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Relationships and Relationality in Times of Profound Eco-Political Change

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Abstract: This paper draws out the distinction between relationship and relationality in the context of a time of ecological turmoil and the climate emergency. It does so from an aesthoecological standpoint—a concept initially developed by the author to establish important criteria and characteristics within education. Eco-political issues are stressed as being vital to education across the lifespan, and this paper offers a philosophical backdrop for these crucial issues and some hope for the future. Ideas of transdisciplinarity are foregrounded in both theoretical and practical ways to emphasise that the problems of climate change, biodiversity loss, and other Earth crises are inherently complex and interconnected. Addressing these challenges requires a new way of understanding our relationships with both humans and more-than-humans, which is primarily an eco-political issue, and lifelong education has a significant role to play. The author proposes that aesthoecology has an important role in framing and addressing educational futures.

Keywords: aesthoecology; eco-crisis; lifelong education; politics; relationality; relationship



Academic Editors: Naomi T. Krogman and Susan A. O'Neill

Received: 3 February 2025

Revised: 31 March 2025

Accepted: 3 April 2025

Published: 16 April 2025

Citation: Turner, C. Relationships and Relationality in Times of Profound Eco-Political Change. *Societies* **2025**, *15*, 102. <https://doi.org/10.3390/soc15040102>

Correction Statement: This article has been republished with a minor change. The change does not affect the scientific content of the article and further details are available within the backmatter of the website version of this article.

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1. Introduction

‘Ecology’ is a term that has been used widely and variously to indicate and illustrate the growing recognition of a relational worldview that stresses the importance of connectivity between all constituents of and on the planet. A drastic misunderstanding of this connectivity, or only a partial and selective understanding of it, has led to ecological changes that have had profound, and destructive, global impacts.

Writers such as James Lovelock [1], who proposed the Gaia theory, and Arne Naess [2], who expounded the ideas of Deep Ecology, were significant in drawing attention to the extensive nature of inter-connectivity in which every entity in some way relies upon every other entity. Rather than chains of linear connectivity, or even webs of traceable connectivity, Gaia and Deep Ecology point to complexity theories and chaos theories.

The basis of chaos theory [3] is hypersensitivity to initial conditions. Even small changes in environmental conditions or interactions with other phenomena can cause extreme, unpredictable and random changes. Complexity theory stresses emergence and self-organisation that give rise to patterns of behaviour that cannot be analysed from their own individual parts. This represents a forerunner to concepts such as Morton’s [4] ‘hyperobjects’, from which it is virtually impossible to disassemble constituent parts partly because of the complexity of connectivity and partly because of the overall impact. This brings about ecological resilience and constant adaptation, according to changing conditions, leading to different but stable states. Complexity theory, chaos theory, and ecological relationality are interconnected. They focus on dynamic, adaptive systems in which non-linear interactions produce emergent patterns moving from unpredictability to co-evolution within ecosystems.

A ‘Change Makers’ project at University College London [5] draws on the chaos theory of change and proposes that chaos theory can help us to see education in a very different way, helping to stimulate inspirational and innovative ways of addressing problems of complexity. The project emphasises that chaos theory is applicable to educational management [6] wherein, rather than an assumption that order must be imposed in some way, dynamic systems are in play and that non-linearity and emergence are significant characteristics in the learning process. This same non-linearity plays a part in understanding the differences between relationality and relationship and the philosophical concept of ecological interconnectedness [7].

Ecological interconnectedness studies are a portal into dual and non-dual frameworks for bioculturally embedded human identity. This field is part of the transdisciplinary, holistic epistemology shift across academia. The discourse is catalysed by concern over injustice, conflict, climate change, ecosystem collapse and extinction. (p. 75)

I contend that relationships, although closely aligned with relationality, are qualitative, describing the more affective aspects of connection. A relationality recognises a non-emotional connection between two or more objects or beings; a relationship implies an affective, emotional interaction between two or more bodies, either material or living. This is a dynamic and organic association with the potential of creative change and transformation [8]. Relationality stresses the various complexities of connections; a relationship needs to be recognised, nurtured and valued if it is to be sustainable. It also considers the emotional, responsive, sensitive and ethical qualities of what it is to be in relationship.

