, 2007b; Wals & Alblas, 1997). The potential of research stories to make research accessible and understandable, to contribute to narrowing this widely observed gap between theory and practice is identified. Although some of the research stories involved narrative inquiry (such as Maia) and autoethnography (such as Simone), it is proposed that research stories may be crafted from all manner of diverse research methodologies.

There exists increasing appreciation for stories as “valued sources of information” (Thomas, 1995, p. xii) and “sense-making tools” (Hwang, 2011, p. 797), capable of informing understandings, enriching knowledge and uncovering “insight for change and transformation” (Ayers, 1992, p. 158). Sharing research stories in order to facilitate deeper understandings of people’s actions (with respect to community) and the implications of these, may then influence future actions and responses (Akinbode, 2013). Kelchtermans (2014) affirms the value of storytelling as “the natural way through which people make sense of the events, situations, and encounters in which they find themselves” (p. 274). Furthermore, the potential of story to embody “theoretical abstractions” (Riessman, 2008, p. 63) is acknowledged, thereby elucidating complex theoretical concepts through pragmatic examples. The reader is encouraged to grapple with

and make sense of these diverse possibilities for learning with/in/as/for community. It is anticipated that these stories might mobilise a de-imagining of community, and also inspire reflection upon the reader's own approaches to teaching, learning, research, thinking, being and doing, with/in/as/for community.

De-imagining and Re-invigorating Community Partnership Opportunities: Maia's Story

...the beauty of it is that in the end, because it's a partnership, everyone just gets so much more out of it. (Mila,⁴ research participant)

As part of a doctoral study, narrative inquiry was utilised to explore twelve environmentally conscious teachers' stories of philosophy, pedagogy and practice in environmental education. Community partnerships were a key focus of the research, because despite the wealth of evidence advocating their value, authentic and ongoing connections between schools and community are often underutilised (Flowers & Chodkiewicz, 2009; Henderson & Tilbury, 2004). Research indicates that barriers continue to limit the widespread utilisation of community partnerships in schools (Barrett, 2007; Shallcross & Robinson, 2008; Stevenson, 2007a, 2007b), and it has been suggested that teachers require support to navigate such partnerships (Kadji-Beltran et al., 2017). Furthermore, efforts to move towards collective thinking with non-human nature are profoundly challenging (Taylor, 2017) and necessitate deeper consideration, especially in the school setting. Such exploration seeks to contribute to growth in "emergent collective and collaborative (human and more-than-human) pedagogical ventures" (Taylor, 2013, p. 120). Through this research story insights are shared around diverse community partnerships possible in schools, and their capacity to encourage deeper attunement to non-human nature.

The research engaged practicing teachers, due to their wealth of useful, pragmatic, ever-evolving "knowledge, ideas, insights, feelings and understandings" developed over decades of teaching (Schubert & Ayers, 1992, p. 9). This research story details one teacher's approach to de-imagining

⁴Pseudonyms are used to ensure anonymity.

and reinvigorating community partnerships. In particular, this story considers the possibilities of partnerships to facilitate attunement to the non-human. Semi-structured interviews were drawn upon and in-class observations to honour and share Rex's voice, wisdom and experience. Although Rex did not explicitly discuss posthumanism, he shared numerous reflections that align strongly with posthuman perspectives. For example, in moving towards an awareness of interconnectedness, Rex shared: "I mean we're a part of nature. And I think what I am trying to say is that we've lost an understanding that we are a part of nature." I embrace posthumanism as a means to recognise our place as "but part of the greater ecology" (see Chap. 1 in this collection).

Re-positioning the Teacher as Learner

Although teachers were the focus of the research approach, the exploration of community partnerships in fact attempts to de-centre the teacher in the learning environment. The inquiry seeks to challenge the misconception of the teacher as the expert source of all knowledge, and reposition them as a learner themselves – learning from community members, parents, grandparents, their students and perhaps most importantly, with, in, through and from non-human nature. Teachers themselves commented on this repositioning, re-iterating the importance of embracing the unknown – "Don't worry about what you don't know... find out together" (Audrey, research participant). This act of de-centring the teacher seeks to acknowledge the profound capacity of non-human nature to communicate, teach and thus instil powerful understandings (Rautio, 2013). This understanding demands shifts towards "listening to, learning to hear... and being open and responsive to the non-human realm" (Ritchie, 2012, p. 91).

De-imagining and Re-invigorating Community Partnerships

The upper primary environmental program at Sunshine Lake College provides a rich example of de-imagining and reinvigorating learning with/in/as/for community, beyond more traditional, short term, shallow partnership opportunities prevalent in schools. Sustainability coordinator

and classroom teacher Rex, in collaboration with past and present colleagues, has developed a comprehensive suite of community partnerships underpinned by a commitment to “radically distributed knowledge production” (Fynn, Blanche, Fourie, & Kruger, 2012, p. 575), and ongoing collaborative relationships. In addition to increasing engagement and sense of place, these partnerships enable deep learning around the inextricable entanglement of humans and non-human nature.

Beyond common forms of collaboration with parents and local environmental agencies, partnerships extend to connections with local farms, biologists, and environmental groups such as Friends of the Botanic Gardens and the local field naturalists club. The Friends of the Enviro Garden group was established to support the maintenance of the sprawling school gardens, replete with vegetable and herb gardens, Indigenous gardens, fruit trees, worm farms, composts, chickens, guinea pigs, and an array of other animals. Rex often takes his class to visit local businesses such as a zero-waste photocopying business, a zero-waste café, and businesses that convert various types of waste into useful products. A visit from Hamish, a year 8 student from the College’s high school campus is an annual highlight for many students. Hamish possesses comprehensive knowledge of local frogs and reptiles, and he visits the Enviro Program each year to share his passion and expertise.

Community partnerships provide opportunities to enrich the children’s environmental consciousness and ecological understandings through socially constructed, experiential learning opportunities grounded in place. Viola, Olson, Reed, Jimenez and Smith (2015) advocate widespread utilisation of community partnerships due to the myriad opportunities they may afford, including “diverse perspectives, political connections, technology, energy, audience members, money, experience, content expertise, and a sense of ownership to a collaborative endeavour” (p. 239). Rex affirmed that connecting with community partners “enriches the experience for the kids”. Rex’s students exhibit excitement, curiosity, and spirited enthusiasm about their individual and shared learning. Notably, they demonstrate a strong and purposeful connection to, and awareness of, their local place. This strong sense of place is influenced by Rex’s unwavering commitment to connect with “the social and ecological

dimensions of places” (Gruenewald, 2003, p. 10). Such connections are enriched exponentially through engagement with community partners. Rex identified community partnerships as a crucial element of the environmental program.

Although the community partnerships are almost exclusively between humans, upon closer examination it is evident that they facilitate opportunities to integrate and embrace posthuman perspectives. Notably, students enjoy many partnerships with local places. Furthermore, the diverse partnerships provide opportunities for students to learn about, wonder about, care about, interact with, connect with, see, touch, and appreciate non-human members of community. Such interactions and intra-actions (Barad, 2007) would not be possible without the involvement of community partners. These experiences shift the focus away from perceptions of the non-human as objects to be studied, towards recognition that they are “active communicating agent[s]” (Barrett et al., 2017, p. 132), with immense capacity to know and produce knowledge (Ulmer, 2017). This understanding reiterates Rautio’s (2013) call to “embrace the thought that teachers – those who invite, guide, support and steer us – can also be other than human beings” (p. 402).

The sharing of wisdom and experience with other schools and community groups through student-led tours of the garden offers opportunities to recognise the non-human as teachers. Rather than a traditional tour pointing out the garden’s features, students are encouraged to tell stories of the learning that occurs in the garden. Rex explained that the tours require the children to “think through what we’re doing, why are we here, what are we learning about.” This deep reflection and sharing prompts the students to engage in higher order thinking and communicate substantively about what they are learning, why they are learning about it and the significance of their learning for themselves and non-human nature. When preparing for the garden tours, Rex clarified to his students:

The point is not ‘Here are the chooks, here are the guinea pigs’. The point is ‘What are the animals helping me to learn or know or understand? Which places have made you stop and think, made you wonder?’

These garden tours, and the wealth of other community partnership opportunities organised by Rex, help students to deeply know and value place, “in all its intimate detail as a place of inhabitation, a place where we dwell with other creatures” (Somerville, 2007, p. 8), and a place from, in and with which we learn.

Such opportunities to understand interconnectedness are crucial as we continue into the Anthropocene, because widespread separation of humans from the non-human, and the concomitant enduring silencing of the non-human, permeates much of formal education (Barrett et al., 2017). Challenging these humancentric views is crucial if acting and be respectful of the non-human in these ‘multispecies common worlds’ is to occur, which according to Taylor and Pacini-Ketchabaw (2015) can only occur “in those embodied (and often fraught) moments when humans and animals actually meet and notice each other” (p. 525).

Rex’s commitment to partnerships enables rich and frequent opportunities for students to meet and notice the non-human, through the above-mentioned connections with farmers, scientists, the year 8 frog expert, parents who provide support for river visits and other excursions, and visits from community members and organisations who work with and/or care for the non-human. These partnerships encourage learners to think deeply about, and interact regularly with non-human nature, thus inspiring a deeper understanding of and fascination with “the unfolding and entangled worlds” in which we live with so many others, human and non-human (Taylor & Giugni, 2012, p. 111). This recognition of humans as an integral part of nature is profoundly important, because it supports knowing the self more deeply and thus be more empathetic towards animals and the broader non-human world (Oakley et al., 2010; Taylor, 2017). In essence, knowledge of the inextricable entanglement of the human and non-human increases accountability for human actions (Bakari, 2014).

Widely acknowledged barriers to learning with/in/as/for community in schools inspired the quest to learn from teachers about opportunities for engagement with community. Rex’s story has uncovered valuable insights into the positive influence of community partnerships to enrich socioecological learning and inspire deeper attunement to non-human nature. It is obvious that posthumanism demands dramatic shifts in thinking and acting, and Rex’s efforts are presented as a powerful starting

point in the school setting. Through community partnerships Rex has realised the potential of pushing the boundaries of pedagogy beyond humancentric limits (Taylor, 2017). For Rex, these community partnerships are a fundamental element of his holistic approach – connecting learners to non-human nature, and themselves in the process.

In the following research story, Simone extends thinking around learning with/in/as/for community through a parent's posthuman perspective of human *bodies-as-nature*. The parent-child relationship is arguably the most accessible and powerful collaboration opportunity available in the quest to enrich community environmental consciousness and ecological understanding.

Parent(ing) with/as Nature/Community Learning: Simone's Story

Current social frameworks and settings have established a disconnected network of individualised homes and, as a result, communities, families and people. This dis-integrated way of living in place, widely adopted as a socio-cultural norm in the minority world, does little to support or enhance a community approach to learning; despite familiarity with the proverb shared above that 'it takes a village to raise a child'. So, what does this mean for the modern lives of humans and families, through the lens of community with/in/as/for socioecological, posthumanist learning? Through this story, ways to conceptualise nature through my role as a parent is explored and the barriers in adopting a socioecological, posthumanist community approach to educating children with/as nature. The reader is invited to join this journey to de-imagine and re-conceptualise what it means to be a parent in community.

