THINK PIECE

Embracing Love as an Educational Force in the Anthropocene

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Abstract

In the past decade, an increasing number of geologists and other scientific researchers have presented evidence that we have entered a new geologic epoch called the Anthropocene. The primary characteristic of the Anthropocene, researchers argue, revolves around the combination of an emerging and measurable sedimentary layer of increasing human artifacts (mostly plastics) in combination with significant and negative transformations within the Earth's biodiversity and climate systems. In this article, the researchers were interested in exploring how anthropogenic events will likely affect educational systems and institutions through multi-decade environmental audits and educational planning that are more closely linked to addressing the world's major anthropogenic problems such as climate change and a global loss of biodiversity related to human development and activity. This article concludes by exploring how anthropogenic forces might be redirected as human catalysts for a more positive environmental and geologic legacy.

Keywords: *Anthropocene, anthropogenic force, environmental education, educational catalysts, emotion*

The Earth, according to an increasingly diverse group of scientists, is definitively in a new geological epoch called the Anthropocene. Waters et al. (2016) documented the widespread traceable deposition of 'technofossils' within the Geologic Time Scale. This has been confirmed by researchers in Asia (Dong et al., 2020) and Africa (Odada et al., 2020). The geologic evidence in these and other studies is not as charismatic as fossils like *Tyrannosaurus rex* that demarcated the Jurassic period. Most of these technofossils consist of manmade plastics and concrete aggregates, sooty layers of carbonised fossil fuels, and the increased acidification of the world's ocean. These technofossils illuminate a significant history of diverse and complex anthropogenic events currently raging across the planet and include the negative effects associated with climatic change such as global rises in ocean and atmospheric temperatures, deforestation/desertification, extreme weather, and a global rise in the world's major oceans (IPPC, 2014). The impact on the planet's biodiversity is enormous. Recent studies have indicated that 10-25% of the Earth's species may be

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threatened or extinct by 2050 (Thomas et al., 2004; Barnosky et al., 2011). Whether or not we are in an extinction event that will equal or exceed the previous five mass extinction events is debatable (see Kolbert, 2014). However, the sad legacy of this new epoch is an increasing awareness that many of the world's increasingly rare and endangered species are failing to evolve rapidly enough to survive the significant challenges brought on by these anthropogenic events and altered ecosystems.

According to the Merriam-Webster Dictionary, 'anthropogenic' is defined as "of, relating to, or resulting from the influence of human beings on nature" (2016). The geologic research of Odada et al. noted that "widespread modification of the landscape and environment has brought humans to the fore as a formidable force of nature" (2020, 1). While this can be considered as a geologic force, it is important to interrogate the human legacy of destruction labelled as the Anthropocene. In addition to its definition as a geologic term, the Anthropocene can also be framed within other cultural, historical and social contexts. As such, the contemporary usage of this term must acknowledge the disparate influence of humans within industrial, economic and neo-colonial contexts whereby former (and current) colonial, industrial and economic powers exerted a greater negative anthropogenic force than the people they exploited and marginalised. The result of this environmental degradation is another form of racism, colonialism and compounded intersectional injustice.

As Table 1 indicates, both climate change and the increasing threat to the world's biodiversity are influenced by *anthropogenic catalysts* and *anthropogenic forces*. Within this context, the primary anthropogenic catalysts revolve around overall population of our species and its associated levels of human industry and development. Rising populations and increasing levels of industry and development are likely to influence natural systems in more significant ways than decreasing populations and vice versa. Anthropogenic forces too, within the context of this article's desire to spawn debate, can have an impact on the environmental rates at which anthropogenic catalysts effect anthropogenic events such as climate change and loss of biodiversity. These anthropogenic forces – intelligence, engineering, and emotion (fear, desire and love) – will be discussed in the rest of this article.

Events & Effects	**Catalysts**	**Anthropogenic-Forces**
Climate change: As a dynamic process the effects of climate change over time will vary around the world. Some of the most important effects that are likely to impact life on Earth include: ■ Global temperature ■ Rising oceans ■ Extreme weather ■ Desertification	*Human population:* While humans have shaped local environments since the evolution of our species, evidence would suggest that the rapid rise of the human population, from one billion in 1800 to more than seven billion today, exerts change on an increasingly global level.	*Intelligence:* Our ability to think, imagine, plan and solve problems is perhaps the most important element of our success as a species. As Orr (1994, 2011) and other scholars have argued, intelligence may lead to our undoing as well. *Engineering:* From the earliest tools to the most modern inventions, human engineering has not only shaped us as a species, but increasingly changed many parts of the world as well.