Relationship and relationality can be described as important characteristics of aesthology [9]—a term that envisions aesthetics in a symbiotic conjugation with ecology. Aesthetics is a sensory function—a deep and sensitive awareness of our surroundings, of the milieu and the feelings that are evoked from immersion in them, stimulating and enabling a relationship, whether that be with another person, a tree or a piece of music. The ecological dimension I determine as a function of relationality, of linking our perceptions to form a more coherent, holistic understanding of place and space. For example, the tree stands in a particular woodland, or the piece of music was composed by Haydn.

I argue in this paper that educators and others need to find a new form of relationality, a greater understanding of relationships with the more-than-human world [10] and a need to fully grasp the impact of the profound ecological changes that have been produced during the era of the Anthropocene and are continuing exponentially to challenge humans’ very existence as a species through climate change and biodiversity loss.

The Convention on Biological Diversity (CBD) defines biodiversity as ‘the variability among living organisms from all sources including terrestrial, marine, and other aquatic ecosystems and ecological complexes of which they are a part: this includes diversity within species, between species and of ecosystems’ [11] (p. 27). Linked to this is the major issue of climate change—a complex phenomenon with no clear trajectory except a certainty of uncertainty. Uncertainty can inhibit decision making, clear political action and national and international adaptation planning [12]. Academic reviews on climate change adaptation (CCA) tend to be specific to areas of concern and within disciplinary niches; for example, in environmental studies or economics. It is now increasingly recognised that the effects of these phenomena will be transdisciplinary [13] and, therefore, a new way of envisioning and acting on these impacts will be urgently required. I concentrate on education to provide this transdisciplinary lens because all generations will require not just information, but a new approach to resonate deeply with a starkly different future. This is not just an educational imperative, however, but one of huge eco-political sensitivity, requiring coherent and united global action.

A critical pedagogical tradition in aesthetics, ecology and education, therefore, challenges dominant power structures and results in transformation. This approach draws on the work of thinkers such as Marcuse [14], Freire [15] and Ranciere [16], who combine these concerns to develop an environmentally aware citizenry. Critical pedagogy encourages the challenge to dominant narratives and an understanding of intersectional environmentalism [17].

2. Aesthoecology

The historic scale of ecological disruption requires a re-evaluation of the relationship that humans have with the more-than-human world [10] and goes well beyond merely understanding lines of relationality. The extent of change that is required to truly understand, and imbibe, the complexity of ecological relationships requires an educational tsunami symbolising the inevitability of change. For example, Marcuse [18] stresses that education is essential in cultivating an aesthetic–ecological sensibility. A radical education develops imaginative conceptions of a different reality and acts towards that aesthoecological transformation in contrast with a normative education dominated by capitalist imperatives. This change is required in all phases and ages of our educational programmes. Therefore, an emphasis on intergenerational learning, with a new ecology at its heart, is a(n) (ad)venture that surely must be embarked upon if planetary relationships are to be improved and repaired. If this new ecology is to be about redefining relationships, rather than just understanding relationality, then a different dimension of ecology needs to be explicit. That dimension, I propose, is the affective dimension, or an aesthetic paradigm, which is not one that is in relation to ecology, but one that is in relationship with ecology. I define this as an aesthoecology—two dimensions entwined and in symbiosis with each other.

Aesthoecology is the symbiotic and dynamic relationship between aesthetics and ecology, in which aesthetics represents the deep and often unconscious sensory awareness of being in the environment (our being in our environment), and the associated ecology, which represents a worldview and an intimate, unfolding and emergent understanding of the complexity, and immediacy, of our surroundings, which form our temporal landscape. Inherent in this, is the effect and affect that are predominant in the interaction between the two and the ways, often subtle, in which behaviours—actions, reactions—and consequences are elicited by the detection and emergence of individual and collective environmental changes. [9] (p. 11)

This is an early working definition of a concept of aesthoecology from which all my subsequent research work has been derived. It arose intuitively from my early work in biological research, particularly in animal behaviour and ecology, and then subsequently in education, particularly during my time in the leadership of community colleges in the UK. My current, more philosophical, research is thus steeped in the elements of behavioural ecology and education. Much can be read into the juxtaposition of these two disciplines, which has led to my proposals, in which aesthetics becomes more than aesthetics; ecology becomes more than ecology; and they become more than each other. Aesthetics relates to sensitivity, empathy and affect by believing *about* the world but with a condition of being *in* it. This could be described as a condition of being alive to the world, characterised by a heightened sensitivity and responsiveness, in perception and action, to an environment that is always in flux, never the same from one moment to the next [19] (p. 10).