Personal Conceptions of Nature/Self

I recently completed a research project, which (in part) explored my conception of nature through the parent lens, adopting a socioecological, posthumanist perspective. Using an autoethnographic methodology, it was necessary to take a deeply introspective and reflective approach to

investigate what I understood nature to be. Through this exploration, I uncovered a dynamic relationship with/as nature that has evolved alongside me and the socioecological community of which I am a part.

Through processing past memory data and artefacts, I uncovered that my relationship with/as nature has changed significantly over time, and this was reflected through my relationship with self. During my childhood, non-human nature was just 'there'. It was an object that formed part of my life, just like my house or a playground. As I entered my teens, I discovered the healing qualities of being in non-human nature through my experience on a school-based remote learning program in a National Park (see literature on restorative qualities of nature in Kaplan & Kaplan, 1989). This led me to *using* non-human nature as a place of escape and restoration when the pace of life became overwhelming in the city. This relationship with non-human nature continued into my 20s. I recall driving for an hour and a half just to go for a swim in the Southern Ocean, no matter what the weather or water temperature. By my mid-20s I left the city and took my 'seachange'. At this point in my life, I could not conceive that I would ever live away from the ocean again.

But, the seaside lifestyle soon began to replicate city living with intense busyness. In response to this, my family and I packed up our home and took a journey into the desert. On this foray, I realised that escaping was never going to answer or solve my problems, but always leave me yearning for more. I decided I needed to radically adjust my understanding about how to live life through identifying my values. That is, what I live in each day and not what I might like my values to be (Carroll, 2012). I sought to let go of some of the things I thought I needed to be able to survive. This involved letting go of the perceived environmental values I had adopted, and allowing myself to explore the possibilities and potential of what living in connection with, or more correctly, living *as* nature, truly meant in practice. It involved being open to the possibility that despite having my own body, I was inseparable from every other including non-human nature.

The process of unravelling self, and being open to explore ways of being in life and my part within the greater whole, required awareness and honesty about what I felt in my physical body: as this is my primary connection with/as nature. Through this identification and developing awareness of the sensitivities of the human body-as-nature, a process of deepening with the individualised self was enabled, disintegrating the

boundary of the individual and viewing the body as ‘porous’ and intermingled with other nature bodies (Malone, 2018; Neimanis, 2017). The application of this theoretical perspective is explored through parent(ing) practice in the following section.

Perceived Barriers to Parent(ing) Community Socioecological Learning

Research increasingly suggests that children and young people are spending less time learning with/in nature in the minority world. The reasons are attributed to spending more time indoors with digital technology (Crabb & Stern, 2010; Neumann, 2015); loss of natural spaces (Louv, 2006); safety concerns (Ridgers, Knowles, & Sayers, 2012); stranger-danger (Foster, Villanueva, Wood, Christian, & Giles-Corti, 2014), time pressures of families and educators, and fear about traffic, crime, pollution and nature itself (Malone, 2007; Malone & Tranter, 2003; Shaw, Anderson, & Barcelona, 2015; Sobel, 2008).

Rather than looking for solutions to these perceived barriers and problems, I explored different ways of conceptualising these issues as the parent of a young child. In the minority world setting where I live, the issues of crime, pollution and stranger-danger are very minimal. I have educated my daughter about traffic and nature from a young age, so that she is aware and responsible about self-managing for these dangers. In our home, we don’t use screen-time as a reward, as a child-minder and rarely for entertainment. Digital technology has a place and is used purposefully. I understand that natural spaces are becoming limited, and our lives time-poor. The time factor was what challenged me the most in our non-human nature intra-actions. Through de-imagining my understanding of time, I came to understand the importance of quality and *not* quantity in nurturing our relationships with/as nature.

Re-establishing the Parent(ing) with/as Nature Foundations

To practically implement the notion of understanding self with/as nature, the human body must be considered and understood as nature. To enable

this action requires the responsibility of caring for and treating the human body-as-nature in the same way we would nurture non-human nature. Through listening to the voice of the human body-as-nature, the depth of awareness and *feeling* that is gifted to each human body is restored and re-enabled; for children as well as adults.

When parent and child are equally responding to the voice of nature, binaries and hierarchies are dissolved allowing an authentic relationship to develop and create space for learning with/in/as/for community. My research found that developing an appreciation of the human body-as-nature subsequently enabled an authentic and embodied care to non-human nature. It was not planned, considered or thought about; it was just there. This idea was suggested by Weston (1996) who asserted that the human 'lifeworld' changes so that non-human nature "is more with us in all its endless fascination and power" (p. 43). That is, instead of tightly gripping to a perception of what we [as humans] think life and lives need to look like, we open to the possibilities of what can be realised when we respond to the human body-was-nature. Through this, humans are embodying and living in connection with/as nature. For example, instead of living in the perception of separate bodies in separate houses, the choice to be aware of the innate connection to human and non-human nature is activated.

One approach to applying this theoretical concept to parenting and living with/in/as/for community involves being a living inspiration: making choices that apply theory to practice. Adopting this approach to parenting aligns with the ideas of how modelling and mentoring by an adult, support children in understanding and appreciating the environment (see Chawla, 1999; Hyun, 2005; Palmer, Suggate, Robottom, & Hart, 1999; Sobel, 1996; Young & Elliott, 2003). For me this involved taking greater responsibility for my choices through listening more to my body-as-nature. For example, to the best of my ability I no longer make parenting decisions based solely on what I read in books or see in society. I use my innate knowing that is expressed through my body-as-nature to discern what is the best parenting choice in each moment that will support and honour my daughter, myself and all human and non-human nature. Sometimes I get it right and maintain a feeling of vitality and empowerment; other times I don't and feel exhausted. This is the communication of my body-as-nature and speaks loudly and clearly. The socioecological

learner as parent, does not take a direct instructional approach, instead adopting a role that gently supports the child to make choices based on what they *feel* (their innate wisdom) that is in consideration of them with/in/as/for their socioecological community.

Understanding self as a socioecological parent with/as nature requires an openness to explore the possibilities of human-non-human community, by deconstructing the binaries humans have established in their lives. My exploration of self and parent-child with/in/as/for socioecological learning is situated in everyday experiences. By adopting a posthumanist theoretical perspective, one that progresses past paradigms of understanding community limited to fields of practice, and through an honest, ongoing reflective process, community can be de-imagined for the parent and child. De-imagined where the human body-as-nature from a place of embodiment, a *feeling*, rather than an intellectualising or thinking. It positions the human body-as-nature as our first responsibility in the knowing that the care that is taken with our first priority flows onward and outward to the human-non-human nature community.

This research story indicates the importance and significance of breaking binaries and divisions, and exploring new territory for understanding socioecological learning. Such reconceptualising of learning with/in/as/for community cannot be fully realised without also considering the online space. The next research story invites you to delve into this relatively new community domain.

Online Communities as Socioecological Learning: Claudio's Story

Since the early days of the technological developments leading to the current usage of mobile smart technologies and social media networks, the understandings of the concept of online communities have been constantly evolving. In defining the process of learning with/in/as/for online communities, scholars highlight the importance of interconnected 'social interaction' and communication (Boyer & Roth, 2005; Hugo, 2002; Jorg, 2000). In socioecological learning literature, the concept of critical social interaction is regarded as a key component for both collective

learning and social transformation towards socioecological sustainability (Aguayo & Eames, 2017; Tilbury & Wortman, 2008; Webler, Kastenholz, & Renn, 1995). As pointed out by Webler et al. (1995), the learning process of individuals is dependent on social interaction, and when community members interact and become involved in collective participation, they can mature into responsible citizens.

With this in mind, and connecting with the ideas relating to socioecological learning presented in this chapter, learning processes occurring within online communities can be depicted from a social constructivist perspective – social interactions based on information transfer and active collaborative interactions that lead to social understandings and construction of knowledge, as in Communities of Practice and Communities of Inquiry frameworks (Bates, 2015; Lave & Wenger, 1991). The main premise here is that effective construction of knowledge is based on collaboration and mutual understanding through participant interactions. In relation to our quest to de-imagine and reinvigorate socioecological learning, and the learning process occurring with/in/as/for communities, online communities offer types of distributed social learning where individuals can self-direct their learning.

Distributed Learning, Heutagogy, and Socioecological Learning in Online Communities

Online communities allow for all learners, regardless of age or digital literacy and confidence, to have access to a continuum of technological networking tools. Within such online spaces, knowledge can not only be seen as socially constructed, but also as self-directed based on individual drive, yet in a frame of collective co-creation (Cook & Santos, 2016; Hemetsberger & Reinhardt, 2006). This approach emphasises authentic knowledge based on meaningful contexts, where experiential learning plays a key role in the construction of shared knowledge (Bruner, 1987; Vygotsky, 1987). Such a constructivist learning paradigm, afforded by technology and online networking spaces, allows for two further theoretical implications in regard to socioecological learning.

On the one hand, online spaces allow for the social distribution of intelligence, knowledge production and meaning-making, where such processes occur as a collective rather than an individual undertaking (Cole & Engeström, 2001; Russell, 2002). The implication here is that the generation of transformative social learning and change becomes a collective endeavour facilitated by online social networking platforms and tools, to which some scholars refer to as the extension of the individual mind into a collective cognition (Clark & Chalmers, 1998; Heylighen & Beigi, 2016). In this view, the socioecological learner becomes an integral part of a complex collective, intertwining biological and artificial distributed intelligence, where outcomes will depend on how the social interrelations and interactions co-evolve towards socioecological learning (Aguayo, 2016a).

On the other hand, learning processes occurring through mobile technology and online mobile social networking platforms provide a learning environment where learners can self-direct their learning, and moreover, self-generate their learning content and contexts (Garrison, Anderson, & Archer, 2000). In other words, online communities provide fertile ground for 'heutagogy' to occur (Blaschke & Hase, 2015; Hase & Kenyon, 2007; Luckin et al., 2010). Within heutagogical perspectives, the role of the teacher is to become a co-learner, not to direct the learning process but to learn alongside other learners. This touches on the Māori concept of 'Ako', where teaching and learning processes are symbiotic in nature and anyone can become both the teacher and/or the learner during the learning process, which is further enhanced through mobile online social media platforms and spaces (Sciascia & Aguayo, 2016).

Thus, online communities offer emancipating grounds for the socioecological learner. They can afford transformative types of learning environments, where learners can control and self-direct their learning, anywhere and anytime beyond physical boundaries and following their own motivations and needs. Online communities also allow learners to connect with others in a distributed mode, making the resulting sum (i.e. the collective knowledge creation) more than the individual parts. Online communities also blur the distinction between teaching and learning, by providing a learning environment where both can occur simultaneously (Sciascia & Aguayo, 2016). Finally, complex learning processes with/in/

as/for online communities are unpredictable in nature. The online setting enables the emergence of innovative and dynamically occurring social interactions, thereby facilitating the continual evolution of online communities and maximising the opportunities they afford. In this way, online communities help to realise the foundational tenets of social ecology identified by Wattchow et al. (2014): lived experience, place, experiential pedagogies, and agency and (social) participation.

