

## On the certainty of entanglements with ecocide: pragmatic action for responsive pedagogy inspired by ecological psychology and permaculture

Roxanne Finn & Louise Gwenneth Phillips

To cite this article: Roxanne Finn & Louise Gwenneth Phillips (2021): On the certainty of entanglements with ecocide: pragmatic action for responsive pedagogy inspired by ecological psychology and permaculture, Educational Review, DOI: [10.1080/00131911.2021.2001438](https://doi.org/10.1080/00131911.2021.2001438)

To link to this article: <https://doi.org/10.1080/00131911.2021.2001438>



Published online: 14 Dec 2021.



Submit your article to this journal [↗](#)



Article views: 183





View related articles [↗](#)



View Crossmark data [↗](#)



# On the certainty of entanglements with ecocide: pragmatic action for responsive pedagogy inspired by ecological psychology and permaculture

Roxanne Finn <sup>a</sup> and Louise Gwenneth Phillips <sup>b</sup>

<sup>a</sup>School of Education, University of Southern Queensland, Toowoomba, Australia; <sup>b</sup>Faculty of Education, Southern Cross University, Coolangatta, Australia

## ABSTRACT

Inspired by youth concerns for environmental justice and pathways forward that sustain diverse biology, we draw upon ecological psychology to theorise learning. This novel proposition, against the tide of cognitive constructivism, proffers a non-dualist paradigm more aligned with the purpose and intent of those seeking ecological justice and responds to calls for theory to support place-based education. Additionally, theory from ecological psychology lends support for understanding how ecocide is sustained and why work that inspired the environmental movement over half a century ago, such as Rachel Carson's *Silent Spring* has seemingly remained ignored and derided in the broader public realm. We provide some clues as to how that ignorance is perpetuated via understandings of perceptual learning theory. Finally, we map a pathway forward to respond with permaculture activism and offer a unique and solutions-based narrative that inspires hope in the face of catastrophe.

## ARTICLE HISTORY

Received 8 December 2020  
Accepted 26 October 2021

## KEYWORDS

Ecocide; ecological psychology; learning theory; pedagogy; permaculture; activism

## Introduction

Discourse of uncertainty in education is popularly discussed at present. In this theoretical paper, we offer an alternative drawing from the sentiment of Alexander's (2015) notion of "crisis as opportunity" as a way out of uncertain times. The certainty of entanglements with ecocide is fleshed out as the unaccounted cost of growth-based economies, and schooling is positioned critically. From an eco-behavioural stance, youth activism towards justice for biodiversity and life-sustaining ecosystems, enacted as protest, can be understood as an expression of learning via emergent encounters with the world as it is experienced directly. Attention to the complex and dynamic relationality of organisms and environments holds the potential to open doors to perception of the multi-system crises creating contemporary ecological predicaments, and map pathways forward. Youth activists' demand for ecological justice can be productively responded to if learning is understood in this holistic way. Theories from ecological psychology will be outlined in this paper to support the illumination of the tangle of values and concerns that animate

action. Pedagogical responsiveness to the actions of youth activists and to the multiple and complex facets of the ecological crisis more broadly, is considered from the standpoint of educators. Some pragmatic directions to inspire further action are outlined. Specifically, the permaculture movement and accompanying ethics of people care, earth care, and fair share, is proffered to further develop activism in everyday actions. We look to permaculture for pragmatic educative possibilities to inspire hope, and clear directions for future possibilities that draw wisely from the past.

### **The certainty of the unaccounted valuing of natural systems**

Recently, the theme of educating in “uncertain times” has been popularised; for example, we note the October 2018 special issue of the *European Journal of Teacher Education*. Collectively the papers in the issue adopt a rhetoric of uncertainty as they describe the complex social, political, and economic problems that underpin the challenges of teaching in the contemporary moment. They also deploy a largely reformatory agenda that seems to perpetuate a disconnect from more foundational considerations of existential threats that will increasingly be encountered over the coming decades. While the editors of the issue argue that teachers matter, there is a counter argument that considering how knowledge has been ignored, oppressed, and silenced in the pursuit of infinite economic growth at the expense of the shared biosphere, teachers might be considered along with politicians, mainstream economists, and other leaders to have failed younger generations. We note, for example, Keen’s (2020) recent analysis that dispels any doubt that the fundamental economic drivers of contemporary societies in growth-based economies have failed to attribute *any value to the Earth’s natural systems* and as such neoclassical economists have failed to interpret that true cost of the unfolding impacts on natural systems. Combinations of deforestation, urbanisation, industrial agriculture, and a global fleet of machines that incite behaviour that drains natural systems, now risk the survival of all life on Earth. Specifically, Keen highlights the enormity of error in the economic modelling of the highly referenced Intergovernmental Panel on Climate Change Report (Field et al., 2014) computing 4 degrees of warming would be optimal, on the basis that Gross Domestic Product (GDP) would not be overly affected, along with indoor or underground activity. Put simply, these economists have not accounted for the value of the environment in the global economy and might prefer we climb under a rock than deal with the impending challenges of over-consumption. A growth-based economy can no longer determine policy frameworks in response to the unfolding environmental crisis, nor is it where pragmatic actions in more hopeful directions lie.

The opportunity for future generations to enjoy clean, air, water, and food, is hindered by unfettered pollution and environmental vandalism (causing rapid extinction of species that support a diversity of life on Earth), perpetuated by global economic growth. Warmly remembered as “the Earth’s lawyer” (Brouwer, 2015), Polly Higgins argued powerfully for ecocide as a necessary amendment to be included as the fifth law of International Crimes (Higgins, 2010). Following in her footsteps, the weight of the largely ignored value of the environment to sustain life, is a heavy burden on an increasing number of young people taking up environmental activism. This is evidenced by the growing global movement of students striking for climate action, alarmed by a plethora of information; for example, Lenton et al.’s (2019) concerning summary of tipping points that provide stark warnings

for global ecocide. The trajectory of growth at all costs ignoring such warnings necessitates environmental vandalism to “sustain” the values of hyper-consumerist societies (Higgins, 2010). Over 20 years ago, ecological psychologist Edward Reed (1996a) warned: “It looks to be well within our power to seriously injure, and perhaps even destroy, the environment we live in” (p. 117). And in 2020, A future for the world’s children report (Clark et al., 2020) states that: “Children are also the most vulnerable to the lifelong environmental effects caused by climate change arising from anthropogenic greenhouse gas emissions, and from industry-linked pollution of the air, water, and land” (p. 609). Without an impetus to address these concerns, is it any wonder the younger generations are angry?

In contrast to education in “uncertain times”, the certainty of the predicament that rapidly depleting natural systems present, demands educators responsibly listen and respond to the concerns of young activists. Education that responds beyond the confines of a curriculum concern with “environmental education” is a priority. We ask in this paper, how can educators respond to the certainty of human impacts on the lithosphere, biosphere, hydrosphere, and atmosphere, with child and youth defence for continuity of biodiversity? How do we move beyond the rhetoric of education in “uncertain times”, manufacturing a sense of doubt, to answer calls for leadership in this predicament of human induced environmental vandalism and demise of Earth’s natural systems and, without being overwhelmed by anxiety, to offer hope and direction to children and young people?