Events & Effects	Catalysts	Anthropogenic-Forces
Loss of biodiversity: There have been at least five major extinction events in Earth's history. Many scientists believe we are on the cusp of the sixth great extinction due to rapidly decreasing populations of plants and animals around the world. Reasons for these population declines include: ■ Exploitation ■ Habitat change ■ Development	*Human industry and development:* While we may be the last remaining tool-using hominid on the planet, *Homo sapiens* is also the most inventive and productive member of this family. We have invented a diverse range tools, chemicals and technologies that have benefitted countless millions of people. Unfortunately, many of these have an increasingly deleterious effect on the environment. Our ability to transform the surface of Earth through human development is best observed from the International Space Station.	*Emotion:* Human emotion in combination with intelligence and engineering can exert a powerful influence on individuals, society and the environment. ■ *Fear* – In an environmental context, fear may act as a barrier to problem solving and/or anxieties about change. ■ *Desire* – Greed may drive us towards actions that are contrary to our environmental well-being while hope may offer motivation to bring about change. ■ *Love* – Within an environmental view, love fosters connections to nature and may inspire us towards empathy and stewardship.

Table 1: *Anthropogenic events, catalysts and forces*

While some may consider it hubris to label a new geologic era after a single species when compared to large scale natural events and extinctions such as the Cretaceous Impact and/or Ordovician eruption, 65 and 450 million years ago respectively, the increasing deposition of technofossils throughout the planet and their lasting geological and environmental impacts are worth considering in more detail. What does this new epoch mean for educators? If the purpose of our formal system of K-12 education is, as the British Columbia Ministry of Education (2016) states, to enable students "to develop their individual potential and to acquire the knowledge, skills and abilities needed to contribute to a healthy society and a prosperous and sustainable economy" then perhaps, as the nominated species of this period of geologic history, we need to dramatically rethink what our educational systems, institutions, and learning processes are doing within the context of anthropogenic events. However, before pushing the reset button upon our educational systems and processes, it might be instructive to revisit its failures a century ago.

In 1916 the world was immersed in a great war with itself and nature when two well-known educators were cementing their legacies in Canada and the United States. John Dewey would publish his most famous work *Democracy and Education: An introduction to the philosophy of education* while teaching at the University of Chicago in Illinois. In British Columbia, Donald MacLaurin was preparing to take over the fledgling Normal School programme initiated by his successor William Burns. More than a century later, both educators continue to have a profound impact on the educational landscape and institutions around the world. Yet, for environmental educators today, the work of these important

scholars and the systems they sought to influence in 1916, illuminated a profound gap within educational systems and the natural environments around them evident to this day. This is exemplified by the mission statement from Ministry of Education in British Columbia above and the vast majority of other similar educational mandates and mission statements by states and provinces throughout Canada, the United States and other members of the Commonwealth.

Consider the educational experiences and events teachers would have experienced in a 30-year career starting in 1916. Over the course of their work, these educators and their students would have experienced the boom/bust economic and environmental cycles of the Roaring Twenties and Great Depression. Chief factors influencing environmental change during this period would have been the rapid mechanisation of fishing and timber industries and the large-scale construction of British Columbia's hydroelectric dams which also stored water for agricultural purposes. All these large scale industrial and agricultural projects would have significantly impacted the local environment as evidenced in declining salmon populations, old growth forests, and related conversion of sagebrush and other lowland habitats for agricultural production. Although the most well-known environmental catastrophe during this period, the Dust Bowl, occured farther to the south, significant environmental degradation emergedenvironmental degradation emerged in the Pacific Northwest in the decline of fisheries, loss of habitat, and sedimentation of spawning sites due to the relatively uncontrolled clear cutting within this region. The Second World War would have ended the career of any retiring teachers from the original 1916 class.

While an awareness of humanity's impact on global climate systems was still decades away during this time, there was plenty of evidence pointing to rapidly deteriorating populations of terrestrial and aquatic species and the habitats they relied on. It is interesting to note that the roots of outdoor/wilderness education, conservation biology, natural resource management and early climate discoveries all emerged during this same period. Little was done, however, to infuse these areas of knowledge within formal educational systems outside of generalised nature studies and walks, where accessible, from schools. Indeed, in concluding his doctoral thesis in 1936, MacLaurin wrote, "There has been little that has been spectacular. Slow but certain evolution, not revolution, has marked the events of the years. Revolutionary idealism has been held in check constantly by conservative sagacity." (p. 354).