An example of dynamic socioecological learning innovation *on the go* draws from the experiences of the #aaeer (Australasian Association of Environmental Education emerging researchers network) online community on Google Plus. Specifically, how the group initiated the task of responding to the provocations of the inaugural Australian Association for Environmental Education (AAEE) research symposium held at Hobart in November 2014 (see Aguayo et al., 2016; Higgins, Aguayo, & Boulet, 2016). Beyond the actual scope of those responses, the point to highlight here is how the natural evolution of this online community brought a set of unforeseen outcomes that were only possible through the 'walking the talk' of online collaboration (Aguayo et al., 2016). Note that the #aaeer online collaborative community later served as a seminal seed to activate further online communities of emerging researchers in environmental education across the globe, i.e. #eeer, #RedIEEEA-LA, and #RIESE-Chile (Aguayo, 2016b; Beasy, Coleman, Emery, Aguayo, & Higgins, 2016).

A key to the successful nurturing and evolution of online communities is the ongoing provision of guidance, facilitation and active moderation (Cochrane et al., 2013; Wenger, 1998). This calls for a set of key requirements for the successful unfolding of online communities in relation to exploring new ways for the socioecological learning. To nurture deep and meaningful socioecological learning through online communities, it is vital to account for relevant social, cultural and ecological dimensions. In addition, the heutagogical capacities of socially distributed online platforms, the critical thinking components required in developing self-directed knowledge, and the presence of a learning facilitator are also vital considerations in the successful use of online communities for socioecological learning.

These collaborative online communities evolved through the collective socio-techno learning to build knowledge. In the above research story this was about socioecological learning. Without the material substrate of the technology, the distributed, public, community of practice learning could not have been progressed – learning that was socioecologically based despite not being with/in nature. In the final research story, Helen explores socioecological learning that is firmly embedded with/in nature.

Mountains and Adolescent Assemblages for Socioecological Community Learning: Helen's Story

My studies inquiring into the positioning of nature in adolescents' lives have explored the place-based socioecological learning of young people in the remote Eastern Himalayan communities of northeast India (Widdop Quinton, 2015; Widdop Quinton & Khatun, 2019). I followed Barratt Hacking, Cutter-Mackenzie and Barratt's 'child-framed' methodology (2013) of collaborating with young people as research partners to give adolescents in the studies agency and voice. During 2012–2016, three cohorts of adolescent co-researchers (aged 14–17 years) from two villages contributed their 'insider' perspectives about place encounters in their lives. The lens of place created a generative, flexible focus for the research that softened the divides between myself as an adult, minority, English-speaking researcher and the adolescents from these less-privileged, English-as-a-second-language, majority contexts.

People-place relationships have been variously defined through framings of affordances, dependency, meaning-making, belonging and identity (see for example Gibson, 2000; Kudryavtsev, Stedman, & Krasny, 2011), demonstrating place as a conceptualised location within one's personal socioecological encounters and influential in terms of development, learning and wellbeing. Gustafson (2001) poses the interplay of self-place-others experiences as determinants of place-making but the 'other' of this theorising is other humans. In the geographies of the adolescents from Eastern Himalayan India, nature was essential to their place-making. Their lives evidenced a seamless integration of home, family, farms, village and the forest surroundings. They most valued places that benefit-

ted their family and community, aligning with others from collectivist and interdependent majority and Indigenous contexts (Panelli & Tipa, 2007). Nature was integral to their way of being in the world, with the adolescents displaying an intimate knowledge and an appreciation of the natural elements of their surroundings; a connection echoing traditional Indian philosophies of environmental care and connectedness (Almeida & Cutter-Mackenzie, 2011), and other Indigenous peoples' connectedness to 'country' (Parkes, 2010; Rose, 2013). Their socioecological community included self-place-human-non-human elements and interactions as an Indigenous way of being and becoming similar to other Indigenous people's emplaced, lived, familial ways of learning (Wheaton, 2000; Yunkaporta & Kirby, 2011).

Mountains as Lively and Agentic

The mountains surrounding the adolescents' villages were profoundly influential within their socioecological encounters. Experiences of landslides, weather, water availability, psycho-emotional restoration, cultural and spiritual symbolism, economic prosperity and societal change were entangled with the mountains. The powerful omnipresence of the mountains was a constant companion I felt as a visitor. For my adolescent co-researchers, the mountains were not just passive objects but deeply connected into their communities, entangled with their culture, their ecosystem dependence and sense of belonging, and the sometimes uncomfortable relationship with the beauty of the mountains and the tourists they attract with their money and litter.

The mountains were prominent in the adolescents' maps, photographs and stories of the important places in their lives, dominating the landscape, and a reminder of nature as the powerful timeless foundation of life. The mountains influenced their construction of identity, pride, cultural connections, spirituality, perspectives of nature, and views of economic development through tourism. The grandeur and uniqueness of the mountains resonated through the young people's material and spiritual lives. The mountain-adolescent relational space influenced their survival and aspirations, with their prayers written on flags to be spread

throughout the community on the wind from the mountains. The young people's images, such as in Fig. 8.1, and their comments below about their connections with the mountains, are examples of their socioecological learning with the mountains:

[Mount] Kangchenjunga is very beautiful and when I see it I feel new.

It is a very cold mountain and from this mountain many streams come down from this mountain which are very important and [I] likes the mountain.

The mountains are part of adolescents' socioecological community that shapes their learning and development – the entangled influences of family, friends, mountains, monasteries, forests, school, community elders, iconic cultural symbols and locations, and tourists, that enables their learning about themselves and where they fit into the world. “[P]laces *teach* us about how the world works and how our lives fit into the spaces we occupy. Further, places *make* us” (Gruenewald, 2003, p. 621 with author's emphases). The Himalayan Mountains are identified as a powerful actor in the construction of the socioecological community of the region (Negi, Maikhuri, Pharswan, Thakur, & Dhyani, 2017).



Fig. 8.1 View of the surrounding Himalayan Mountains above the clouds from Ghoom High School. (Ghoom teenager's photo, November 2016)

Akin to the socioecological learning encounters of children-mountain-rocks in Burnaby Mountain in Canada (Nxumalo, 2017), the adolescents of the Eastern Himalayan region interact with the mountains as part of their common world experiences that strengthen their being and becoming in the world. The mountains were not just passive objects in the background, but rather echoing new materialist and posthuman theorising of Nxumalo (2017) and Rautio (2013) that blur the boundaries between lively/inanimate, life/non-life of mountains and rock in socioecological encounters. The adolescents in India identified the mountains as active in shaping their community. Such perspectives unsettle accepted human-centric classifications (often originating in the sciences) of what is lively and agentic in socioecological communities, diverging from human social ecology perspectives of non-human nature and material elements of places simply as resources to supply human needs. Instead, by attending to the socioecological learning impacts of materialities and nature that are entangled in the ways adolescents learn about themselves and their place in the world, a new relational space emerges for considering socioecological learning with/in/as/for community. Attending to non-human community interactions, such as the Indian adolescents' with the Himalayan mountains can "create openings that unhinge the humanistic learning child" (Nxumalo, 2017, p. 5) from linear, developmental, human-centric conceptualisations of learning. This then opens up to possibilities of fluid assemblages of human-non-human-place community encounters for the socioecological learner.

These adolescents' stories of emplaced meaning-making explored through a posthuman lens trouble a humanist ontology by including the mountains as active agents in their learning and identity development; extending beyond entrenched, human-centric thinking "towards seeking possibilities for learning how to unsettle, rather than sustain what is inherited" of the Anthropocene (Nxumalo, 2017, p. 8).

Summary of Research Stories

Through these research stories, we have attempted to reconceptualise and de-imagine learning with/in/as/for community, using a posthuman fram-

ing to trouble and extend our thinking. The strong foundations of learning with/in/as/for community success are leveraged through different practices of situated, lived, collaborative and distributed, self-determined, online, public and private learning experiences. We identify and generate new ways of learning with/in/as/for community by engaging posthuman perspectives. Learning is considered through the social and ecological connectivity of community partnerships and place in Maia's story of collaborative environmental education; Simone's story of parent(ing) with/as nature; Claudio's story of co-created community online learning; and Helen's story of attending to the non-human other influences on learning. These stories of socioecological learning practices unsettle traditional approaches to learning and open up possibilities for enriching learning with/in/as/for human-non-human communities. By expanding our consideration of community beyond a human focus to the relations and inter/intra-actions with non-human other community, layered, rich common world learning emerges.

Conclusion

In this chapter literature, theories, and research stories of learning with/in/as/for community in a variety of settings has been mapped, from the perspectives of researchers, teachers, parents, students and with/as non-human community. Through these reflections, explorations and stories the potential of community to enrich socioecological learning is emphasised, particularly through a recognition of the central place of non-humans with/in/as/for community. It is increasingly recognised that learning is inextricably entangled with living, sharing, co-creating, and community – extending far beyond the boundaries of classroom walls and login passwords. Despite increased awareness, learning with/in/as/for community remains on the margins, and in humans' busy lives a sense of local community appears to be lacking. We explore and share posthuman perspectives and understandings around community; de-imagining community as a means to enhance socioecological learning. In attending to dimensions of social, ecological, human and non-human, the multiple actors and inter/intra-actions that co-exist are emphasised.

Nurturing socioecological learning with/in/as/for community demands shifts in thinking and being. In the school setting, such approaches involve the active facilitation of diverse and non-traditional partnerships, participation in meaningful and ongoing collaborative projects, and heartfelt attunement to the non-human. Parenting for socioecological learning repositions human bodies-as-nature, and posits that parents can encourage child with/as nature relations, and inspire their children through their own choices. A posthuman perspective acknowledges that socioecological learning extends into the non-human nature community. Emergent, co-constituted online learning signals online environments as new sites of socioecological-techno learning with/in/as/for community, although we do wish to caution that the online world can represent a danger for socioecological learners if mediating technology is not founded on values resonating with social and ecological justice. The examples of socioecological learning grounded in community explored in this chapter all disrupt the teacher-student binary. Teachers/adults/parents/non-human nature become co-learners and co-teachers, learning and teaching alongside each other. By unravelling learning through our research stories, we illuminate possibilities to move beyond humancentric perceptions of community, and enrich conversations and practices around socioecological learning with/in/as/for community.

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9

Socioecological Learners as Agentic: *A Posthumanist Perspective*

Marianne Logan, Joshua Russell, and Ferdousi Khatun

Abstract Agency, or the ability to act upon others within one's context, is central to socioecological activism. The socioecological learner, as an emergent agent, can thus begin to facilitate social, ethical, political, and environmental change. However, in this chapter we challenge the traditional notion of agency and activism by moving beyond a view of human-centredness to encompass the more-than-human. We acknowledge the power imbalance not only within and between human groups but also between humans and other inhabitants of the Earth. It is pertinent in the Anthropocene era, where ecological balance is supposedly 'regulated by humans' and where all living organisms are impacted, to rethink (or de-

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imagine) activism as a solely human endeavour and to propose an alternative view that encompasses other beings. This examination first outlines Foucauldian discourse theory that illuminates the possibilities for the disruption of power structures and illustrates the role of socioecological learners as activists before turning from a poststructuralist paradigm towards one rooted in posthumanism. This is complemented by research vignettes to provoke a broader understanding of agency and activism through a posthumanist lens.