According to literature reviews of climate change education (Monroe et al., 2017; Rousell & Cutter-Mackenzie-Knowles, 2019), both the mass media and a scientific approach to environmental education have been ineffectual in producing pro-environmental behaviour. Public education has largely focussed on behaviour changes communicating with people as consumers rather than citizens (Jensen & Schnack, 2006). It may be, as Slovenian philosopher Žižek (2010) perhaps first put it, that we are indeed “living in the end times” and that those not marching in the streets have resigned to despondence or environmental melancholia (Lertzman, 2015). And there are many who do not see a need for concern at all (9% across the world according to Pew Research Center 2018 survey, Fagan & Huang, 2019). Perhaps a more illustrative description for these present times of inertia is what Kim Stanley Robinson (2012) describes as “the dithering” (a period from 2005 to 2060) in his novel 2312 that explores the disastrous long-term effects of climate change. And we have certainly witnessed such dithering in successive Australian Governments debating how to address carbon emissions (see Goodman, 2020). The citizenry of each nation needs clear directives to curb carbon emissions, waste, and their ecological footprint as certain action to prevent ecocide. Perhaps the complexity of behavioural change is simply too much of a hard sell and felt more despairingly in a global pandemic. We shall see.

This is a theoretical paper with practical application. We draw from an ontology of co-constituted relationality of organism and environment (see J. J. Gibson, 1979/1986/2015; E. J. Gibson, 2003) to bring depth to understandings of calls for ecological justice. This eco-behavioural stance facilitates a “listening pedagogy” (see Rinaldi, 2006) with attention to learning rather than teaching to support responsivity of teacher educators and education more broadly. As Monroe et al. (2017) contend from their review of educative strategies to address a rapidly changed planet, very little work assists educators with pragmatic

solutions to overcoming the challenges of over-consumption and environmental degradation. For example, at the widely publicised launch of the BBC documentary “Seven Worlds, One Planet” David Attenborough replied to a young man’s question on what action is needed to avert the catastrophe, he responded with “waste less” pointing to frugality as a way of life that would reduce consumption. Other practical matters, such as dietary choices (eating fresh and locally grown), reduction of hydrofluorocarbons used for refrigeration and air-conditioning, developing regenerative agriculture, and reducing travel are necessary, but require more than a climate change education “programme”.

To be effective and to intentionally address these concerns that cut across disciplines, we propose understanding learning as a primarily perceptual activity from an eco-behavioural stance, as a necessary post-cognitive turn (Szokolszky et al., 2019). To explain further, cognitive science is limited by its scope to what de Oliveira and Chemero (2015) describe as “smallism and localism” for its focus on constituent parts and confinement to mentalistic internal representations. In contrast, emerging understandings of cognition embrace cognition as intelligent action that is embodied, enacted, embedded, and extended. Szokolszky et al. (2019) suggests, and we agree, that ecological psychology is a “fundamental, overarching ‘E’ that serves to ground the 4 Es” (p. 17). This concurs with Reed’s (1996a) earlier description of ecological psychology as a science (in its own right), for the broad and deep concern with how animals regulate their behaviour according to the properties of their habitat. We propose this as a paradigm shift from interactionism, of separate subjects and objects, to mutualism as “the principle of organism (animal or human) and environment being mutually defined relational aspects of one another” (Szokolszky et al., 2019, p. 20).

We invite attention to the big picture processes at play impacting schooling, by theorising learning from a mutualistic eco-behavioural stance, where organism and environment (in this paper we are concerned with person and place) are co-constituted. We see that a mutualistic eco-behavioural stance can support pragmatic activism that educators can endorse to expand future action possibilities that are worthy if not hopeful. Specifically, we suggest endorsing permaculture principles and ethics that apply sustainability and endorse degrowth with holistic systems thinking. These principles and ethic work to close loops of production and consumption through, not only regenerative agriculture, but regenerative culture of creativity, frugality, and minimalism. We propose that perceptual learning theory derived from eco-behavioural science (learning as perception in action), aligns strongly with the first principle of permaculture (observe and act) (Holmgren, 2017), and provides useful direction for decoupling from the man-made systems that promulgate growth at all costs. To begin this, schooling is first positioned problematically.

## **The uncertain purpose of schooling**

Before we get to the uncertain purpose of schooling, it is relevant to consider the certainty of schooling as a cog in the wheel of the globalised economic system. Education has increasingly come under the influence of growth at all costs neo-liberal policy directives, increasingly via public/private partnerships (see Hogan, 2013). Ushered by the increasing unpredictability of worldwide events to trigger instability in this global economic system, minimising disruptions via intervention and controls has become the new norm. In

education, this has led to what has been described as an “audit culture” driving nationalised curriculums, increases in assessment and evaluation, as well as comparison of schools (Hogan, 2013; Mills et al., 2014). These dictates are largely unexamined in the public realm according to Gruenewald (2008) and actions such as global giant publishing company Pearson, increasing its interests in the education sector with 60% of their billion-dollar revenue now staked out in education (Singer, 2013) perhaps going unnoticed. However, Pearson’s increasing stake in education has coincided with policy shifts that see them publishing both national tests, and curriculum materials, according to Singer. Amid rising concerns that the company is now positioned as a powerful lobbying force upon governments (Hogan, 2013), claims that economic growth is determining the aims of education (Graham & Harwood, 2011; Nussbaum, 2010) are difficult to dispute. Such emerging private/public partnerships signify the increasing pressure for profit motives to certainly impact education.

While schooling is said to endorse a higher quality of life through its provision of new opportunities to acquire skills and information, some argue this comes at too great an expense. For example, Black’s (2010) documentary “Schooling the World: The White Man’s Last Burden” describes the practice of schooling as part of the colonising process that disrupts traditional communities of practice that afford a means of authentic participation and subsistence. Similarly, Winter (1996) argues “poverty has worsened as a result of ‘development’ because subsistence economies have been converted to market economies” (p. 56). Helena Norberg-Hodge’s (2009) ethnography detailing the encroachment of western life and values on Ladakh (a remote region of the Indian Himalayas) over several decades makes similar claims. Poverty is framed as a consequence of introduced western values. Prior to the impact of western culture on the people of Ladakh, no member of the community went hungry, and there was no homelessness she claims (Gorelick et al., 2011; Norberg-Hodge, 2009).

The function of schooling, according to Bowers’s (1997, 2000, 2006) critical contentions is to lubricate the engine of a hyper-consumerist, globalised economy that requires a population of individual units of consumption. Confoundingly, Moser (2009) expounds that the quality of life that schooling affords also “has been brought about largely by unsustainable resource use” (p. 352). And similarly critical, Andre Gunder Frank’s dependency theory goes further to include schooling as part of a world system that perpetuates the distribution of wealth to a small minority, keeping many people throughout the world in a state of dependence (see, Sens, 2012). More recently, a comprehensive analysis of the globalised world economies revealed: “mass consumption and economic growth in high-income countries are sustained by asymmetric exchange relationships with poorer regions” (Wiedmann et al., 2020, p. 10). Such arguments and indeed evidence, increasingly call into question the purpose and place of schooling.