For example, Witt and Clarke [20] call on pedagogies of attention, through field visiting with primary school-age children, in which they encourage entanglements of ‘ethical caring, doing and knowing’ (p. 125). In this context, they consider field visiting as ‘a deepening of relations that makes places visible and tells rich narratives that include more-than-human

voices' (p. 127). Similarly, Wren [21] engages in research and teaching that concentrates on a pedagogy of co-creation and entanglement with the more-than human in environmental education. Her concept of eco-empathy focuses on diverse ecological connections, drawing on ideas of ecologies of belonging [22] and invites participants to look for the ruptions that shift normative ways of thinking and to seek creative ways of following a pedagogy of empathetic emergence.

Being alive to the world takes on an added dimension when thinking about what one is alive to. The condition of 'being in the world' is an awareness that moves away from the dominant default positioning of anthropocentrism. This can be understood in considering Abram's concept of the more-than human, Barad's [23] and Braidotti's ideas on posthumanism [22,24], Haraway's talk of kin and multispecies [25], and Bennett [26], Harman [27] and Morton's [4,28] writings about new materialism. What they all have in common is an approach to environmental crises that emerge from a post-humanist perspective. In the view of Bianco-Wells [29], it is wise to view

environmental crises through a post-humanist perspective; that is, it takes full consideration of the non-human agencies shaping the world. It provides theoretical reflections on recent processes of intense damage or affectation that unleash creative social forces to rebuild broken relationships, damaged ecosystems, and obsolete institutions, through explicit recognition of the capacity of agency and practices that involve people, animals, objects, and other materials. It is precisely this network of relationships that is called ecologies of repair. (Introduction, n.p.)

Ingold [19] does not consider that life can be attributed to existing objects or subjects, but that life emerges from the interrelations between them. He does not see the 'trails of life', as he calls them, as the relationality between one thing and another—'between the organism *here* and the environment *there*' (p. 13, my italics) but as

a trail *along* which life is lived: one strand in a tissue of trails that together make up the texture of the lifeworld. That texture is what I mean when I speak of organisms being constituted within a relational field. It is a field not of interconnected points but of interwoven lines, not a network but a *meshwork*. [19] (p. 13)

This extracts us from the distanced, detached, and distinct view of the world and illustrates the entanglement of humans and more-than humans. It is within this liminal zone, the betwixt and between [30]—spaces of 'ambiguity and paradox, a confusion of all the customary categories' [31] (p. 97)—that relationality might be conceived of as becoming relationship and aesthoecology as a way of being and knowing—an eco-centric onto-epistemology. I propose that seeing aesthoecology from this perspective offers a different and radical alternative for education. The concept of aesthoecology grew through my work in education, and my background in biology, and by critically examining these ideas I suggest that aesthoecology has much to offer to educational futures, particularly for life beyond planetary destabilisation.

3. Eco-Political Challenges

Profound ecological changes are occurring on our planet. These include measurable parameters such as increasing global temperatures—the most significant contributor to climate change overall. Climate change is creating significant challenges in different regions of planet Earth with variable but multiplying effects. These are manifested by more intense rainfall and consequent flooding, more severe droughts, continuing sea level rises, permafrost thawing and melting of ice sheets, changes to the ocean (including marine heat waves), acidification and reduced oxygen levels [32]. Eco-political issues are entwined with

complexity and enacted through individual, local and governmental actions, each of which is often in conflict.