Keywords Anthropocene • Posthumanist • More-than-human • Agency • Power • Resistance

Introduction

It is now suggested by many scientists that the Earth has entered a new geological epoch: the Anthropocene. The Anthropocene is characterised by intensified human action and impacts on the Earth's systems on a scale that is comparable to events of the deep past, such as meteorite impacts or continental collisions (Zalasiewicz, Williams, Steffen, & Crutzen, 2010). Chakrabarty (2009) describes how as well as being the biological agents humans have always been, humans are now also geological agents, a designation which attributes to humans "a force on the same scale as that released at other times when there has been a mass extinction of species" (p. 206). The impacts of extractive human activities and technological developments, including various forms of mining (in particular commodities such as oil, diamonds and gold), synthesis/use of new inorganic compounds, deforestation, waste management, and more, are all highly significant and not only impact living systems but reshape entire physical landscapes. Food is transported over thousands of kilometres from "paddock to plate" and the resulting shipping causes carbon dioxide emissions that contribute to climate change (Standage, 2009, p. 100). Climate-induced sea level rising as well as acidification of ocean systems are leading to mass extinctions and threatening the entirety of the Earth's living systems (Zalasiewicz et al., 2010). Genetic modification of species, new forays into artificial intelli-

gence, and technological advancements happen at an extremely rapid pace and depict a future of uncertainty.

While significant, the focus on natural processes and impacts belies a need to also think through the sociocultural impacts of the Anthropocene both materially and dialogically (Lövbrand et al., 2015). Social problems likewise are compounded by the human activities named above, among them environmental injustice and the unequal distribution of environmental harms in the direction of poor communities within majority countries (Bell & Russell, 2000). Current and future human conflicts will continue as a result of dwindling resources such as oil, water and arable land and the continued redistribution of waste and damages around the world. It is no longer novel to think of social and ecological concerns or violations as ‘separate’, hence the centrality of the term ‘socio-ecological’ throughout this text (Bell & Russell, 2000).

As a result of these complicated and life-threatening crises, the concepts of ‘nature’ and the boundaries of ‘human being’ require rethinking or de-imaging. Socioecological learners are not only confronted with a changing environment in the ‘Anthropocene’ (as a touchstone concept—see Chap. 1, this collection), they are also encountering changing perceptions of what it means to be human at this period in time. As a result, the actions that all socioecological learners take within their multispecies communities of influence are impacted in part by their understanding of these concepts as well as their sense of agency and self-efficacy. In this chapter, we take the need to politically and pedagogically respond to the naming and tracing of the Anthropocene as a starting point. While it is vital to be critical of the ‘Anthropocene’ concept, we consider theoretical perspectives such as Foucauldian discourse theory that inspire subjects and communities to cultivate and advance a sense of agency that motivates continued resistance, activism, and change in light of the challenges now faced. Posthumanism encourages us to challenge the anthropocentric domination in a learning sense as it repositions the human from a central and dominating position in our relationship with the more-than-human (Braidotti, 2013, p. 1). Building on the ideas asserted in Chap. 2 (this collection) we look at the perspectives of the more-than-human, and from the viewpoint of this chapter, their agency. Furthermore we contextualise socioecological learners as in dialogical and material relationships with

more-than-human others (Abram, 1996), and as a result we share ways in which these ‘others’ are agents as well through research ‘vignettes’. New conceptions of action and partnership are a core outcome of our posthumanist description of agency within the Anthropocene.

Conceptualising Agency Through a Poststructuralist Lens

Discourse theory and poststructuralism are theoretical positions that emerged during the 20th century as a means of disrupting extant minority world humanist ideologies. Such ideologies have often been attributed to the foundation of attitudes, values, and ultimately uphold infrastructures of violence, destruction, and inequalities that have been alluded to above. In this section, we present a brief overview of poststructuralism, with a particular emphasis on Michel Foucault’s descriptions of power, discourse, and resistance in order to paint a picture of agency as a practical goal of socioecological teaching and learning.

Poststructuralism evolved within the French intellectual community during the 1960s in critique of structuralist views that attempted to establish an objective, scientific approach to analysing culture and society (Dreyfus & Rabinow, 1983). Several prominent scholars have shaped poststructuralism including Jacques Derrida, Julia Kristeva, Gilles Deleuze, Luce Irigaray, Helen Cixous, Jean-Francois Lyotard and Jean Baudrillard (Rivkin & Ryan, 2004) and later Michel Foucault. Poststructuralism also tends to critique the humanist paradigms of cultural evolution, human exceptionalism, and binary opposition as well as their social impact (St. Pierre, 2000). Given the goals here, a poststructural point of view provides a perspective for exploring past, current, and potential future articulations of ‘nature’ and ‘human being’ as they evolve in response to social and ecological forces and ultimately influence *action*. While poststructuralism is often associated with the idea that meaning “can never be found,” poststructuralists are more concerned with how meaning evolves, where it is found historically and culturally, and how it is “produced or regulated” (St. Pierre, 2000, p. 485). To be able to understand activism in the context of poststructuralism, St. Pierre highlights

the importance of examining the key concepts of discourse, power, resistance, and freedom, and how they have been reconceptualised within a poststructural thinking framework. In the subsections below, we focus on Foucault's theorising in terms of his descriptions of power and discourse theory as a way to sketch out current theoretical visions of 'agency' and its implications for socioecological learners, before expanding that concept later.

Power

For Foucault, power is an all-encompassing framework that rejects the idea of justice for all (Chomsky, 2011). Foucault (1982, p. 786) defines power as: "that which is exerted over things and gives the ability to modify, use, consume, or destroy them." The 'how' is more important than the 'what' in terms of Foucault's understanding of power. Power-*relations* are more important to Foucault than power itself, and in fact he centralises relationality in stating that "the term power designates relationships between partners" (Foucault, 1982, p. 786). Foucault also saw the necessity to separate the relationship of power from the "relationships of communication" (communication being where information is transmitted by "language, a system of signs, or any other symbolic medium") (Foucault, 1982, p. 786). Foucault establishes power as beyond a singular act of repression or dominance. He questions the notion of power as being 'evil' or as being solely associated with repression, as power has often been relegated to the "hostile engagement of forces" (1980, p. 91). Rather, he suggests that "individuals are the vehicles of power, not its points of application" (1980, p. 98). Foucault highlights the importance of a critical attitude and how people have the power of language to be able to speak out for what they believe (Bazzul & Carter, 2017), that is to speak the truth. Foucault's work suggests that power is fluid rather than fixed and that it is "associated with a domain of possibility and consequently, of reversibility, of possible reversal" rather than being associated only with "domination and mastery" (as cited in Bazzul & Carter, 2017, pp. 443–444). Power in this sense does not only have to be "prohibitive and oppressive," or a force that "only constrains behavior" (Applebaum,

2004, p. 63). Socioecological learners can be vehicles of power as power can actually be constructive and revolutionary.

Foucault describes a form of power in everyday life in which individuals are categorised. That is, humans are known by specific terms of individuality, connected to identities that they begin to recognise and that others recognise as constituents of themselves (Foucault, 1982). This type of power is associated with individuals becoming *subjects*. Two meanings of “subject” are identified by Foucault. The first outlines subjection of one to another through “control” or “dependence,” while the second meaning conveys a sense of identity entailing self-knowledge (Foucault, 1982, p. 781). Both of these meanings relate to power relationships that are internalised by individuals and that are acted upon by larger institutions or structures. We unpack power relationships further in Vignette 1 and with a focus on the more-than-human/human relationship in Vignettes 2 and 3.

Discourse

Michel Foucault’s theory of discourse emerged in response to a milieu of changing knowledge and power structures in the second half of the 20th century (McKenzie, 2006). His works on governmentality, power/bio-power, state discipline, and sexuality have widely influenced the field of ‘social and cultural inquiry’ (Pitsoe & Letseka, 2013). To step back, the term ‘discourse’ has many definitions that are relevant here. Discourse of course relates to speech patterns and language, but in philosophical contexts, the term relates to the meanings and effects of conversations shared among groups of individuals in a particular context, and at a particular time in history (Pitsoe & Letseka, 2013). Foucault connects discourse to structures of power:

In any society, there are relations of power which permeate, characterize, and constitute the social body, and these relations of power cannot themselves be established, consolidated, nor implemented without the production, accumulation, circulation, and functioning of a discourse. (lecture 1976, in Foucault, 1980, p. 93)

Discourses have real impacts on humans' individual and social lives, as well as human identities because discourses work to make human's social conditions appear natural or pre-ordained; as a result, relations of power are often maintained through discursive means (Garvey, 1997; Pile & Thrift, 1995 as cited in McKenzie, 2006, p. 200). However, discourses are not static or unchanging. Foucault's notion of discourse in a state of change is significant in terms of a basis for agency and resistance:

We must make allowance for the complex and unstable process whereby discourse can be both an instrument and an effect of power, but also a hindrance, a stumbling-block, a point of resistance and a starting point for an opposing strategy. (Foucault, 1978 p. 101)

In a debate in 1972 with Noam Chomsky, Foucault highlighted the importance of being critical of discourses of power that are associated with institutions, particularly those that are perceived to be independent or neutral, including schools. He saw the necessity for people to expose the "political violence" that is so often concealed within such structures, so they can act against this violence (Chomsky, 2011, n.p.). Foucault warned that political power is much deeper than people realise. He discussed the importance of exposing the "invisible, little-known points of support" and "centres" where domination occurs, as these points of support are the institutions' genuine strength (Chomsky, 2011, n.p.). Foucault explained that this domination is the "instrument" or "condition that makes" the power possible; "the suppression of one is achieved through the exhaustive discernment of the other" (Chomsky, 2011, n.p.). Here Foucault has identified that by failing to recognise these points of power then there is a risk that they will continue to exist even after a 'so called' "revolution", has taken place (Chomsky, 2011, n.p.). It is important as a socioecological learner to be aware of how they might "unwittingly" participate in what is accepted as appropriate or "norms and conventions" within a powerful discourse such as their educational institutions or social contexts, and actually assist in maintaining the "norms or conventions" that discriminate against, or suppress a certain group (Applebaum, 2004 p. 65).

In an anthropocentric context, maintaining these conventions entails reaffirmation of the ‘norm’ that privileges humans over non-humans. A learner may be passionate about environmental issues such as climate change and marine health but inadvertently continue the anthropocentric behavior which is considered ‘the norm’ in their society. An example of this anthropocentric behavior might include: using language that separates humans and other animals, viewing the Earth as a resource for the benefit of humans, or supporting anthropocentric activities where other animals are disrespected or mistreated (i.e., performing dolphins or seals) (see also Vignette 3).

Agency—the capacity to of subjects to act in ways that influence others and events—emerges despite a subject’s nested position within existing discourses and relations of power. This occurs because of several key features of discursive power relations, among them freedom, resistance, and the mutability of language.

Freedom, Resistance, and Language

Poststructuralists resist the idea of liberation or emancipation, but maintain the importance of freedom (St. Pierre, 2000). Freedom is a construct that relates to power, and hence to resistance and activism. Foucault emphasises that power is neither “a function of consent” nor “a renunciation of freedom” (Foucault, 1982, p. 788). Freedom is seen by Foucault as an important element of power where power is a “mode of action upon the actions of others” (Foucault, 1982, p. 790). Foucault (1982) writes that power can only occur towards a subject if that subject is free; that is, it is possible for a subject to react or behave in a certain way. He contends that there can be no power relationship if a subject is physically restrained and not free, providing the example of slavery. With this understanding of power relationships unless there is the “means of escape or possible flight” there is no power relationship (Foucault, 1982, p. 794). As a result, even subjects within the most seemingly inequitable of power relationships can recognise and act of their own freedom or volition. The difficulty for the socioecological learner is in recognising the ways in which discourses act upon them in

order to critically challenge and de-imagine what is taken for granted or assumed.