School is an inherently monocultural project, and policy initiatives within this monomorphic system may only be deployed when they support needs and aspirations of the dominant group – reifying the hegemony of a global objective of one education for all (Maxwell, 2012). Much of the educational discourse remains convincing that schools are an interventionist socio-political strategy that can lead to societal transformation (Stetsenko, 2019). However, it also argued that even adopting a critical pedagogy in education, and its objective to “transform” education as a post-colonial movement, reinvents the very thing it seeks to disturb by perpetuating school-based values of

“individualism, anthropocentrism, and a faith in progress” (Gruenewald, 2005, p. 211). More recently, a regime of testing and comparison as “global policy technology” (Lewis, 2013), has echoed throughout the world, congruent to the globalisation of economies (Arnove & Torres, 2003), negating diversity, and driving the homogenisation of education.

Place-based and environmental education professor David Gruenewald (now Greenwood) (2005) surmised the failure to perceive the interconnectivity between ourselves and the natural world, also detailed by Bateson and Bateson (2005), as the crux of the problems within the wider contemporary context of ecological crisis. To overcome such ecological blindness, Plumwood (2002) contended: “we will need a re-conception of the human self in more mutualistic terms” (p. 142). Movements to posthuman sensibilities and material agency go some way to indicating the significance of relational thinking and Ingold’s (2011) work in anthropology takes inspiration from eco-behavioural science describing learning as a variation in skills embedded in ecological niches. We wonder how education might be similarly inspired. In the following section, we take inspiration from several theorists in the Gibsonian tradition of ecological psychology – that is following the work of Eleanor and James Gibson and their combined contributions to detailing perception and learning from an eco-behavioural stance. We also take inspiration from Roger Barker whose work contributing to environmental psychology is also encompassed in the paradigm of eco-behavioural science.

## Eco-behavioural science theory

Here, we explain key concepts of eco-behavioural science that we see have potential for education to equip children and youth to defend the continuity of biodiversity. These concepts include affordances, attunement, effort after meaning and value, and affordance of place.

### *Understanding the role of affordances in perceptual learning*

The fundamental premise of learning from an eco-behavioural paradigm of co-constituted relationality is that the human species (among others) both perceive to learn and learn to perceive (Gibson, 1991). This original point has recently been reiterated in a paper by Szokolszky et al. (2019) calling for attention to this altogether more holistic turn away from cognitivism. Understanding this more dynamic and reciprocated relationality is hinged upon Gibson’s (1979/1986/2015) term *affordance* that captures the *opportunities for action in the environment, realised according to capabilities of the organism* (Heft, 2017). Learning as primarily perceptual rather than cognitive activity, positions learners as active and agentic. Information from the perceptual array is detected directly and without the mental gymnastics of cognitivism’s internal representation according to Chemero (2009). This perception-action process specifies affordances as possibilities for action and capabilities simultaneously (Gibson, 2003; Gibson & Pick, 2000).

From an eco-behavioural stance, attention is never on separate “individuals” and “environments” but on the complex interconnectedness of organism and environment in a dynamic process. Constructivist epistemology was strongly criticised by ecological

psychologist Edward Reed (1996a), a strong proponent of the Gibsons' work, for negating the role of an organism's constant activity. He disputes claims that the world is made inside the organism rather than the organism making its way in the world:

For more than two thousand years, Western epistemology has oscillated between claiming that the mind copies an already existing world and claiming that the mind constructs the world in its entirety. All the arguments have the same logical flaw, arguing about what "must be" the case on the basis of a restricted range of options. Ecological psychology starts from the premise that this whole debate is a mistake. Cognition is neither copying nor constructing the world. Cognition is instead, the process that keeps us active, changing creatures in touch with an eventful, changing world. (p. 13)

From this stance, what is important is not the co-constructing of meaning, and as Vygotskian theory would stipulate the "internalising" of understandings (Vygotsky, 1978); what is significant are *effectivities* as capacities or capabilities, coupled with opportunities for action in the environment as *affordances* (Gibson (1979/1986/2015). Perceptual learning is the constant search to reveal what information in the perceptual array stays the same, and what comes to the fore for our attention. The world is encountered in cycles of perception and action that lead to increasing specificity (Reed, 1996a; Gibson, 2003).

### **Attunement**

Learning results from encounters with others and with objects in the environment which provide information for the detection of affordances. Attunement to affordances is the pedagogical process of shared attention, for example, the pointing out of what to attend to in the environment, or what is significant (Zuckow-Goldring & Arbib, 2007). The education of attention as attunement to information specifying affordances, is a primary pedagogical social practice (deVilliers Rader & Zukow-Goldring, 2012). It is innately familiar for parents to not necessarily tell young children what to do as much as point out information for them, to help them make sense of their world. Attention is attuned to what is graspable, eatable, makeable, doable, knowable, likable, or breakable, for example. Perception can be directed by the linguistic system, amongst other pedagogical tools or extended (across time and space) affordances, to attune attention (Waters, 2012). It is through the promotion of affordances during shared attention that language is acquired according to Cowley (2011) and all pedagogy has its foundation in this joint or shared attention (Heft, 2013). Attunement inspires action to further increase the perception of affordances. Thus, we learn to see (or smell, or hear or taste or feel for that matter) as much as we see to learn.

### **Effort after meaning and value**

Socio-normative practices come into play in the promotion of affordances and as Heft (2003) importantly notes, "affordances are not neutral; they are not value free" (p. 155). More recently clarifying this process further, when claiming ecological psychology can be considered a social psychology, Heft (2020) contends:

By engaging in social practices, we develop habits of engaging the environment, including its artifacts, in socially normative ways; come to recognize the social significances of places as emergent eco-social entities; and develop and sustain an awareness of the pragmatic reality of conceptual social structures. (p. 823)



The values of those around us are central to affordance detection and promotion. The motivation to enact affordances is shaped by values and agendas. A more complete description provided by Reed (1996a) is worth recounting here to explain the motivation for learning manifested as a search for value and meaning in the environment:

Information and affordances are available in the environment of all animals. This grounds meaning and value in the environment, but it also requires of individual animals that they undertake an effort to come into relationship with meanings and values. The nature and intensity of these efforts to detect information or use affordances will vary with the biological needs and developmental experiences of a given animal. It is this effort after meaning and value that, I claim, is psychologically basic and is the embodiment of motivation. (p. 101)

Thus, proclivities toward the realisation of “particular” affordances over others are determined in the cultural milieu. For example, the efforts of young environmental activists to protest government inaction is an expression of their values. This follows the detection of information as they read, watch documentaries, hear family, friends, or prominent figures, consume media, or perhaps even have first-hand experience of the increased intensity of fire, floods, species extinctions and the displacement of people as climate refugees. It is no wonder the lack of political willpower or motivation to address these issues, compels action as felt unalienable rights are usurped. To better understand perceptual learning in the cultural milieu, the settings of behaviour come to prominence.