Climate change is a significant factor influencing unprecedented biodiversity loss across the planet, alongside habitat destruction caused by anthropocentric activity. Changes in temperature are ‘causing disruptions to the timings of migration and breeding, and asynchronies between interacting species’ [33] (p. 225). These interacting species may be predator–prey relationality or host–parasite interactions. This is not unusual in niche habitats, but on the global scale at which it is currently occurring it is causing mass shockwaves to animal and plant relationships and relationality: ‘Different components of climate drive phenology in different regions of the globe’ [33] (p. 228).

For those interested in ecology generally, even amateur natural historians, changes in populations of animals and plants, reductions in sightings of an array of organisms, and changes to the timing of the seasons are very noticeable. I am a biologist by training, so I have more than a passing interest in these population changes, but even the untrained eye can point to examples of change that young people, or less observant adults, may not be aware of. For example, 30 years ago, or even less, on returning from driving, particularly at night in the summer, the headlights and the windscreen of the car would be covered in squashed insects. My experience now is that this is rarely, if ever, the case.

Møller et al. [34], for example, used ‘citizen science’ to quantify the abundance, or otherwise, of flying insects on the windshields of cars across Europe. Their methodology (the use of a splatometer) recorded numbers of insects on the windshield over a particular distance. One survey by the Kent Wildlife Trust in the UK showed a 50% decline in insect numbers between 2004 and 2019. An extensive study in Denmark by Møller [35] showed an 80% reduction between 1997 and 2017. There may be several reasons for this significant decline, including intensive farming methods and the use of pesticides, but all causes are primarily the result of adverse anthropogenic activity.

Any reduction in insect numbers has a severe knock-on effect on populations of other organisms (for example, bats, swallows and house martins), so we might expect a corresponding decline in their numbers as well. The latest report of the World Wildlife Fund (WWF) [36] indicates that the Earth is approaching dangerous and irreversible tipping points in critical natural systems. It highlights ecosystems, such as the Amazonian rainforest and the polar icecaps, as such indicators. According to the latest WWF report, there has been a reduction of approximately 73% in the populations of all vertebrates since 1970. This is catastrophic for the planet.

However, this reported dramatic decline is nothing new. In 2012, Cardinale et al. [37] prefaced their paper on biodiversity loss by saying that 20 years prior to writing their paper, in 1992, the first Earth Summit, representing most of the world’s nations, declared that ‘human actions were dismantling the Earth’s ecosystems, eliminating genes, species and biological traits at an alarming rate’ (p. 59). Thirty years before that summit, in 1962, Rachel Carson first published *Silent Spring*, which warned of global warming and the poisoning of the planet through pesticide use [38]. This connection was hotly contested by the chemical industry in America [39], just as the oil and gas industries in 2024 are still in self-denial over the catastrophic effects of the use of fossil fuels [40,41]. These sorts of changes are devastating, long standing, scientifically verified and yet still, after all this time, largely neglected and avoided because to act will reveal many truths, which in the short term may be considered, at the very least, to be uncomfortable, inconvenient and politically difficult. Ecological issues have inevitably moved into the realm of politics—they are now eco-political. There may be several reasons why politicians have, thus far, failed to achieve significant change in ecological matters. McKinnon [42] suggests that a failure to act on

climate change is because it presents ‘a snarl of ethical challenges’ that ‘combine to generate morally corrupt reasoning’ (p. 13).

Our everyday lives and modes of domestic and commercial life continue to contribute to increases in environmental instability, even though many people are increasingly aware of the detrimental effects and pressures that this is placing on the health of the planet and, therefore, our own health. During the periods of lockdown that were considered necessary during COVID-19, despite the disruption they caused to everyday life, many more people cycled, and, as cars were left on driveways or at the side of the road, walking in towns and cities became safer and more pleasant. There was noticeably less pollution. The behaviours of both humans and more-than humans changed and gave us a glimpse of different ways of being.

Cougars strolled down the streets of Santiago, Chile. Goats took over a small Welsh town. Jackals played in a park in Tel Aviv. And sea lions made themselves at home in a port town in Argentina. [43] (p. 1)

It cannot be denied that lockdowns caused a great deal of anxiety for many people, but there was also a glimpse of a possible future in which cars are not dominant, aeroplanes are not heard overhead, the air feels fresher, and exercise is increased as people walk and cycle. There were noticeable benefits of this nature during the enforced lockdowns, and many more. These are many of the personal benefits—those that might be considered as aesthetic—that make people feel better in a way that many had never experienced or had forgotten about.