It is evident that (and perhaps most interesting), when looking back from a historical perspective, both these educators failed to recognise what indigenous knowledge could have contributed towards the creation of environmental ethics and curricula to address the issue of habitat loss and biodiversity. While Dewey noted the importance of outdoor education and experiences earlier in his career from both a pragmatic and utilitarian perspective, in a later speech entitled *Freedom* (1938), he expressed his concern to conserve nature: "We have a somewhat congested population and we have much less accessibility of natural resources, partially because in those earlier days we wasted so much of our patrimony; we failed to conserve it, thinking our opportunities would remain boundless…" In Canada,

MacLaurin (1936) seemed to dismiss local knowledge existing prior to conquest and the infusion of Western scientific ideas into education as well:

> The beginning of anything almost always provides a peculiar interest. That period in the history of any land when the dawn of scientific discovery begins to dispel the dusk of mythical legend presents a magnetic attraction. … The middle of the eighteenth century leaves the northwest coast of America still in the dusk of mythical legend. (p. 1)

As devout Christians, both men would have been culturally encapsulated in the dominant religious views of the time that envisioned wilderness and uncontrolled nature as something that was foreboding and dangerous. Famed environmental historian, Roderick Nash, wrote that European settlers and their descendants imported deeply held views on "wilderness as a fact and symbol permeated the Judeo-Christian tradition" (1982, p. 8). Nature, according to the new citizens of the time, should bow to the wills of men and provide an endless bounty of gold, timber, salmon and other wealth which was rapidly being exploited during this period. It was only later in life that Dewey would begin to see the folly of this worldview and argue for more careful management of the commons (public lands), as noted above.

Walking and learning in educational buildings a hundred years later, we seem to be in an entirely different era. But looks can be deceiving. Despite the rapid emergence and evolution of environmental science, policy, and education since the sixties, the educational gap described earlier largely remains in place. Educational systems continue to be oriented towards society, industry and economic interests to the exclusion of environment and natural systems. Reflecting back on the cultural and environmental experiences of our predecessors teaching a century ago, it is evident that educational systems need to realign their programmes to meet new realities of life in the Anthropocene. What is needed in this new epoch are educational programmes and processes that not only acknowledge the extraordinary period we live in, but also which assist in reshaping the anthropogenic forces underlying them: intelligence, engineering, and emotion.

Intelligence

In a series of landmark essays, noted author and environmental educator, David Orr, explored the problem of education and intelligence. It is not possible to comprehensively examine the diverse academic views on intelligence in the limited space here. However, as Orr noted, it is possible to describe intelligence in ecological and environmental contexts. To Orr, there was a fundamental difference between intelligence and cleverness. He wrote:

> Cleverness would have us advance a narrowly defined, short-termed, and anemic self-interest at all costs and at all risks. But cleverness, pure intellect, is just not intelligent enough. Its final destination is madness. Intelligence would lead us, on the contrary, to protect biological diversity, but for reasons that go beyond the calculation of self-interest. The surest sign of the maturity of intelligence is the evolution of biocentric wisdom, by which we mean the capacity to nurture and shelter life – a fitting standard for a species calling itself *Homo sapiens*. (2011/1992, p. 250)

Intelligence on a global scale exhibits itself very differently from intelligence on an individual level. For the purpose of this article and our discussion, intelligence is a powerful anthropogenic force capable of influencing human populations and their actions in profoundly significant ways.

Engineering

Engineering is a second anthropogenic force and here too the work of David Orr is significant. In an essay comparing the work and contributions of Aldo Leopold and Albert Speer, Orr (1994) noted how unchecked industrial engineering can lead towards tremendous human suffering as Speer's talents in this area for the Third Reich significantly extended the horrific suffering that occurred during the Second World War. Engineering within an anthropogenic context refers to the impacts, both known and unknown, that human industry and development exert upon natural systems. A good example of this would be the early development of refrigeration and its effects on the ozone layer. In this case, the initial development of a highly desired and useful technology by society had unintended and long-term environmental consequences that persist, despite policy and technological changes in this industry. Like intelligence, engineering in this context primarily is measured at a global scale rather than at the individual or community level. In many ways as an anthropogenic force, engineering is the fulfillment of intelligence and emotion.

Emotion

The final anthropogenic force discussed here is a messy one: human emotions. For the purpose of this discussion, we will focus on three: fear, desire, and love. Again, the work of David Orr and other scholars such as Richard Louv and David Sobel are pivotal as each of these writers explored important aspects of emotion as they relate to education. Like intelligence and human engineering, each emotion is multifaceted and not easy to describe. We can begin with fear.