### ***The affordance of place***

Roger Barker’s (1968) work inspiring the field of environmental psychology explains how settings of behaviour demarcate typical actions as normative social practices, so that place is an excellent predictor of behaviour. Normative pressure to behave according to the setting and its nested affordances, simultaneously generates the setting, and possibilities for action and developing capabilities – in a self-perpetuating way. Heft (2018) perhaps says it better: “the degrees of freedom of action of individuals are constrained by virtue of the fact that those actions generate the very setting that those actions constitute” (p. 110). Affordances are thus nested and extended in places with varied histories of engagement foregrounding situatedness as the “affordances of place” (Finn, 2015; Heft, 2018).

Institutions, organisations, and even languages nest and extend socio-material affordances across space and time. For example, to draw on our previous critical discussion of schooling, resources are offered (including teachers and technologies) as socio-material affordances that are nested and extended spatio-temporally in classrooms as behaviour settings. Such socio-material affordances produce histories of social practice that can make it difficult intergenerationally to see the colonising effects on previously self-reliant cultures. Considering the affordance of place, brings attention to affordances nested and extended across space and time, with historicity (Heft, 2018). For educators, knowledge of: attunement as a mediating pedagogical process for learning; and affordances as mutual reciprocity of species capabilities and environmental possibilities, and socio-materially and spatio-temporally nested and extended in social practices, offers support for educational responsiveness.

Having developed an introduction to an eco-behavioural paradigm as inspiration to develop pedagogical responsiveness, we now give specific reasons for such a stance with consideration to young environmental activists and to pathways forward for educators.

### **How can perceptual learning theory serve us in this time of crisis?**

An eco-behavioural stance provides a scientifically justified means to position ourselves as “one with” our environment – as co-constituted entities. The divergence from cognitivism’s separation of mind from body, and person from place offers a relatable coming together from which a broader commitment to environmental ethics and responsible stewardship can grow. Awareness of values as central determinants of behaviour and how these underpin action provides opportunities to examine flows of value and explicate the trails of destruction that much of contemporary social life in a growth-based economy leaves, in the wake of technological progress. For example, the capabilities to access, remove and process fossil fuels detected in the environment has afforded increases in what is manufacturable, producible, transportable, colonisable, and pollute-able, with arguable pros and cons. The understanding that affordances are nested and extended, allows thorough examination of possibilities and discussions of who benefits, how, and what might be unseen or obfuscated. Where, for example, plastics and rare earth minerals come from, how they are combined to produce a device, and where these might end up are significant considerations to weigh up along with use value. Environmental journalist, George Monbiot provides an excellent example in his presentation titled, “How smoked salmon is destroying our minds” (Double Down News, 2021), illustrated by a smoked salmon ATM machine on the busy streets of Little India in Singapore (see [Figure 1](#)). Such complete examinations of everyday consumables do not need to conjure up a return to a time before such technology and conveniences existed, but it does provide a platform from which to base future decisions and actions and from where materials matter, and the abundance of food provided by a tree or bush can be fully appreciated; the “wasting less” Attenborough mentioned can be more fully understood.

Eco-behavioural science explains how attention is mediated through its capture, as socio-normative attunement, in very natural ways by parents of young children, and with increasing technology in classrooms. For example, eco-behavioural science can illuminate how hyper-consumptive capitalism promotes “particular” values implicitly harnessed to drive sales and compel purchasing, while also obfuscating any social or ecological impacts. Understanding how this happens as part of the perceptual learning process is fundamental to increasing responsibility for ecological impacts of human action as much as it might inspire improvements to education. From here, we contend the education community is best supported to develop responsive pedagogy not just with young environmental activists but with their families and communities.

### **Embracing responsive pedagogy with young environmental activists**

Young environmental activists are refusing to identify with standing patterns of behaviour incumbent upon their subordination in school, at least within the spatio-temporally arranged “Fridays”. Eco-behavioural science positions pedagogical responsiveness as constrained/enabled by the multiple emerging agencies educators occupy according to



**Figure 1.** A smoked salmon vending machine.

a particular landscape of affordances as a field of action for emerging possibilities (see McGann, 2020). Thus, sites of work, roles undertaken, and lived experiences will situate and particularise the possibilities for pedagogical responses. It is important to understand how behaviour settings as coercive of behavioural expectations, serve to normalise and exclude (see for Finn, 2019a, 2019b). Compliance and volition become more prominent and developing a responsive “listening pedagogy” necessitates understanding affordances as both instrumental and socio normative.

The compulsion to march for climate is an actionable opportunity coupled with the ability to both detect and enact the affordance of protesting. For these young environmental activists, achieving their intention expediently is instrumental, although such behaviour can be perceived by an adult perhaps as condemnable according to normative socio-material practices (Lo Presti, 2019). Students striking for climate are perceiving government inaction on protecting and preserving the natural environment, demonstrating their capabilities of active citizenship and civic responsibility motivated by a concern for natural systems – a valuing of environment. They seem to be demonstrating an ecological ethic that we should be prioritising. We propose this is evidence of learning rather than a condemnable action of “naughty children” refusing to subordinate to authority, as Australian Prime Minister Scott Morrison claimed when condemning the student strikers of the 26th of

November 2018 in a parliamentary speech (The Guardian, 2018). Young environmental activists are expressing an emerging political identity via direct action, or a form of active citizenship that according to Reichert and Print (2018) will increase the likelihood of future civic engagement and expresses effectivities to organise cooperation around a shared goal – complex and comprehensive tasks and evidence of learning in tangible and pragmatic ways.

Ecological psychologists, Reed et al. (1996) examining closely the role of values in development with consideration to political implications of values embedded in action suggest: “we must study values, not as they are represented in the idealized worlds of discourse, but as they live within and among communities” (p. viii). Values are what bring communities together for action/activism. Phillips (2010) has previously found, in her work examining children’s active citizenship, that the responsiveness of adults to children’s initiatives should “provide further scope for children’s participation” (p. 371).

We suggest the theories of ecological psychology outlined above can be applied to descriptions of responsive pedagogy adopted by many teachers – though we note these theories have not been favoured in teaching courses. For example, teacher efforts to attune with students’ information detection (perception) and affordance enactment (action) expand opportunities for further action via shared attention in cycles of perceiving and acting. Specifically, educators adopt responsive pedagogy when they act to increase the synergism between children’s effectivities (what they can do) and action possibilities, expanding the field of affordances available for enactment.

We, the authors, have recently further detailed specific practices constituting responsive pedagogy as the practice of widening or expanding affordances for action in learning with environments (see, Phillips & Finn, 2020). When motivation to learn embodied in the effort made to come into relationship with meaning and value was considered in an interest-based setting, four key practices of relational pedagogy were discerned. These included the curatorial practice of offering clues that invite exploration, communicating via actions as in showing rather than telling, supporting interest and wonder by aligning with perception-action cycles, and making offers to enhance performance by expanding the range of affordances available. We see some relevance here to mapping pathways of responsiveness to youth environmental activism as well as increasing educator responsibility to provide leadership and guidance. To more specifically provide further scope to expand participation (in protest) we are inspired by the opportunities entailed in adopting permaculture activism to pragmatically engage with the scale and complexity of the problems these young activists alert us all to, as a community of educators.