But there were not just personal benefits. There was an average 17% reduction in daily global CO₂ emissions [44] (p. 648) which, if it continued, would have had an accumulating positive effect on climate change. Global emissions from surface transport fell by an average of 36%, and those from the aviation industry fell by an average of 60% (p. 650). These were signs of hope that this might stimulate national debate about how society and individuals might be happier, more resilient, more secure, and more connected if lessons were to be learned from these positive changes. Should we start to reduce our undue reliance on the car, the lorry, and aviation? Should we rapidly turn to more sustainable means of transport, such as trains and trams? The benefits would be significant [45]. But sadly, the lessons we learned from the temporary reduction in polluting activities will soon be lost, as it is already clear that it will not be reflected in structural changes to the economic, transport, and energy systems in sufficient time to turn back the tide of many years of CO₂ accumulation.

COVID-19 shone a spotlight on the significance that these changes could have for all living beings, societies, and ecosystems. However, the pendulum has swung back to an emphasis on economic growth and renewed reliance on unsustainable forms of transport and energy production. Amazingly, not only directional changes in, for example, transport policy have been ignored but also, according to articles in the *British Medical Journal*, the world is ill prepared for another pandemic [46], and the European Health Agency claims that politicians are failing to prepare for this inevitable eventuality [47].

Another positive effect of lockdown was the quietness that many people commented on, and the fact that birdsong became more evident. These much quieter environments [48] were generally reported to be beneficial and contributed to a much greater sense of wellbeing. Humans would not be the only ones to benefit were that learning to be carried forward. Reports in the *Smithsonian* magazine [49] illustrated how even relatively small reductions in noise pollution allow animals to exist more successfully, leading to significant changes in bird migration and their use of urban habitats. Wetzel reports that when animals do not have to compete with anthropogenic noise, birdsong becomes more intricate and humpback whales, in the absence of cruise ships, sing softer songs. Polak et al. [50] show that most studies indicate that roads carrying heavy traffic have led to a reduction in density and

species richness of birds nesting in the immediate vicinity, and the breeding success of birds is reduced near areas with heavy traffic noise [51].

Addressing these environmental issues is clearly enmeshed in political action and far greater ecological awareness, including a willingness to act. Education has a key role in enabling young people and adults to have access to transdisciplinary knowledge, accepting that places and spaces for learning are democratic and open, leading to a citizenry that is eco-activist in a way that is distinct from just being a place of protest [52]. This is perhaps the most important area of eco-politics in which intergenerational and lifelong education can play a key part.

There are now a growing number of publications that talk of the pedagogical changes which are required in an era of massive global instability. It is important not just to tinker at the edges, say the right things, and appear to be addressing the problems. That is the big eco-political challenge that faces us within education and beyond. Ultimately, it is the action of local, national and international politics that will decide the future, and I fear that politicians are caught in the fateful trap that I have suggested should be avoided. Gardiner [53], as reported by McKinnon [42] (p. 23), claims that ‘our failure to move towards just climate policy is best explained by our moral corruption in the face of climate change.’ However, he is optimistic about humanity’s ability to change outcomes.

4. Relationality, Relationship, and Indigenous Perspectives

An eco-centrist reality considers that humanity is deeply entwined in the material world and in ecosystems that sustain all life. Life organises itself in networks, an ever-changing pattern of connections—of relationships [54]. Indigenous ways of being [55], for example, are still embedded in eco-centrism and profound ecological awareness. Posthumanism and new materialism stress that there is a fundamental interconnectedness between all forms of matter. Indigenous scholars would claim that this is not, in fact, something new, but has been fundamental to many Indigenous cultures intuitively. Tailbear [56] (p. 191), for example, considers this Indigenous understanding as ‘a framework that posits social relations not only between humans and “animals”, but also between humans and “energy”, “spirits”, “rocks”, and “stars”.’ She goes on to say that this is an ‘Indigenous metaphysic: an understanding of the intimate knowing relatedness of all things’.