Likewise, Foucault states that “there is no power without potential refusal or revolt” (Chomsky, 2011, n.p.). Resistance and noncompliance, which are associated with freedom, are at the centre of power relationships. Foucault suggests that life provides opportunities, or certain “moments” in “history” where people can resist and make change (St. Pierre, 2000, p. 493) such moments are illustrated in Vignette 1. While constrained by some external forces and structures, socioecological learners contend that one goal is to uncover the discourses and power relations that subjects come to see and take up as their own (Gough, 1999). As such, resistance becomes a “starting point” or a catalyst to expose power and locate the point of “application and the methods” used to exercise the power (Foucault, 1982, p. 780). For the socioecological learner “to understand what power relations are about” it is vital to explore “forms of resistance and attempts made to dissociate these” power “relations” (Foucault, 1982, p. 780). In a power relationship Foucault emphasises that there is always a choice to carry out resistance, otherwise it is no longer a power relationship. Additionally resistance assumes there is a relationship to change (St. Pierre, 2000). According to Foucault, resistance it is not about a kind of “revolution” where power is thrown out once and for all. Rather, resistance is better conceived of as “local, unpredictable and constant” (St. Pierre, 2000, p. 492).

Foucault (1982, p. 781) identifies three types of struggles (or resistance); these are: (1) struggles against domination (ethical, social, and religious); (2) struggles against the “exploitation” of individuals; and (3) struggles where an individual is tied to themselves and submitted to others (Foucault, 1982, p. 781).

The following vignette and accompanying drawing emerged from work conducted by Ferdousi and a student co-researcher, looking in particular, at the eco-literacy of Bangladeshi young people in postcolonial times. It illustrates the pedagogical possibilities of identifying, critiquing, and responding to discursive power relations within one’s context as we have described above.

Vignette 1

Niha, a young secondary student from Bangladesh, has been deeply influenced by the actions of the student activist role models in 1952 that led to reform and change (See Niha's drawing, Fig. 9.1). The background behind this drawing illustrates power, resistance and cultural freedom. From 1947 to 1971 Bangladesh was the East Bengal province (renamed East Pakistan in 1956) and under the dominion of Pakistan. The "all powerful ruling elite" from 1947 to 1958 comprised senior bureaucrats supported by the military and none of these bureaucrats were from East Bengali (Choudhury, 1972, pp. 242–3). During this time, under the guise of democracy modeled on the Westminster parliamentary system, there were no general elections and the Bengali people saw this 'so called' democracy as a "a farce, mockery and a fraud upon the electorate" (Electoral Reforms Commission, 1956, as cited in Choudhury, 1972, p. 242). The Pakistan government attempted to enforce cultural and language uniformity across the nation declaring that 'Urdu' was to be the national language. This move to language uniformity led to the East Bengali people believing their culture and language (Bengali) was disappearing (Choudhury, 1972). Here the individual rights and cultural identities of the people were threatened, leading to wide unrest but also prompted people to exercise power in the form of resistance movements in response to this domination. The government outlawed protests and meetings of this resistance movement in East Bengali. On February 21st, 1952, students from Dacca University (now the University of Dhaka) in East Bengal, in defiance of this ruling, took action in the form of protests to attempt to protect their precious language and culture ultimately leading to the death of three students (Choudhury, 1972). This incident, known as the 'language movement' only strengthened the Bengali resistance movement. In the period leading up to the formation of Bangladesh in 1971 there were many lives lost from people resisting domination and taking action to protect culture and identity (Choudhury, 1972). Prior to independence, during the 1971 war surrounding this resistance, "gross violations of human rights" occurred including the rape of 200,000 women, similar to those in Rwanda, Bosnia and Democratic Republic of

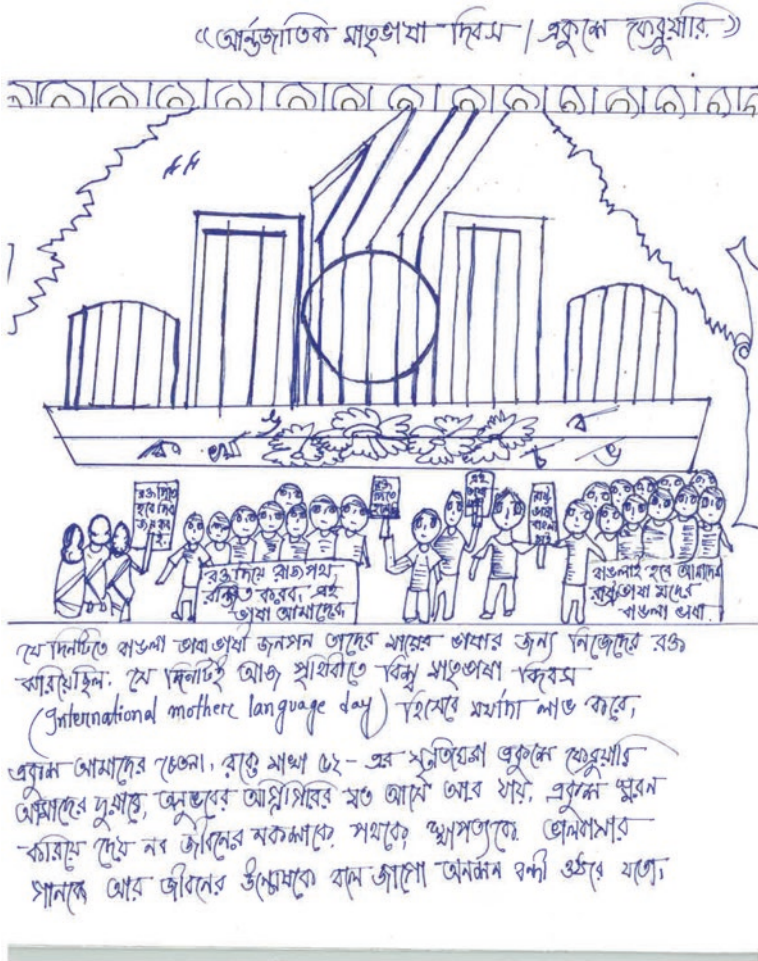


Fig. 9.1 Niha’s drawing on “International Mother Language Day/21st February” with slogans such as “Bengali will be our national language” in front of the Martyr’s Memorial at the campus of the University of Dhaka [Translation of text: International Mother Language Day is the day when many Bengali people sacrificed their life for their mother language. The 21st February is in our consciousness and we celebrate every year relating to many people’s life in the year 1952. This day reminds us about the way of new life, the Martyr’s monument, and songs of love, and reminds us to make people aware of the sacrifice of these students]

Congo in times of war (von Joeden-Forgey, 2010, p. 74). This exercise of power and domination was extreme but after a period of political turmoil and resistance independence occurred in 1971. Bangladesh in the 21st Century is steeped in postcolonial attitudes and a history of violence, resistance and liberation, and Islamic law influences governance. It is out of this cultural and religious background that Niha shared her drawing (Fig. 9.1) that illustrates the influence of these three young student activists in 1952, who took action for their treasured Bengali language and culture and lost their lives. In fact, school students in Bangladesh in 2018 carried out acts of resistance against governments and corruption surrounding the death of two students by a speeding bus and these protests led to violence by the police and resulted in student injuries (British Broadcasting Corporation, 2018).

As demonstrated in the vignette above, language plays a key role in the recognition and enactment of agency. “Language” according to Saussure, a 20th Century linguist, “is a system of signs in which the only essential thing is the union of meanings and sound-images and in which both parts of the sign are psychological” (Saussure, 2004, p. 59). Subjects are identified through systems of language and subsequently, subjects take up a linguistic position in which to speak even if the position is not one they consciously choose (Applebaum, 2004). This is significant in terms of power structures and identity. Generalising of terms can lead to loss of identity (Applebaum, 2004). Poststructuralist critiques highlight the damage that linguistic classification structures can do, particularly with the identity of “disadvantaged groups” and they seek to make language visible where the meaning is never fixed but is in motion depending on the context. In this sense, poststructuralism privileges difference over identity (St Pierre, 2000, p. 480). Poststructuralism urges socioecological learners to examine their own position when it comes to social or environmental justices and the structures and barriers that language reinforces (St. Pierre, 2000). Building on this poststructuralist discussion relating to language, the term ‘animal’ is exemplary. While humans are scientifically categorised as animals, the term ‘animal’ is generally employed in such a way as to exclude humans. Humans may assume that they are somehow separate from, or superior to, other animals. Oakley et al. (2010) highlight the importance of ‘specific language choices and openness’ in order

to move away from this separation of humans and other animals, which has real, material consequences. Learners and educators are urged to consider language choice and to be aware of its impact in privileging humans over the more-than-human.

Passion for environmental and social justice and grasping moments in history to resist and make change where injustices occur, particularly taking up power and inspiring others to locate and expose those subtle discourses that perpetuate injustices towards the more-than-human and human, are hallmarks of the socioecological learner as activist. However, much poststructural theory—and as a result the critical pedagogies that draw upon poststructuralism—upholds an anthropocentric point of view. This critique has been acknowledged and explored elsewhere, often leading to calls for a wider, more inclusive call for analysis and practice in education (Bell & Russell, 2000). The positioning of non-human animals, plants, living beings, ecosystems, and even ‘nonliving’ objects as less than or outside of the realm of concern hinges on many epistemic and ethical assumptions that have been systematically challenged and critiqued by those in animal studies and posthumanism (Russell, 2016). In this exploration of the agency of socioecological learners, we align with the posthumanist view that embraces a wider sense of agency and critiques the discursive, linguistic, and institutional power relations that allow for continued injustices against human and more-than-human beings.

Reconceptualising Agency Through a Posthumanist Lens

Posthumanism acknowledges the humanistic past of so-called Western, Enlightenment-based traditions and seeks to deconstruct their anthropocentric legacy. In particular, we consider the posthuman touchstone, most notably that of a flat ontology (see Chap. 1, this collection) that breaks down the facticity of human dominance and rejects the idea that humans are ‘privileged’ over all other beings. A posthumanist position can be used as a pedagogical and navigational tool to reconceptualise the place of human beings in our changing milieu. While humans have impacted

every part of the Earth's dynamic ecosystem, they are not alone in their histories of action and in their ability to respond. Therefore it is timely that humans embrace their interrelationship with the "more-than-human" (Braidotti, 2013, p. 5) rather than continuing to privilege themselves at the expense of all others and arrogantly believing that 'humans know best'. The term more-than-human is used in this chapter to encompass all living things and the Earth's elements, and attempts to reposition other species, ecological systems, and even the biosphere itself as agential (Abram, 1996; Lovelock, 2000). We acknowledge here that many traditional indigenous cultures have always embraced the interrelationship of all things (including humans) within the Earth's dynamic ecosystem. For example, the New Zealand Māori, the *tāngata whenua* (Indigenous people of the land) of Aotearoa, recognise that "the language and land comes together bundled up in symbiotic relationship with, and alongside, seas, skies, and all manner of creatures" (Skerrett & Ritchie, 2018, p. 5). We likewise embrace the touchstone term 'common worlds' (see Chap. 1, this collection) to avoid the separation of human societies, multispecies communities, and the Earth as a dynamic system rooted in ontological relationality.