### **Why permaculture activism and not techno optimism?**

It is pertinent to remember that schooling (as a relatively new phenomenon) brought altered dispositions to a previous way of life, disrupting social practice and values, for example intergenerational learning and self-sufficiency. Pedagogy that is responsive must make space for unfolding emergent agency as lived curriculum. The monomorphic system of education based on an industrial (now fourth as will be spelled out below) model does not typically account for learning that takes place in a social-ecological context. Fossil fuel abundance has provided great distractions from the abundance of “learning as relating with” all manner of co-existing species.

The notion of “sustainable development” which pervades policy, reports and initiatives has been strongly disputed with the argument that there is nothing sustainable about the high energy industrial society currently perpetuated by neo-liberal contemporary socio-political governance (Holmgren, 2017). The fossil fuel age has afforded human-technology synergisms that now risk the very natural systems on which the diversity of forms of life depends. Attention to the prevailing resource depletion that technological advancement promulgates cannot be ignored. Wiedmann et al. (2020) report that “to a large extent, the affluent lifestyles of the world’s rich determine and drive global environmental and social impact. Moreover, international trade mechanisms allow the rich world to displace its impact to the global poor” (p. 7). The emerging Fourth Industrial Revolution (FIR), already promoted in schools taking up these technologies, and its potential impacts are described as:

...converging, step-change innovations in digital technology, artificial intelligence, Internet of Things, 3D-printing, biotechnology and nanotechnology. While digitalisation is already a key driving force in societal transformation, it has so far led to more consumption and inequality and remained coupled with the indirect use of energy and materials, therefore sustaining resource-intensive and greenhouse-gas growth patterns at the macro-economic level. . . Even if the FIR were to achieve absolute decoupling, this would come at a potentially high risk for privacy, liberty, data sovereignty, civic rights, security, equality and democracy. (Wiedmann et al., 2020, p. 7)

Techno-optimistic solutions might distract attention from the bigger problems to be faced, however it seems they hold little promise for real solutions. How can political, or indeed education leaders be motivated to change a system when that very system is bringing about such disruption?

An underlying value of the natural world and our mutualistic existence with it – not as a resource but for its inherent support for a diversity of forms of life seems common-sense but perhaps for some, altogether overwhelming. We propose permaculture activism provides pragmatic action to expand youth environmental activism as a powerful and effective means to begin or progress decoupling from the growth at all costs systems while congruently growing healthful optimism (among other things).

Two anecdotes of women who are strongly committed to the education of attention to natural systems are illustrative to the use value of adopting permaculture activism. They not only inspire; the examples also explain the values conflicts that imperil solutions within socio-political systems in a similar way to the space “schooling” occupies. Permaculture author and teacher, Beck Lowe, shares how, because of protesting the destruction of old growth forests, she received her Year 12 (completion of formal schooling in Australia) results in a jail cell. She laments that there was simply too much to protest about but reflects in hindsight that her actions were focused on the negative – her role today to promulgate the growing permaculture movement affords solutions focused on change (Kruse, 2020). Similarly, documentary film researcher and producer Antionette Wilson shares her disenchantment at being in Brazil in her youth at the time of the inaugural Earth summit in 1992, only to be perplexed at the “cleansing” of the city of any indication of poverty (Peterson, 2018). Such deception that removes from sight the true costs of progress, perpetuates a system where nature has been left out. Wilson’s work now focuses on sharing permaculture with the world through online platforms and documenting her own process of adopting permaculture via the inspirational examples that contribute to the

documentaries she makes. These two women have found values alignment working on solutions-focused change by adopting and sharing permaculture activism. We suggest similarly that permaculture activism (Holmgren, 2017; Mollison, 1988) expands the horizon of personal action possibilities for those who share a concern for the natural environment.

### **What is permaculture activism?**

Beyond protesting, how can affordances for action be expanded and capabilities strengthened? What is growable, harvestable, preservable, fixable, and findable, become priorities for a degrowing economy and can also be enacted as protest. Perceiving the interconnectedness of all species and stewarding the promulgation of diversity and abundance in nature, offer simple solutions to some of these complex problems we have outlined. Permaculture is a philosophy of design for degrowth, drawing on Indigenous and traditional intergenerational wisdom that enhances abundance of natural systems that works with nature rather than against it (Mollison, 1988). The term was coined in the 1970s and is now a world-wide movement of committed people practicing its ethics and principles as an alternative to hyper-consumerism (Holmgren, 2017). Permaculture encompasses other movements towards degrowth such as localisation, regenerative agriculture, minimalism, and neo-peasantry, underpinned by ethics and principles that go beyond “sustainability”; specifically, to apply in every way possible, what David Attenborough meant as wasting less – a seemingly simple concept that in fact impacts more complexly and comprehensively, every aspect of the human form of life.

Lifestyles that adopt frugality and work with natural systems by harmonising with the diversity of species of which we are only a part, offer practical action and hope. Permaculture as activism provides a wider scope to expand the affordance possibilities for anyone concerned with the health of the Earth’s natural systems. Holmgren (2017), the co-originator of permaculture as a solution to energy decent (a shift to less complex and more resilient societies in response to declining resources [Holmgren, 2018]), refers to permaculture activism, as a pragmatic response that endorses living “a renewed and deepened teaching of ethics and principles” as “beyond the sensible design of gardens and farms to a redesign of our economy and culture” (p. 13). Permaculture, tested around the world for the last five decades, and applying ethics and principles to support an energy decent future “will not help save the world as we know it, but it can inspire and inform a multitude of creative responses to the world that is emerging” (Holmgren, 2017, p. 13). Tackling over-consumption and commodification of resources is pragmatic action young environmental activists (among others) might value as encouraging and hopeful in a time of crisis. With reference to the passing of intergenerational wisdom, Holmgren contends what is most pertinent is: “. . .instilling in them a living appreciation of the enduring rhythms of nature along with the value of long-term thinking, persistent ethical behaviour, and the importance of the simple, ordinary, even mundane, aspects of life” (p. 267).

Applying the four practices of responsive pedagogy outlined above (Phillips & Finn, 2020), we invite consideration by educators to which clues could be offered to open up exploration of what permaculture has to offer – from fermentation to water retention, animal husbandry to home economics, the complexity of soil biology and the importance of reclaiming and repairing, there is so much more to share than a kitchen garden

(although this is a wonderful and obvious clue). There are sites and enthusiasts from large scale farms to tiny homes and gardens, so showing rather than telling can be achieved by connecting to the community and educators leading by example. Any interest and wonder shown can be aligned with, and many children and young people concerned for the environment may be practicing permaculture principles in their own homes making this something educators should be celebrating. Action in this direction to make connections to the permaculture movement will expand the range of affordances available for children and young people not only to protest, but to learn any number of important and life-enhancing skills and dispositions.

In permaculture, the margins and fringes are attributed value as key places that support and sustain diversity; known as the highly valued edge spaces. In education, the edge spaces could also be fertile places for creative solutions and might include alternative forms and places of learning, traditional cultural practices, home-schooling and unschooling, for example. In these fringes, the promulgation of diverse ways of doing education exist and hold perhaps more potential than the monomorphic system of schooling as part of the problem, not the solution. Certainly, these forms of education might more readily make space for the emergent agency of young environmental activists, space where the consideration to and enactment of values could be central. But what of school?