To counter understandings of relationship and relationality always being expressed in Eurocentric terms, there is a need to listen to those who have instinctively had close relationship with ecology or ‘Country’. In Aboriginal English, for example, ‘Country’ has particular usage—it ‘encompasses the seas, waters, rocks, animals, winds and all the beings that exist in and make up a place, including people’ [57].

Referencing Indigenous scholars, however, raises important ethical issues, risking instrumentalizing those views to fit pre-existing arguments, rather than engaging with Indigenous knowledge systems. Tuck and Yang [58], for example, raise their concerns over appearing inclusive without genuinely appreciating Indigenous sovereignty and decolonization. It is important in a paper such as this to draw the reader’s attention to the vital importance of engaging with the work of Indigenous writers such as Wahinkpe Topa (Four Arrows) and Narvaez [59] who

emphasize our deep need to move away from the dominant Western paradigm—one that dictates we live without strong social purpose, fails to honor the earth as sacred, leads with the head while ignoring the heart, and places individual “rights” over collective responsibility. Restoring the Kinship Worldview is rooted in an Indigenous vision and strong social purpose that sees all life forms as sacred and sentient—that honors the wisdom of the heart and grants equal standing to rights and responsibilities.

This ecological assemblage represents more than relationality; it represents a true relationship and a state of *being with* rather than *knowing that* and, for me, helps me to understand why I have intuitively felt that, if ecology is to mean something in terms of *caring for*, and *knowing about*, then the aesthetic dimension is the transition point between relationality and relationship—hence aesthoecology. Aesthoecology is the entanglement that helps us to better understand this transformation—the paradox of a complex assemblage of planetary objects and mechanisms and a ‘biosphere as it is experienced and lived in from within by the intelligent body—by the attentive human animal who is entirely a part of the world that he, or she, experiences’ [10] (p. 65). I believe it is a paradoxical interplay between the two—the first a relationality, the second a relationship, not one or the other.

Interestingly, Tynan [60] talks of relationality not being easy for Indigenous peoples and the idea of relationality as connection. She continues as follows:

Indigenous identity is defined by relationships, primarily with Country, which is often portrayed with mystique and romanticism. However, connection to country also means connecting to unwanted messages, like feeling the grief of Country when she is burning or hurting. Relationality with Country and relationality as an ethos means being prepared to listen to messages we may not want or expect to hear. Relationality, being in good relation, is being willing to cop a mouthful of flies and sand in eyes. [60] (p. 599)

Indigenous perspectives on relationality and on our relationship with the environment, which emphasise interconnectedness and respect for ecosystems, highlight the value of Indigenous knowledge in addressing ecological change and offering a different world perspective for sustainable living and relational thinking. Indigenous communities, in protecting biodiversity through their approaches to land and species, offer valuable insights into ontologies and epistemologies that diverge from normalised Western ways of thinking.

Lewis’s [61] engagement with Ranciere’s theory of aesthetics [16] is important in relation to aesthoecology. Lewis extends Ranciere’s framework of dissensus by expressing revolutionary aesthetic education as an unsettling way to perceive and engage with the environment—what aesthoecology would consider as an individual’s ecology. Aesthoecology might, alternatively, emphasise the entanglement of affect, sensation and agency that already exceed control (the ‘police order’) and argue that such totalizing orders are always already permeable, unstable, and intertwined with different modes of aesthetic knowing. Rather than focusing solely on disrupting dominant distributions of the sensible, an aesthoecological perspective highlights how aesthetic attunements already involve complex interactions among human and other-than-human forces. Instead of negating the political force of disruption, it attempts to reframe it within a more dynamic, relational understanding of aesthetic experience and ecological assemblages.

5. Educational Implications

The relational implication was one I recognised and, inevitably, was part of when I was working in schools and community colleges. I consider the relational as clear cut, delineated, bounded and classified, whereas a relationship is blurred, ill defined, malleable, and nuanced. It was very easy to see educational establishments as flow diagrams, and the planning documents produced by management teams often depicted their work as such: linear maps of responsibilities, tasks and outcomes. Sometimes they would become more complex and be drawn as webs but still connected by lines and depicting branched hierarchies delineating who should do what, when, and how. This was the most straightforward way of illustrating the workings of a school to outside bodies that needed to check that things were being done properly. Accountability is easier to check, and outcomes could be

measured simply and quickly. But this was a simplistic misunderstanding of a school or college's ecology.