The aim here is to reconceptualise the idea of agency as a socioecological learner as beyond that of mere human action. Such work has been taken up in various posthumanist accounts elsewhere, providing insights into pedagogical possibilities for decentering the human (Gough, 2004; Lloro-Bidart, 2017; McKenzie, 2009; Pedersen, 2010). Helena Pedersen's description of posthumanist theory in education is perhaps a prime example, as she provides both an excellent description of posthumanism and an historical account of its philosophical evolution as it pertains to education in particular. Pedersen writes that "'posthumanism' in the context of education research has not primarily been concerned with cross-species intersubjectivities, agencies, and entanglements, but has rather been understood as a *symbolic* decentering of the human subject" (Pedersen, 2010, p. 243). So what would it mean to consider and articulate cross-species 'agencies' as a socioecological learner?

Building on definitions we have already provided, agency is also articulated as being related to "choice and self-determination" (McKenzie, 2006, p. 201) or to the "minorities ability to influence their own lives" (Hribal, 2007, p. 102). Agency involves multiple kinds of actions within

and across the histories of power structures, discursive systems, and institutions over time. McKenzie, drawing on discourse theory, defines agency as “the ongoing process of (un)making ourselves through explorations of our positioning within discourse” (2006, p. 203). This is an illustrative definition for the critical learner who seeks to work toward goals that encourage action and resistance. Applebaum (2004, p. 68) connects agency to a subject’s moral position, that is one’s critical awareness of power in relation to others, such as the privileges of being white in a minority society. Applebaum (2004) warns that this is an ongoing process, and educators of privileged students need to constantly encourage their students to “interrogate their moral motivations,” de-learn ways that they may see themselves as being “good”, and dig deeper about how language, power, and discourse shape their identity (p. 71). This discussion of agency can be applied to a critical awareness of Anthropocentric positioning, emphasising a need to continually interrogate how lifestyle, language and attitudes may privilege humans as having dominion over all things. A posthumanist account of agency seeks to destabilise the notion that human activity is somehow different-in-kind or completely separate from the agency of more-than-human others or of the Earth as a dynamic ecosystem.

It is important then to acknowledge how more-than-human beings demonstrate agency, particularly within relationships with humans. This is perhaps most obvious in the activity of more-than-human animals. For example, a horse returning home against the wish of a rider, or a dog barking and showing aggression to prevent a person entering his/her home demonstrates agency and resistance. Moving into the world of plants, Franklin (2006) describes the ability of Australian Eucalyptus trees (gum trees) to replace rainforest plants (due to rainforest trees susceptibility to fire and Eucalyptus trees fire tolerance) “as a dance of agency” (p. 562). The ‘dance’ continued once Australian Aboriginal peoples arrived in Australia and started practicing their fire technologies and burning became more frequent (Franklin, 2006). Some Eucalyptus trees became so fire dependent over time that without regular burning germination did not happen (seeds required the heat of the fire to stimulate germination). White settlers also joined this ‘dance of agency’ taking part in widespread clearing of Eucalyptus forests. The dance of agency contin-

ues with this iconic component of the Australian landscape and the feared fire regimes, where Eucalyptus and humans are “mutually constitutive” of each other and are “affected by each other in embodied or physical terms” (Franklin, 2006, p. 560).

The concept of agency being considered in more-than-human others has its skeptics. The anthropocentric views associated with some cultural and religious beliefs promote clear separation between humans and other animals therefore the concept that animals have agency, which is considered a human trait, is rejected. Likewise, many scientists and philosophers argue that agency is limited to humans and any view that suggests otherwise is considered “misplaced anthropocentrism” (Steward, 2009, p. 228). Steward (2009) describes behaviouristic scientific methodology as being rigidly interpreted and she believes this rigidity conceals the notion of agency relating to other animals. Like biological scientists, many psychologists resist the idea of agency in other animals. Since the 17th Century many psychologists have interpreted other animal behaviour using a “mechanistic conception or perception and action” approach (Withagen, Poel, Araújo, & Pepping, 2012, p. 250). With this mechanistic perception, the environment was perceived as “meaningless and consisting merely of matter in motion” in fact meanings were only thought to originate in the human mind (Withagen et al., 2012, p. 251). Gibson (1966, 1979/1986) rejected this mechanistic view of other animals being like ‘puppets’ who were controlled by their environment, instead he believed that other animals had agency (as cited in Withagen et al., 2012). Withagen et al. (2012) highlighted the significance of the environment in the emergence of the agency of other animals.

The values of empathy and emotion appear to be present in other animals although this is also an area of contention with some scholars. This empathy and emotion certainly appears evident in the relationship between animals such as the affection and apparent empathy displayed by cats and dogs towards each other or towards their human partners. However, we take care not to project humanist values or ‘universal qualities’ upon the more-than-human, as human values could accentuate the human/more-than-human divide and may not take into consideration the individuality of each species or the interrelationship between all species and their environment (Braidotti, 2013, p. 79). This interrelationship of all things in the Earth’s ecosystem where no being is privileged

over the other is central to our posthumanist position and our flat ontology. We see socioecological educating and learning as embracing the Earth's ecosystem and the interrelationship of all elements and organisms. Unfortunately many school educational curricula foster human dominion over the more-than-human and the Australian curricula is no exception despite having sustainability as a cross-curricula priority where the organising ideas, systems state that “all life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival” (Australian Curriculum, Assessment and Reporting Authority [ACARA], para 4, 2018). Rodriguez (2016), in her review of the Australian Curriculum Science revealed the following underpinning philosophies:

- a separation of human and the more-than-human;
- an absence of care for other animals; and
- humans being placed as “managers and administrators of nature and other species” (p. 1018).

We urge socioecological educators and learners to examine curricula with a posthumanist mindset and provide learning experiences that embrace the more-than-human as agentic.

The following vignettes illustrate pedagogical contexts wherein the more-than-human world demonstrates agency, in ways that support our theoretical position in this chapter.

Vignette 2

Three decades ago there was a small degraded rainforest remnant on a property where Marianne lives in North Eastern NSW, Australia, with cattle roaming through. The land is situated in the area of the Big Scrub Rainforest, where prior to British colonisation, it was the largest continuous lowland subtropical rainforest in Australia. Aboriginal peoples from the Bundjalung Nation are the traditional custodians of this rainforest area, and have been for thousands of years, and are deeply interconnected with this dynamic ecosystem (Gordon, 2017). However, after colonisation

in the 19th Century, there was enormous physical and cultural change (Parkes et al., 2012). The magnificent cedar trees, with valuable timbers perceived as ‘red gold’ were logged by the European ‘cedar getters’ (Gahan, 2017). Then followed the lure of the fertile volcanic soils for farming, including the rich red soils originating largely from the basalt of the Wollumbin volcano, renamed Mount Warning by the English explorer, Captain Cook (Hundloe, 2015). After European settlement, this land was given by the New South Wales (NSW) Government to white colonial settlers, largely from England, Scotland and Ireland. They were required to ‘improve the land’ which meant clearing this dynamic ecosystem for agricultural purposes (Gahan, 2017). Consequently within a few decades, less than one percent of the original rainforest remained (Parkes et al., 2012). The Aboriginal peoples were “displaced and removed from their traditional lands” at this time (Parkes et al., 2012, p. 212). However, within these remnants and beyond, the elements of the Big Scrub rainforest demonstrate agency, where despite the decimation of this rainforest, many plants such as trees, shrubs, vines and herbs species in this Big Scrub area continue to regenerate on these volcanic red soils (Figs. 9.2, 9.3, and 9.4).



Fig. 9.2 Rainforest remnant growing where open pasture occurred thirty years previously. (Australia, 2018; image by Logan. Reproduced with permission)



Fig. 9.3 Young hoop pines (*Araucaria cunninghamii*) emerging in the rainforest remnant. (Australia, February, 2018; image by Logan. Reproduced with permission)



Fig. 9.4 Advanced Hoop pines (*Araucaria cunninghamii*) growing in the rainforest remnant. (Australia, February, 2018; image by Logan. Reproduced with permission)

It is a power struggle of the plants, their dispersal agents such as birds, bats, marsupials and elements of wind and water, and the human impact such as: farm machinery slashing the plants, clearing for building purposes, and cattle and other animals trampling over or eating the plants. In addition, the invasive non-indigenous weed plants compete with the rainforest plants for water, light and nutrients and smother the native vegetation (introduced plants such as camphor laurel *Cinnamomum camphora* or madeira vine *Anredera cordifolia*). In this protected rainforest remnant and other remnants within the Big Scrub region, rainforest species have prolifically regenerated. Ancient trees—such as the hoop pine (*Araucaria cunninghamii*) (Fig. 9.4), which date back to Jurassic and Cretaceous periods—and other rainforest trees have regenerated to form a canopy with shrubs, vines and epiphytes (ferns such as staghorn ferns growing high up in the canopy). Under the rainforest canopy native grasses and herbs have replaced weed species and the rainforest provides habitat to a multitude of animals and other living organisms including endangered animal and plant species. Many of these rainforest plants regenerate in areas that are inaccessible for farm machinery, on land that no longer has cattle grazing, or on properties where people have actively encouraged the regeneration of the Big Scrub Rainforest (Fig. 9.5). Despite the recognition of this ecosystem as an Endangered Ecological Community (under the NSW Threatened Species Conservation Act, 1995 and ‘Lowland Rainforest of Subtropical Australia’ and as a Critically Endangered Ecological Community under the Federal Environmental Protection and Biodiversity Conservation Act 1999) (Parkes et al., 2012, p. 213), the power struggle between the rainforest elements and human impact continues (Fig. 9.6), largely surrounding human development or agricultural endeavours.

Vignette 3

The Australian Brush Turkey (*Alectura lathami*) is a species that is threatened by habitat destruction. Both in NSW and Queensland much of the natural habitat of this species has been cleared and this animal is a protected species in both NSW and Queensland (NSW Government, 2018; Queensland Government, 2018). With decline in numbers in the early



Fig. 9.5 An example of a young strangler fig tree growing and surrounding an older strangler fig tree. (Australia, 2018; image by Logan. Reproduced with permission)

20th Century, the turkey, increasingly in the past three decades, has shown agency as it often makes its habitat in urban gardens. An Australian Broadcasting Commission (ABC) news report titled ‘Man v Bird, the Brush Turkey battle’, reveals the attitudes of many people towards the Brush Turkey: ‘Brush turkeys have already spread like cane toads across south-east Queensland and now have marched en masse into Sydney’s North Shore’ (Collerton, 2009). An urban ecologist from Griffith University Queensland, Professor Darryl Jones said:

once a pesky male brush turkey has decided his mound, his nest which he uses to attract females, is going in your backyard, it’s all downhill from there. It’s just about impossible to get rid of the guy... Once he has decided that’s where he’s going to put his precious mound, which is the most important thing in his world, and nothing will dissuade him. It happens all the time. People say ‘I’m sick to death of that bloody bird’, so they spend



Fig. 9.6 Bangalow palm (*Archontophoenix cunninghamiana*) emerging in the built environment. (Australia, 2018; image by Logan. Reproduced with permission)

back-breaking hours spreading it all back out again. Next morning they wake from their exhausted sleep to find it all back in place. It's like the turkey is saying 'look I've made a big decision about where my mound is going and look buddy this is it, I'm staying'. (Collerton, 2009)