We move towards what is valued, as children defend animal life or youth defend biodiversity and a habitable biosphere, or the politician shuns youth activism. It becomes more than figurative that actions speak louder than words when adopting this post-cognitivist sensibility. Yet the situatedness of schooling and teachers as authoritative, imperils the very notion of making a difference. Educators, Ali-Khan and White (2019) advocate resistance: “The guerrilla teacher understands that she/he has an ethical obligation to supplement the official curriculum with texts and assignments that speak to specific students’ cultures, values and beliefs” (p. 5). We wonder if, with inspiration to understand learning behaviour as perceptual and action-based rather than primarily cognitive, teachers are better equipped to move outside of the constraints of “environmental education”. For an even bigger impact, guerrilla teachers may have to reinvent education from the ground up.

## Conclusion

The politics of ecocide is outside the scope of most teachers’ capacity to engage students but when students take active citizenship in their own hands, how can educators engage with children and youth more courageously? When learning is understood as cycles of perceiving and acting, pedagogical responsivity (the educative act as a social affordance), can be attunement to increasing refinement of actionable opportunities. As a regenerative social and agricultural response to the multifaceted crisis faced by children and young people where ecocide has prevailed without challenge, permaculture ethics – specifically earth care, people care, and fair share (Holmgren, 2017; Mollison, 1988), are a practical extension of Attenborough’s imperative to “waste less”. Permaculture practices are underpinned by a cycling of observation preceding action, aligning strongly with perceptual learning theory’s description of perception-action cycles, and offering simple and actionable starting points for learning with natural systems rather than about them.

In the contemporary moment, characterised by uncertainty (as discussed at the start of this paper), the education of attention or attunement to natural systems can provide certainty, stewardship, and hope. Importantly, these kinds of actions taken up en masse go some way to reorganising a way of life that is more accurately sustainable rather than sustaining the current levels of consumption and destruction.

Eco-behavioural science is gaining prominence in psychology, neuroscience, and computing where learning is understood as the attunement to an affordance (its perception) in information-rich landscapes of affordances (Rietveld & Kiverstein, 2014) leading to the realisation or actualisation of an affordance as enacted behaviour. van Dijk and Kiverstein (2020) have recently expounded on direct perception in context and the radical empirical account of behaviour as the relationship maintained with surroundings “prior to any analytic separation from...environment” (np). We propose similar traction could be gained in education for the reasons we have outlined above.

Socio-material reciprocation can be accounted for as affordances following the Gibsonian tradition of ecological psychology that details the mutuality of opportunities for action that couple with capacities to act. Spatio-temporal reciprocation, enacted as embodiment of roles and agreements in behaviour settings as collections of affordances, determine the greatest influence over behaviour. Settings of behaviour constrain and enable behaviour to achieve higher order purposes, warranting a concern for whose goals such behaviour settings serve, whose voices are silenced, and what tempos are favoured, and which are discouraged. What forces are at play in orienting behaviour? How we coordinate with the environment or how the environment coerces emergent identities are all worthy of exploration. To attend to the complex and dynamic relationality of people and place, is to notice how roles and behaviour settings, and the pressures that come with them such as “to teach”, shape perceptions and the flow of values. Reed (Reed, 1996b) eloquently recalls:

Gramsci was one of the first social theorists to emphasise the role played by schools and the media in reproducing not the entire range of values of a society, but a restricted subset of that range, a subset typically in line with the needs and aspirations of the dominant, not the subaltern members of society. (p. 12)

We have aimed to unravel some of the complexity in supporting educational responses to youth environmental activism and the unfolding ecological crisis perpetuated by growth-based economies. This paper has aimed not just to unsettle and create a conversation that disrupts assumptions, necessary to the framing of an educational response that normalises catastrophising, as environmental educator Bob Jickling (2013) puts it. It explores an obligation as educators to adopt a listening pedagogy (Rinaldi, 2006). To not turn away from student actions as expressions of environmental values, but to embark on the discussions Jickling points to, of “what constitutes a good life, how we ought to live and right relationships amongst people, and between people and the more-than-human world, in short, discussions about ethics” (p. 164). Jickling contends that previous concerns for human impacts on the environment were framed to circumvent such discussions of values. Inspired by Indigenous cultural practices, permaculturalists (among others who name it differently or not at all) have been doing this work mostly outside of educational institutions – in suburban backyards, rural landscapes, and the traditional ways of First Nations people (see Holmgren, 2018).



Educational institutions are not places of revolution, they are self-perpetuating systems – near impossible to change, as prominent educators have long noted (see, Fullan, 2001). Jickling and Sterling (2017) contend that education needs a new vision for its remaking, one that moves beyond access to schooling as a marker of quality. In this paper, we have drawn on eco-behavioural science to bring perceptual learning theory to a wider audience for inspiring education and developing responsive pedagogy with consideration to young environmental activists. Competing agendas, tension and conflict can be understood best by drawing on eco-behavioural science that explicates the motivations behind action: *what is of value*. We suggest this might lead to resolutions of conflict where common ground is pursued as a place from which to begin to create solutions, albeit simple solutions to complex problems.

## Acknowledgements

The authors would like to thank the referees for their precision and competence in contributing guidance to refine the paper.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## ORCID

Roxanne Finn  <http://orcid.org/0000-0003-1868-3818>

Louise Gwenneth Phillips  <http://orcid.org/0000-0002-2937-145X>

## References

- Alexander, S. (2015). *Prosperous descent: Crisis as opportunity in an age of limits*. The Simplicity Institute.
- Ali-Khan, C., & White, J. W. (2019). Between hope and despair: Teacher education in the age of Trump. *Educational Philosophy and Theory* 52(7), 738–746. <https://doi.org/10.1080/00131857.2019.1654374>
- Arnone, R. F., & Torres, C. A. (2003). *Comparative education: The dialectic of the global and the local* (2nd ed.). Rowman & Littlefield.
- Barker, R. G. (1968). *Ecological psychology: Concepts and methods for studying the environment of human behaviour*. Stanford University Press.
- Bateson, G., & Bateson, M. C. (2005). *Angels fear: Towards an epistemology of the sacred*. Hampton press.
- Black, C. (Writer) & C. Black (Director). (2010). *Schooling the world: The white man's last burden* [Documentary film].
- Bowers, C. A. (1997). *The culture of denial: Why the environmental movement needs strategy for reforming universities and public schools*. State University of New York Press.
- Bowers, C. A. (2000). *Let them eat a data: How computers affect education, cultural diversity, and the prospects of ecological sustainability*. The University of Georgia Press.
- Bowers, C. A. (2006). *Revitalising the common: Cultural and educational sites of resistance and affirmation*. Lexington Books.
- Brouwer, K. (Director). (2015). *The Earth's Lawyer* [documentary]. VPRO Backlight.
- Carson, R. (1968). *Silent spring*. Other India Press.