Up to a point, a planning document makes sense—a structure that links cause and effect and is easily understood by all—but must not superficially gloss over systems' complexity and emergent phenomena. After all, Bronfenbrenner's [62] Ecological Systems Model—a child-centred depiction of relationality represented by a series of concentric circles—interestingly, at least, brings into focus the many factors involved in one individual's existence. But if you multiply it such that you place different elements of this ecological system into the centre of the circles, and continually overlay the influences and influencers, you begin to get an idea of the complex combinations that arise at any one time.

Bronfenbrenner's model (Figure 1) is unapologetically anthropocentric and relational. Supposing we apply the model to illustrate an educational situation in which a stone is at the centre, or a fly, or a mouse; then we begin to move away to a paradigm that encourages the recognition of a multiverse. Supposing we see the model in three dimensions rather than two, or in motion, like throwing a pebble in a pond and seeing the influence of the ripples on the water. Or we might see it as a spectrum of phased colours where the centre of attention constantly changes and where there is not an inside or outside—something like the experience of walking around the Earth looking for the edge (Figure 2). In this way of seeing, the focus shifts and changes and moves from relational to relationship. These different ways of seeing point to the complexity of education and aesthoecological interpretations of being.

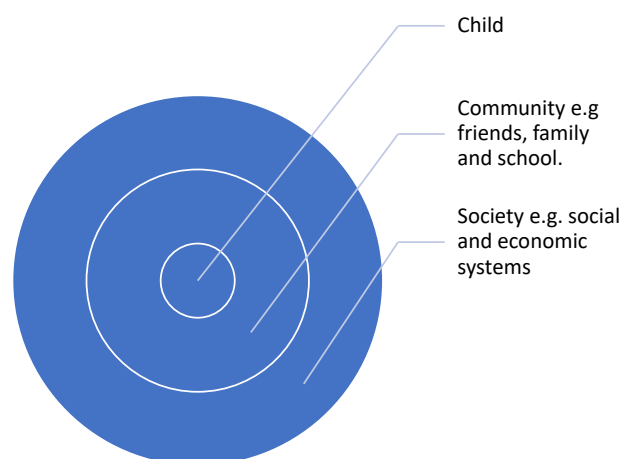


Figure 1. Simplified version of Bronfenbrenner's ecological systems model.

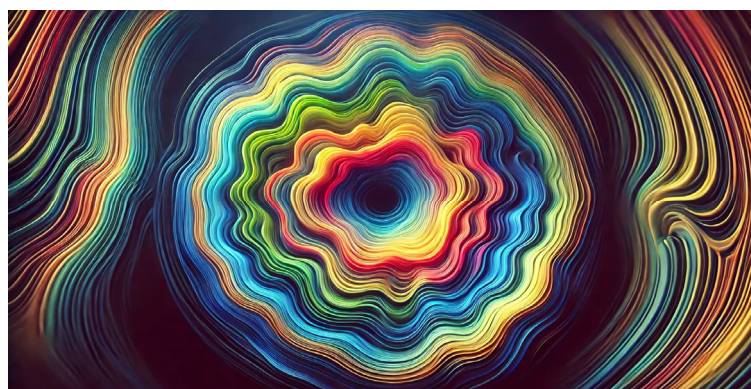


Figure 2. AI-generated non-linear unseen forces.

For Indigenous peoples there is a recognition that many unseen forces are at play in the elements of the universe and that very little is naturally linear or occurs in a two-dimensional grid or a three-dimensional cubic form [63] (p. 12). Katingima Day [64] explores the philosophy of Utu, from Eastern and Central Africa, claiming that ‘knowledge is arrived at through human experience—created, embedded, embodied and validated by those who participate.’ (p. 207). Utu is a lived form of knowledge. Thus, instead of asking ‘what is Utu, the discussion asks where is Utu?’ (ibid).