Within an anthropogenic context, fear is a powerful emotion capable of arousing cautious awareness and anxieties about different issues that may spawn individuals and/or communities into action on behalf of the environment and there is a tremendous body of work supporting this. Consider the emotion and concern underlying Rachel's Carson's *Silent Spring* (1962) or, more recently, Richard Louv's *Last Child in the Woods* (2004). These and other works illuminate how personal and professional fears about the plight of birds, other species, the climate, pollution, and the lives of children today are forged into a call for environmental action and educational reform. Fear can also lead to environmental inactivity and become a barrier to substantive action as it might force individuals and communities into making changes despite their impact on the environment.

Desire is the emotional reserve from which both environmental greed and hope can be drawn. As a selfish act, greed from an anthropogenic standpoint, ignores the needs of others, including nature. Orr wrote, "In the conquest of nature and of other men, the rhythm changed to those of the business cycle, the product cycle, the electoral cycle, the seasons

of fashion and style … the rhythms of commerce, greed, power, and violence" (2011/1992, p. 42). However, in this context, desire is also linked to hope which, when combined with environmental wisdom and engineering, allows for the possibility of an environmental re-awakening to the possibilities that may overcome our fear of inaction. For Orr, hope is fundamentally different to environmental optimism: "Authentic hope is made of sterner stuff than optimism. It must be rooted in the truth as best we can see it, knowing that our vision is always partial. Hope requires the courage to reach farther, dig deeper, confront our limits and those of nature, work harder, and dream dreams." (2011/1992, p. 326)

For the purpose of this article, we are left with the most powerful environmental force: love. As an educator, David Sobel was aware of the power of love as it relates to children and nature. In an essay on the problems of ecophobia and environmental fear in education, he noted:

> If we want children to flourish, to become truly empowered, then let us allow them to love the Earth before we ask them to save it. Perhaps this is what Thoreau had in mind when he said, 'the more slowly trees grow at first, the sounder they are at the core, and we think the same is true of human beings'. (1998, sec. 8)

Orr challenged us as educators as well:

> Why is it so hard to talk about love, the most powerful of human emotions, in relation to science, the most powerful and far-reaching of human activities? And why is this so for textbooks written to introduce the young to the disciplined study of life and life processes? An introduction would appear to be a good point at which to say a few words about love, awe, and mystery and perhaps a caution or two about the responsibilities that go with knowledge. This might even be a good place to discuss emotions in relation to intellect and how best to join the two, because they are joined in one way or another. (2011/1992, p. 31)

Like our young teachers graduating in 1916, we cannot fully predict or prepare future educators for the next three decades. But unlike them, we have access to tools, technology and information that would be the envy of any teacher preparing to work a century ago. Yet, despite all our advances and environmental awareness, educators must overcome the historical disconnect still existing between educational systems and the natural world. This is a significant problem as many post-secondary programmes define environmental education as both a profession and field that can be encapsulated within the context of individual tenured positions (when funded) and optional electives rather than integrating deeper and more meaningful change within the institutional culture itself. If we are to empower human populations and industry with the intelligence, engineering, love and hope that our planet requires, then perhaps we need to start by changing the educational institution itself. While many environmental educators such as Sobel (1998) and Louv (2004) are in tune with the power that emotional forces may convey as it relates to the aesthetics and feelings we want students to develop with nature, it is important to couple these experience with the environmental intelligence Orr has written about, and the

ability, as young engineers, to build this. In the next 30 years, our students will live in an increasingly technologically autonomous and digitally connected world which is likely to contain at least two billion more people than today. What will they need to know as it relates to anthropogenic knowledge and the human forces and emotions underlying it?

Note: In writing this article it became evident that the issues of hubris and cultural bias weave themselves throughout this topic. Regarding hubris, it is our belief that while humanity as a whole may exert both a force and increasing impact on this world, nature, as exemplified in the 2020-21 Pandemic, has a way of humbling life on this planet. In terms of cultural bias, the term 'Anthropocene Epoch' and the environmental damage/evidence that presently identifies it was primarily created by the most developed and industrialised nations at the expense of many cultures and societies whose contribution to these environmental problems would be negligible within a geologic time scale. As briefly noted in this article, this is an event that can be culturally pinpointed but more work needs to explore different cultural effects within geologic time. We hope that these interrelated errant dispositions against people and the planet can be realigned through a different paradigm of education as explored in this article. Anthropocene then, while representing a negative destructive force, for us is a hope that these errant humans can be brought back into the fold of humanity and a more sustainable Earth.

Notes on Contributors and their Contributions

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Percentage contribution

Areas of contribution	Author	Percentage contribution
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	Monk	50 %
Data collection	Hammond-Todd	50 %
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Analysis and interpretation	Hammond-Todd	50 %
	Monk	50 %
Drafting the paper	Hammond-Todd	50 %
	Monk	50 %
Critical review of paper	Hammond-Todd	50 %
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