- Chemero, A. (2009). *Radical embodied cognitive science*. The MIT.
- Clark, H., Coll-Seck, A. W., Banerjee, A., Peterson, S., Dalglish, S. L., Ameratunga, S., . . . & Costello, A. (2020). *A future for the world's children? A WHO–UNICEF–Lancet Commission*. [https://www.the-lancet.com/journals/lancet/article/PIIS0140-6736\(19\)32540-1/fulltext](https://www.the-lancet.com/journals/lancet/article/PIIS0140-6736(19)32540-1/fulltext)
- Cowley, S. J. (2011). Taking a language stance. *Ecological Psychology*, 23(3), 185–209. <https://doi.org/10.1080/10407413.2011.591272>
- de Oliveira, G. S. & Chemero, A. (2015). Against smallism and localism. *Studies in Logic, Grammar, and Rhetoric*, 41(1), 9–24. <https://doi.org/10.1515/slgr-2015-0017>
- deVilliers Rader, N., & Zukow-Goldring, P. (2012). Caregivers' gestures direct infant attention during early word learning: The importance of dynamic synchrony. *Language Sciences*, 34(5), 559–568. <https://doi.org/10.1016/j.langsci.2012.03.011>
- Double Down News. (2021, March 26). *How smoked salmon is destroying our minds*. Retrieved May 8, 2021, from [https://www.youtube.com/watch?v=JsSF1\\_TYdWw&t=69s](https://www.youtube.com/watch?v=JsSF1_TYdWw&t=69s)
- Fagan, M., & Huang, C. (2019). *A look at how people around the world view climate change*. Pew Research Center. <https://www.pewresearch.org/fact-tank/2019/04/18/a-look-at-how-people-around-the-world-view-climate-change/>
- Field, C. B., Barros, V. R., Mach, K. J., Mastrandrea, M. D., Bilir, T. E., Chatterjee, M., et al. (2014). *IPCC, 2014: Climate change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Contribution of working Group II to the fifth assessment report of the intergovernmental panel on climate change*. Cambridge University Press.
- Finn, R. (2015). *Affordances of place: Implications of ecological psychology for inclusion* [Unpublished Doctoral Thesis]. University of Southern Queensland.
- Finn, R. (2019a). Specifying the contributions of parents as pedagogues: Insights for parent–school partnerships. *The Australian Educational Researcher*, 46(5), 879–891. <https://doi.org/10.1007/s13384-019-00318-2>
- Finn, R. (2019b). How pedagogical diversity can afford parallaxes of competence: Towards more inherently inclusive school. *International Journal of Inclusive Education*. Advance online publication. <https://doi.org/10.1080/13603116.2019.1642400>
- Fullan, M. (2001). *The new meaning of educational change* (3rd ed.). Routledge Falmer.
- Gibson, E. J. (1991). *Learning, development, and conceptual change. An odyssey in learning and perception*. The MIT Press.
- Gibson, E. J. (2003). The world is so full of a number of things: On specification and perceptual learning. *Ecological Psychology*, 15(4), 283–287. [https://doi.org/10.1207/s15326969eco1504\\_3](https://doi.org/10.1207/s15326969eco1504_3)
- Gibson, E. J., & Pick, A. D. (2000). *An ecological approach to perceptual learning and development*. Oxford University Press.
- Gibson, J. J. (1979/1986/2015). *The ecological approach to visual perception*. Lawrence Erlbaum Associates, Inc.
- Goodman, J. (2020, January 2). What is Australia doing to tackle climate change? *BBC News*. <https://www.bbc.com/news/world-australia-50869565>
- Gorelick, S., Norberg-Hodge, H., & Page, J. (Directors). (2011). *The economics of happiness* [Film]. International Society of Ecology and Culture.
- Graham, L. J., & Harwood, V. (2011). Developing capabilities for social inclusion: Engaging diversity through inclusive school communities. *International Journal of Inclusive Education*, 15(1), 135–152. <https://doi.org/10.1080/13603116.2010.496208>
- Gruenewald, D. A. (2005). More than one profound truth: Making sense of divergent criticalities. *Educational Studies*, 37(2), 206–215. [https://doi.org/10.1207/s15326993es3702\\_10](https://doi.org/10.1207/s15326993es3702_10)
- Gruenewald, D. A. (2008). The best of both worlds: A critical pedagogy of place. *Environmental Education Research*, 14(3), 308–324. <https://doi.org/10.1080/13504620802193572>
- Heft, H. (2003). Affordances, dynamic experiences, and the challenge of reunification. *Ecological Psychology*, 15(2), 149–180. [https://doi.org/10.1207/S15326969ECO1502\\_4](https://doi.org/10.1207/S15326969ECO1502_4)
- Heft, H. (2013). An ecological approach to psychology. *Review of General Psychology*, 17(2), 162–167. <https://doi.org/10.1037/a0032928>

- Heft, H. (2017). Perceptual information of 'An Entirely Different Order': The 'Cultural Environment' in The senses considered as perceptual systems. *Ecological Psychology*, 29(2), 122–145. <https://doi.org/10.1080/10407413.2017.1297187>
- Heft, H. (2018). Places: Widening the scope of an ecological approach to perception–action with an emphasis on child development. *Ecological Psychology*, 30(1), 99–123. <https://doi.org/10.1080/10407413.2018.1410045>
- Heft, H. (2020). Ecological psychology as social psychology? *Theory & Psychology*, 30(6), 813–826. <https://doi.org/10.1177/0959354320934545>
- Higgins, P. (2010). *Eradicating ecocide*. Shephard-Walwyn.
- Hogan, A. (2013). *Global networks of educational governance: The role of the OECD, IEA, and Pearson in the production of education policy* [Paper presentation]. Postgraduate Research Community Conference, School of Education, The University of Queensland, Australia.
- Holmgren, D. (2017). *Permaculture: Principles and pathways beyond sustainability* – Revised. Melliodora Publishing.
- Holmgren, D. (2018). *Retrosuburbia: The downshifters guide to a resilient future*. Melliodora Publishing.
- Ingold, T. (2011). *The perception of the environment*. Routledge.
- Jensen, B. B., & Schnack, K. (2006). The action competence approach in environmental education. Reprinted from *Environmental Education Research* (1997), 3(2), 163–178. <https://doi.org/10.1080/1350462970030205>
- Jickling, B., & Sterling, S. (2017). *Post-sustainability and environmental education: Remaking education for the future*. Palgrave Macmillan. <https://doi.org/10.1007/978-3-319-51322-5>
- Jickling, B. (2013). Normalizing catastrophe: An educational response. *Environmental Education Research*, 19(2), 161–176. <https://doi.org/10.1080/13504622.2012.721114>
- Keen, S. (2020). The appallingly bad neoclassical economics of climate change. *Globalizations*. <https://doi.org/10.1080/14747731.2020.1807856>
- Kruse, K. (2020, July 26). *Beck Lowe: Frugal, productive living is a fulfilling way of life*. Permaculture Institute. [https://permacultureaustralia.org.au/beck-low-frugal-productive-living-is-a-fulfilling-way-of-life/amp/?\\_\\_twitter\\_impression=true](https://permacultureaustralia.org.au/beck-low-frugal-productive-living-is-a-fulfilling-way-of-life/amp/?__twitter_impression=true)
- Lenton, T., Rockström, J., Gaffney, O., Rahmstorf, S., Richardson, K., Steffen, W., & Schellnhuber, H. J. (2019, November). Climate tipping points - too risky to bet against. *Nature Journal*, 575(7784), 592–595. <https://doi.org/10.1038/d41586-019-03595-0>
- Lertzman, R. (2015). *Environmental melancholia: Psychoanalytic dimensions of engagement*. Routledge.
- Lewis, S. (2013). 'Bringing schools into focus': A critical understanding of the PISA-based test for schools as a global policy technology [Paper presentation]. University of Queensland School of Education Postgraduate Research Conference, Brisbane, Australia.
- Lo Presti, P. (2019). People and affordances. *Ecological Psychology*, 32(1), 25–40. <https://doi.org/10.1080/10407413.2019.1689821>
- Maxwell, J. (2012). Interest convergence in Australian education. *Critical Race and Whiteness Studies*, 8(2), 1–19. [https://www.academia.edu/5254231/Interest\\_Convergence\\_in\\_Australian\\_Education](https://www.academia.edu/5254231/Interest_Convergence_in_Australian_Education)
- McGann, M. (2020). Convergently emergent: Ecological and enactive approaches to the texture of agency. *Frontiers in Psychology*, 11, Article 1982. <https://doi.org/10.3389/fpsyg.2020.01982>
- Meadows, D., Meadows, D., Randers, J., & Behrens, W. (1972). *The limits to growth: A report for the club of Rome's Project on the predicament of mankind*. Universe Books.
- Mills, M., Monk, S., Keddie, A., Renshaw, P., Christie, P., Geelan, D., & Gowlett, C. (2014). Differentiated learning: From policy to classroom. *Oxford Review of Education*, 40(3), 331–348. <https://doi.org/10.1080/03054985.2014.911725>
- Mollison, B. (1988). *Permaculture: A designers' manual*. Tagari Publications.
- Monroe, M. C., Plate, R. R., Oxarart, A., Bowers, A., & Chaves, W. A. (2017). Identifying effective climate change education strategies: A systematic review of the research. *Environmental Education Research*, 25(6), 791–812. <https://doi.org/10.1080/13504622.2017.1360842>
- Moser, G. (2009). Quality of life and sustainability: Toward person-environment congruity. *Journal of Environmental Psychology*, 29(3), 351–357. <https://doi.org/10.1016/j.jenvp.2009.02.002>