The male brush turkey builds a mound, from leaves and mulch in the area close to his nest. This involves large amounts of leaves being moved by the bird (Figs. 9.7 and 9.8). Once the mound is a suitable size female turkeys (if they find the male and his mound suitable), deposit their eggs in holes in the mound (Fig. 9.9). The male turns the mulch on the mound to ensure the temperature of the eggs is kept constant. When the babies hatch from the eggs and climb out of the mound they do not receive care from either parent and are vulnerable to predation. The ABC news report illustrates the Anthropocentric attitude of people towards the turkeys as



Fig. 9.7 Turkey mound built close to carport. (Australia, February, 2016; image by Logan. Reproduced with permission)



Fig. 9.8 Scrub turkey raking the leaves to build his mound. (Australia, July, 2018; image by Logan. Reproduced with permission)



Fig. 9.9 Male and female scrub turkey on mound. (Australia, October, 2018; image by Logan. Reproduced with permission)

people regard these birds as pests and look at ways they can get rid of these birds from their private gardens. The urban ecologist, Professor Jones, suggests people use the following methods to ‘fight off’ the turkey:

But don’t despair – there are few things you can do to fight off the bothersome creature. Apart from shelling out the big bucks for a pest control person to come and take them away....the best way to deter them is to make it really hard for them to rake. They spend all day everyday raking the ground with the big feet of theirs, so what you can do in places that are vulnerable, is put down chicken wire. They absolutely hate that because every time they put their foot down it gets caught in that wire. So it looks horrible for a while but after a week or so, the birds abandon the whole thing and move on. (Collerton, 2009)

Following what appears to be advocating unpleasant (bordering on cruel) prevention measures to remove this bird from urban gardens the ecologist changes heart and urges people to “embrace the brush turkeys as these birds

are not going anywhere” ... “It’s like climate change – we have to adapt to their presence, rather than mitigate against them” (Collerton, 2009).

Humans often create gardens around their homes for the ‘social nicety’ of living in a community or for the aesthetic pleasure and colour. It is common for the more-than-human animals such as small birds and butterflies to share these urban spaces. However, if an animal such as a brush turkey moves into the garden and causes disruption or perceived damage to this land that the human considers ‘their own’, then with an Anthropocentric mindset humans try and remove or sometimes kill the animal rather than learning to live alongside this more-than-human who has shown agency to share a habitat. More-than-human animals have shown similar agency and ‘moved in’ closely to share the habitat within the big Scrub Rainforest with Marianne and her family (Figs. 9.10, 9.11 and 9.12). These more-than-human neighbours possibly had ancestors inhabiting this area for hundreds of thousands or millions of years, so



Fig. 9.10 A potter wasp building a nest under a roof of a home. (Australia, 2018; image by Logan. Reproduced with permission)



Fig. 9.11 A carpet python in a box of screws. (Australia, 2018; image by Alan Logan. Reproduced with permission)

essentially it is humans that have ‘moved in’ to share this habitat with a multitude of more-than-human others.

Our posthumanist interpretation encourages socioecological learners and educators to promote understanding of the importance of the more-than-human and human cohabitation and this position commands respect for the more-than-human as agentic. Similarly, Cutter-Mackenzie and Young in Chap. 2 (this collection), building on Whitehead’s (1920) concept of bifurcation of nature, allude to the de-bifurcation of nature where the notion of humans and nature being separate is overturned. This is a very complex position as Vignette 3 illustrates, despite the human desire to connect with the elements and the more-than-human, once this connection becomes uncomfortable humans often attempt to disconnect the more-than-human from themselves rather than working towards coexistence.



Fig. 9.12 An Australian ring tailed possum in a home shed. (Australia, 2018; images by Alan Logan. Reproduced with permission)

Conclusions

These vignettes highlight the agency that emerges in a posthumanist view of human relationships with more-than-human others. Agency, within both poststructuralist and posthumanist traditions, is inherently relational and connected to both power and to the discursive traditions that shape human lives. Yet, those who develop and exercise their agency—whether human or more-than—are capable of intentional acts of resistance, and of remaking their communities and worlds. Education for socioecological learners can evoke the kind of recognition and reflection that upholds such views by taking seriously intersubjective, inter-related positions as beings in multispecies systems. It is important to fully acknowledge the agency of all beings and recognise the harmful structures of power surrounding humans when they place themselves in

a hierarchical position above the more-than-human. We argue that in the 21st Century, in the Anthropocene, moving to a posthumanist paradigm is fitting to fully decentre or deterritorialize the human, embrace the more-than-human, and respect the interrelationship of all things.

The naming of the Anthropocene has been both an important and a contentious moment in history, evoking a time for both individual and societal reflection on the past, present, and future of ‘nature’ and of ‘human being’. If, for example, “nature is envisaged as a multiplicity of localizable material points that form the bodies and locales of all existence,” then it becomes clear that relations of power between the many kinds of bodies and locales that make up the biosphere are a key point of pedagogical interrogation and sociopolitical activity (Debaise, 2017, p. 17). At the very least, the concept draws attention to the existing actions of agents of change, both human and more-than-human, that seek to de-imagine historical and contemporary inequities and imbalances. Likewise, the Anthropocene has implications for future thinking, de-learning, and action as well. We don’t purport to having all the answers as to how we could incorporate this posthumanist thinking towards agency in the complexity of the Anthropocene. However, we hope that this chapter encourages the socioecological learner to further reflect, discuss, and practice a discourse that enables and supports the agency and actions of myriad human and more-than-human beings.

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10

Un/Folding Socioecological Learning: *An Aesthetic Portrayal*

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Abstract The final chapter in this collection is presented in the form of a poetic portrayal as Creative Milieux for the socioecological learner. Through the engagement of the touchstone concepts of the Anthropocene, Posthumanism and Common Worlds we reclaim the socioecological learner through the engagement of such Creative Milieux as entangled concepts. Using Hemingway's 6-word memoir as a creative pivot, and the praxis of enabling constraints, this chapter dovetails the collection, not as summary but rather as a launching.

Keywords Anthropocene • Posthumanism • Common worlds • Creative milieux • Socioecological learner • Visual essay • Fold • Unfold

(With 6 word memoirs by Judith Wilks, Marianne Logan, Angela Turner & Wendy Boyd)

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Orientation

The concept of the socioecological learner is an entangled, fluid and complex positioning as has been explored in this collection. The touchstone concepts of the Anthropocene, Posthumanism and Common Worlds as Creative Milieux support and further exhume socioecological learning. In the previous chapters, it is clear how these concepts have been put to work. This working of ontological and epistemological de-territorializing opens up the space for de¹-learning and de-imagining the learner, socioecologically.

The notion of the *socioecological*, in and of itself is sticky, knotted in ways that are inevitably humanist. For the purposes of our conceptualising, however, we argue that at the core of socioecological learning is a posthumanist praxis. In dwelling in such tensions and such stickiness, we find it useful to de-imagine the socioecological, deterritorializing socioecological learning, deconstructing human authority in the context of the Anthropocene. In engaging Latour's (2013) framework of common worlds, together with posthumanism in the Anthropocene, the socioecological learner is a relational, flattened, ethical and political proposition. Yet significantly, such positioning may often 'background' aesthetic concerns, which we see as perilous to socioecological learning, since multifaceted, unique uncommon moments in children's learning are often made possible "through which the common world of nature is felt, perceived, and experienced differently" (Rousell & Cutter-Mackenzie-Knowles, 2019, p. 1). It is with this in mind that notions of creative milieux foreground distinctive and relational qualities of ecological-aesthetic experiences.

To this end, this chapter seeks to build upon of the ideas and intentions in this collection, reclaiming and revealing socioecological learning as a deeply aesthetic, creative, emplaced, transcendent, enfolded, common world, posthuman praxis in the context of the Anthropocene. This pleating and unwrapping of socioecological learning is explored through Deleuze's (1993) conceptualisations of the fold, before unpacking creativity and aesthetics in the context of socioecological learning. These theorisations then support a lift-off of creative and enabling constraints posited as a visual essay (Burke, Lasczik Cutcher, Peterken, & Potts,

¹ De meaning 'from' in Spanish.

2017; Cutcher, 2013; Cutcher & Boyd, 2016; Cutcher & Rousell, 2014; Cutcher, Rousell, & Cutter-Mackenzie, 2015), which aesthetically portrays and visually theorizes (Lasczik Cutcher, 2018) socioecological praxis. Engaging Lasczik Cutcher's (2018) argument regarding critical, visual theorising, we argue for a more egalitarian and aesthetic communication of the concepts expressed in this chapter. As she argues (p. 93),

When we open ourselves to the possibilities of communication through languages other than those that are penned, we open ourselves to 'encounters with forces and passages of intensity that bear out, while occasionally leaving bare, the singularly and intimately impersonal – even sub-personal and pre-personal – folds of belonging (or non-belonging) to a world' (Seigworth & Gregg, 2010, p. 3). The processes of communication through visual languages, potentially transcend the barriers surrounding the written, and thus are egalitarian, inclusive and democratic: conceivably accessible to all.

Such a praxical linguistic turn both troubles and performs Deleuze's (1993) conceptualisation of the fold, which is assembled in the next section, before exploring creativity and aesthetics as a plateau (Deleuze & Guattari, 1987) for the visual essay to follow.

Folding-Unfolding Socioecological Learning

Folding – a line, crease, hill or hollow. This is not a typical definition of folding which readily refers to something being covered. Deleuze (1993) challenges traditional notions of folding and unfolding contending that any organism:

... is defined by its ability to fold its own parts and to unfold them, not to infinity, but to a degree of development assigned to each species... The simplest way of stating the point is by saying that to unfold is to increase, to grow; where as to fold is to diminish, to reduce, to withdraw into the recesses of a world. (pp. 8–9)

At this juncture (in the final chapter of this book), the concepts of folding-unfolding are useful in further understanding the touchstone concepts

of the Anthropocene, posthuman and common worlds as they are in an endless dance of folding and unfolding through a creative milieu. Examples of this dance are scattered from chapter-to-chapter, whether that be through the semblance of the Cane Toad, Chimpanzee, interview with a tree, Kosi the pedadog, the agentic feats of the rainforest breaking through or the brush turkey's fortitude, Big History learn/ing/ers in a post-Anthropocene world or visual ecoli affectivities. While on the surface these appear as separate or distinct moments or milieux they are intricately interconnected through amassed matter – *physical and metaphysical substances occupying space and mass*. The point is that organisms are “enveloped by organisms, one within another (interlocking of germinal matter), like Russian dolls” (p. 8).

Enveloping organisms can be seen in the human body itself, where the body is more bacteria than human. The same could be said about Chimpanzees (humans' closest animal relative), or trees that mostly constitute carbon dioxide interspersed with bacterial leaf spots, blights and shoot blight. Of significance is that two thirds of the Earth's biodiversity is bacteria, and in that sense it is bacteria that are responsible for the folding and unfolding of amassed matter as bodies and objects decompose and “folds in upon itself, abruptly involuting into the again newly dormant seed by skipping all intermediate stages” (Deleuze, 1993, p. 8). Thus death is an impartial and incomplete concept as matter always remains. In the context of the Anthropocene or post-Anthropocene, humans will remain whether that is in their current form or as folded matter.

What this book does is provide touchstone concepts for folding and unfolding socioecological learning which enable one to de-learn and de-imagine a new post-Anthropocene world where humans are not at the centre.