- Norberg-Hodge, H. (2009). *Ancient futures: Lessons from Ladakh for a globalising world*. Sierra Club Books.
- Nussbaum, M. (2010). *Not for profit: Why democracy needs the humanities*. Princeton University Press.
- Peterson, G. (2018). *The urban farmer podcast, 345: Antoinette Wilson on inspiring stories*. The Urban Farm. <https://www.urbanfarm.org/2018/04/21/345-antoinette-wilson/>
- Phillips, L. G. (2010) Social justice storytelling and young children's active citizenship. *Discourse: Studies in the Cultural Politics of Education*, 31(3), 363–376. <https://doi.org/10.1080/01596301003786993>
- Phillips, L. G., & Finn, R. (2020). Learning with environments: Developing an ecological psychology inspired relational pedagogy. *Pedagogies: An International Journal*. Advance online publication. <https://doi.org/10.1080/1554480X.2020.1781639>
- Plumwood, V. (2002). *Environmental culture: The ecological crisis of reason*. Routledge.
- Reed, E. S. (1996a). *Encountering the world: Toward an ecological psychology*. Oxford University Press.
- Reed, E. S. (1996b). Selves, values and cultures. In S. E. Reed, E. Turiel, and T. Brown (Eds.), *Values and knowledge* (pp. 1–15). Lawrence Erlbaum.
- Reed, E. S., Turiel, E., & Brown, T. (1996). *Values and knowledge*. Lawrence Erlbaum.
- Reichert, F., & Print, M. (2018). Civic participation of high school students: The effect of civic learning in school. *Educational Review*, 70(3), 318–341. <https://doi.org/10.1080/00131911.2017.1316239>
- Rietveld, E., & Kiverstein, J. (2014). A rich landscape of affordances. *Ecological Psychology*, 26(4), 325–352. <https://doi.org/10.1080/10407413.2014.958035>
- Rinaldi, C. (2006). *In dialogue with Reggio Emilia: Listening, researching and learning*. Routledge.
- Robinson, K. S. (2012). 2312. Orbit Books.
- Rousell, D., & Cutter-Mackenzie-Knowles, A. (2019). A systematic review of climate change education: Giving children and young people a 'voice' and a 'hand' in redressing climate change. *Children's Geographies*, 18(2), 191–208. <https://doi.org/10.1080/14733285.2019.1614532>
- Sens, A. (Producer). (2012). *Dependency theory. Introduction to global politics: Instructional video series*. [You-Tube]. Retrieved January 18, 2014, from [www.youtube.com/watch?v=JN6LIMY2ApQ](http://www.youtube.com/watch?v=JN6LIMY2ApQ)
- Singer, A. (2013). *Enough is enough. Pearson education fails the test again and again*. Huffington Post Politics: The Blog. Retrieved February 14, 2014, from [www.huffingtonpost.com/alan-singer/enough-is-enough-pearson-\\_b\\_3146434.htm](http://www.huffingtonpost.com/alan-singer/enough-is-enough-pearson-_b_3146434.htm)
- Stetsenko, A. (2019). Hope, political imagination, and agency in Marxism and beyond: Explicating the transformative worldview and ethico-ontoepistemology. *Educational Philosophy and Theory*, 52(7), 726–737. <https://doi.org/10.1080/00131857.2019.1654373>
- Szokolczyk, A., Read, C., Palatinus, Z., & Palatinus, K. (2019). Ecological approaches to perceptual learning: Learning to perceive and perceiving as learning. *Adaptive Behaviour*, 27(6), 363–388. <https://doi.org/10.1177/1059712319854687>
- The Guardian*. (2018, November 26). Scott Morrison tells students striking over climate change to be 'less activist'. <https://www.theguardian.com/environment/2018/nov/26/scott-morrison-tells-students-striking-over-climate-change-to-be-less-activist>
- van Dijk, L., & Kiverstein, J. (2020). Direct perception in context: Radical empiricist reflections on the medium. *Synthese*, 198, 8389–8411. <https://doi.org/10.1007/s11229-020-02578-3>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Waters, P. (2012). From extended phenotype to extended affordance: Distributed language at the intersection of Gibson and Dawkins. *Language Sciences*, 34(5), 507–512. <https://doi.org/10.1016/j.langsci.2012.03.007>
- Wiedmann, T., Lenzen, M., Keyßer, L. T., & Steinberger, J. K. (2020). Scientists' warning on affluence. *Nature Communications*, 11(1), 3107. <https://doi.org/10.1038/s41467-020-16941-y>
- Winter, D. D. (1996). *Ecological psychology: Feeling the split between planet and self*. Harper Collins.
- Zizek, S. (2010). *Living in the end times*. Verso.
- Zuckow-Goldring, P., & Arbib, M. (2007). Affordances, effectivities, and assisted imitation: Caregivers and the directing of attention. *Neurocomputing*, 70(13–15), 2181–2193. <http://dx.doi.org/10.1016/j.neucom.2006.02.029>