Creative Milieux Put to Work Through Enabling Constraints

In such an enveloped and enfolded positioning, and in engaging the touchstone concepts as creative milieux, it is timely to consider the nature of creativity in this framework, before a contextualising of the creative milieu portrayed in this chapter as a visual essay.

Creativity has variously and idiosyncratically been defined in the educational literature, yet, “there is no consensus on what creativity is” (Lucas,

Claxton, & Spencer, 2013, p. 7). Glăveanu (2010, cited in Piper, 2017, p. 61) asserts that “creativity is not the product of a ‘disconnection’, but of deeply rooted ‘connections’ between person and environment, self and others, creator and culture”. Creativity has been variously described as applicable and apparent in all aspects of life, multifaceted, learnable and strongly influenced by context (Lucas et al., 2013). The literature on creative thinking is plentiful, as it is seen as core to contemporary learning, and indeed is included in the Australian Curriculum as a General Capability (Australian Curriculum and Reporting Authority [ACARA], n.d.). Yet there are many barriers to engaging in creativity in learning and insufficient enablers (Hotko, 2017), largely because of a perceived enigma around the nature of creativity and how it can be put to work.

In this chapter, we posit that it is exactly the notion of creativity as an ecology (Harris, 2017) that may be assembled with and through the socioecological touchstones as advanced in this collection. When thinking-with the notion of the creative milieu as argued in Chap. 1 (Cutter-Mackenzie-Knowles et al., this collection), we begin from the middle, directing thought to a situated yet simultaneously transcendent suite of relational and resonating vibrations that synthesise affective and sensational rejoinders. Since a milieu has shifting materiality, creative milieu may indeed be, as Glăveanu (2010, cited in Piper, 2017) argues, rhizomatic.

Engaging creativity and appropriately, creative milieu usefully in socioecological learning as we have in this chapter, is dependent and occupies all of the touchstones (Posthuman, Anthropocene, Common Worlds). Putting these concepts to work for the socioecological learner as resonating, affective, sensational and creative forms allows for (among many other things) a practice-led, aesthetic and visually privileged praxis. One way to do this is through the engagement of enabling constraints (Manning & Massumi, 2014; Rousell, 2018).

Enabling constraints are particularly useful when working-with creativity or working-through creativity, as they delimit pedagogies and protocols and allow for focus and divergent thinking within and through imposed parameters. Enabling constraints “collaboratively “catalyze” movement toward the emergence of the new” (Manning & Massumi, 2014, p. 93) and set the conditions for creativity, the engagement of imagination and the opportunity for expression. Aesthetic interactions, intra-actions (Barad, 2003), processes and outcomes occur. Manning and

Massumi further explain (2014) that an enabling constraint is positive, dynamic and emergent – so that something nascent and new can transpire.

As in Chap. 7 (Rousell et al., this collection), we sought to compose an essay visually using photography and short textual, poetic passages to exile academic text and thereby operate as expressive of conceptual thought and creative action. The visual essay accordingly, is activated *as* theory, *as* artwork, *as* exhibition, *as* action (Lasczik Cutcher, 2018).

Thus, the socioecological learner in creative milieux materialises as aesthetically positioned, imaginative and fundamentally tied to the touchstone concepts that are at the core of this collection. Ecologies of creativity, enabling constraints, affect, sensation and learnings are then able to be experimental, useful in rupturing thought, thereby opening possibilities for action and engaging socioecologies as an event in the making (Rousell, 2018).

In mapping a pathway into a creative milieu by engaging the touchstone concepts, we sought to activate enabling constraints by limiting the focus of our actions. We held the space of creativity through the use of propositions presented by Whitehead (1978, p. 22), as a “matter of fact in potential,” as an enabling constraint (Manning & Massumi, 2014). As the editorial group, and in an online meeting, we sought to open our thinking by moving immediately away from our computers to venture outside for a short foray. The movement from virtual space to actual space was a deliberate drift re-activating the senses and re-engaging affect. The propositions were then:

Note your environment.

Think of the Touchstone Concepts.

Take a photograph.

Write a six-word memoir.

The reason we decided on the six-word memoir (Rousell & Fell, 2018) is that it was an enabling textual and visual constraint that forced thought into action (Manning & Massumi, 2014), extruded through imagination and inspiration. By constraining our scope, materials, time and space, we were able to diffract thinking, respond to affect and sensation, and allow creativity its breath.

The resultant visual essay is portrayed below.

Six-Word Memoirs for Socioecological Learning: A Visual Essay

Lexi: Common Worlds/Posthumanism



Complex life worlds that lie beneath

Amy: Posthumanism



Life
and death
dancing as compost

Wendy: The Anthropocene

Water tower:
Quenching
thirst,
creativity,
communication



Angela: The Anthropocene



human - animal interaction; species empathy gap

Marianne: The Anthropocene/Posthumanism



The earth heaves
under our feet

Judith: Common Worlds

Unique, relational: A child's ecological-aesthetic experiences



Last Words

Earth
地球
Tierra
Föld
הארץ כדור

Across all the human languages Earth has a different name with the common origin of soil or ground. In the opening chapter of this book we commenced a process of clearing the ground so as to de-territorialize the learner. This was a declaration of the collection's flattened ontology, or at least its attempt at a flattened ontology where all objects are equal in their beingness. The touchstones of Anthropocene, Posthumanism and Common Worlds as Creative Milieux represent what might be possible in socioecological learning where humans are not at the centre. This represents a new kind of learning or de-learning or de-imagining as we phrase it, where rather than relearning or reimagining we commence at the position of 'from'; from-learning or from-imagining. While 'from' represents a starting point, it also represents the middle and no end where learners and learning oscillate through foldings and unfoldings infinitely, productively, generatively.

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Afterword: Green Shoots in the Shadow

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I have been privileged to watch this inspiring project evolve since its inception. Invited to give a short presentation on ecological economics at the inaugural gathering, I then sat back to listen. Speaking from a variety of backgrounds and personal experience in teaching sustainability at all levels across education, the authors' roundtable discussions ranged far and wide. Frustrations, passions, concerns and questions emerged. Momentum gathered. A frisson of revolution was in the air.

The authors told stories of how surprised they were when watching the delighted reactions of children with nature, and of the awe nature inspired. They spoke of the curiosity of children when introduced via excursions, to the science of the origins of life and even, yuk, the role of fungi. They spoke of the insights offered by children participating in artistic activity involving nature and of the creativity in stories of nature told by children from majority (lower income) countries; and they

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spoke of the value of stories themselves, in pedagogy. An unease was expressed about the lack of a deep engagement with sustainability in the present curriculum (in Australia in particular) and the seeming 'tokenism' of what was included; and about how the joy and spontaneity in learning could be lost in rules imposed from 'above', for example, in the number and extent of forms needing to be filled in simply to take children into an excursion with nature. Among many other things, they explored new ways of teaching about biodiversity and they spoke of the genius of how nature actually functions, and the need for industrial design to imitate this.

After tapping deeply into the literature, these disparate beginnings cohered into the radical re-imagining (or de-imagining as they call it) of educational theory and practice that is now presented. As I see it, this new thinking highlights students' lived experiences, particularly ecologically inspired experiences, and shifts the focus from the products of learning to the process of learning. Importantly, that process breaks down the silos of separate disciplinary inquiry and is transdisciplinary, looking from all angles, at how problems might be understood and solved.

The socioecological learner is familiar with managing the risks they take. From nature, the socioecological learner learns resilience, the miracle of nature's design and an understanding that resources are to be left for future generations. Human dominance is reframed within whole systems and deep ecology thinking where humans are one of many species within encompassing, interconnected systems. The sociological learner also learns the importance of community connections and how to have an ethical and political role in community.

As I reflect on this now, I cannot help but wonder what difference it might have made if past students of economics (my discipline) had been grounded in the principles of socioecological learning. Would it have been so easy to accept the textbook picture of an 'economy' as that frenzy of human-dominated activity that exists completely in the absence of any containing environment? Might students have re-imagined something a little more realistic? An economy that draws on material inputs and vital

ecosystem functions from the surrounding biosphere, depositing dangerous wastes back into it, perhaps? Could these students have accepted without question that an economy can keep on growing, expanding in scale, forever? Even today, most introductory economic textbooks, still depict the economy as a closed circular flow of goods, services, and money. The sources of the inputs into the system and the final destination of its waste, are not mentioned. This circular flow expands a little, year on year, but, into what? *Only into the blank white space of the textbook page!* There is no finite containing biosphere and no concept of the overall scale of the economy within the earth's biosphere.

Why does such an unrealistic view of the economy exist in mainstream economic theory? Perhaps the answer is most simply explained using Kenneth Boulding's (1966) metaphor. Mainstream theory was developed at a time of 'the cowboy economy' – wide open spaces, new lands to colonise and no apparent shortage of resources. Now, as the population and scale of the economy has grown, we have a 'spaceship economy' – one where resources are limited and wastes will poison the containing atmosphere. In the paradigm of the spaceship economy, there will be dangers evident in a continual expansion of the economy. Suddenly, it becomes clear. On spaceship earth, we have to ask the question nobody wants to ask: How can we keep on growing without further damaging the environmental systems on which we depend?

Economic growth has immediate and undeniable benefits for human societies. Many millions of people have been lifted out of material poverty in recent decades. But there is also a widespread attitude in the public mind that all growth is good and can go on indefinitely. No politician or party can query this and hope to retain political support. Those within the economics discipline who have queried the net benefits of growth – the ecological economists, have been somewhat marginalised. The ecological economists do draw the 'box' around the economy, calling this the biosphere. Yet this again raises awkward, and not often asked, questions: If it is acknowledged that the sheer scale of the world economy may be moving into the biosphere and 'using up' a limited capacity for future

growth, how much ‘space’ (in the sense of the finite capacity of the natural world) is being left by the minority rich countries for the majority countries to grow into? How much space is being left for future generations?

This all matters because it creates an acute dilemma for politicians and policy-makers. To employ all those who want jobs, and to raise the taxes that will fund vital services such as education, health, and public safety – an economy has to grow. To maintain the incomes of those who are employed, the financial system in which the incomes are banked must also grow. Growth allows the financial system to pay interest on deposits and borrowers to repay loans. If the financial system fails the economy collapses and human society descends into chaos. Yet if there *is* economic growth to a point where vital ecosystem processes begin to fail, the economy fails.

This dilemma arises at a time when the shadow of the Anthropocene threatens to pose humanity’s greatest challenges. Not least among these will be the impacts of the changing climate brought about by exceeding the capacity of our atmosphere and oceans to absorb the emissions of fossil fuel use. Already locked into the atmosphere now for many hundreds of years, trapped emissions will lead to rising sea levels, hotter temperatures, acidifying oceans, more frequent bushfires, increases in the number and intensity of tropical storms and further biodiversity loss (Codur & Harris, 2017; IPCC, 2014; Steffen, Rice, & Alexander, 2018). These costly and disruptive impacts will continue throughout this century and beyond.

To survive at all, life in the biosphere must adapt. Those who acknowledge the dangers and challenges ahead now speak of a ‘dark optimism’ in which new technologies and new skills are needed to manage disruption on an almost unimaginable scale. Dark optimism places hope on the effective education of the young. I believe that the new educational pathways this book opens up, will provide the new green shoots so critical to developing better theories and better skills. This de-learning and de-imagining¹ is an act of immense significance.

¹ *De* meaning ‘from’ in Spanish.

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