Rather than seeing interactions as purely complex, we might, alternatively, want to acknowledge the complexity and think of them as creative spaces full of opportunity and potential. Chappell et al. [8] consider creative spaces as ‘productive ruptions—disturbances and commotions—in practice and research thinking’ (p. 3). Perhaps this is where the transition occurs between relationality and relationship—from the connected to the affective, requiring curiosity, imagination and empathy. This often requires brave approaches involving risk and intuition in embracing change.

During my time working in leadership roles within schools and colleges, I can see now where my concepts of aesthoecology were formed by taking those sorts of risks. When they worked, they had surprisingly positive outcomes with emergent phenomena hitherto completely unexpected. Engaging in possibility thinking, rather than predetermined absolutes, injects a dynamic energy into the learning process. I give an example of the pedagogical opportunities arising from the development of an art gallery at the centre of a community college [65] (pp. 51–70)—a space for transdisciplinary and intergenerational learning.

Humanity is currently facing a series of Earth crises variously referred to as ‘wicked problems’ [66] or ‘hyperobjects’ [4], which are complex and difficult to understand. It is important that educators find ways to relate to these issues in ways other than the general future-related anxiety that they provoke in children, young people, and adults. One way may be to develop not only greater empathy in relationships between educators and students on these matters, but also to investigate how we enable them to form more empathic relationships with the more-than-human environment within which we live and on which we mutually depend for our future existence and wellbeing.

Empathy is a complicated phenomenon but, nevertheless, it appears fundamental to the establishment of functioning human relationships. Maibom [67] (p. 2) proposes that empathy is displayed if the person who feels it emotionally ‘is aware that it is caused by the perceived, imagined, or inferred emotion or plight of another, or it expresses concern for the welfare of another’ [68] (p. 2). It may be possible to use these entanglements to relate to education and to equip young people and adults for this period of profound eco-political change. This needs to be a continuing education imperative. The eco-problems are too immediate to leave to the next generation alone to make the massive transformation that this will require.

Encouragingly, there are some good examples of how this is beginning to be thought about and, more importantly, put into practice, by educators, political philosophers, architects and town planners, anthropologists, geographers, scientists and artists. The Centre for Climate Change and Sustainability Education at UCL in the UK is at the forefront of researching the views of students and teachers and developing programmes of continuing professional development (CPD) for teachers. Initially, this has taken place in individual subjects, but there is a growing relationship between disciplines. Eco-political climate issues are progressively considered as inter-disciplinary [69] and are moving rapidly towards a relationship between subjects that could be described as truly transdisciplinary. That is an important next step—to make these global ecological issues central to everything we do and to embrace this within our pedagogy. The concept of education without walls has merit,

tracing new lines that radiated not from the limits of the university or its classrooms but from the land itself. Thick, silvery threads extended from our relationship(s) to the natural world and to each other. These landlines did not bring us back to institutionalised teaching and learning; they were not the product of redesigning course content to better capture a feeling that threatened to slip away. Rather these were the lines of resistance, connection, rest, care, pleasure and transformation *in action*—meaningful and powerful in their/our defiance of structures, boundaries and categorisation. [70] (p. 283)

From the perspective of aesthoecology, this adaptive pedagogy incorporates the aesthetic into an ecology that is responsive, active and more meaningful. It draws us into a new realm of politics within education that stresses attention to care and ethics. But, as Ghemmour [71] (p. 226) points out, it is important to engage with these terms ‘openly rather than in instrumental and teleological ways’, which allow ‘new emergences, orientations and knowledges to develop and shape the trajectories of decolonisation and the future creatively and ethically—without colonising it’.

I offer aesthoecology as a conceptual framework within which a way forward can emerge in education and beyond. I have stressed before that aesthetics, in the context of aesthoecology, must not be read as art but as a much broader concept. However, that is not to say that art is not significant in this relationship. Indeed, my interest in aesthetics in education began because of the impact that I saw the arts having in establishing global understandings partially, but not exclusively, in environmental matters. They also provide methodologies for looking at problems differently—through different lenses and incorporating mind and body holistically.

A good example of this is the Forest of Imagination [72], an annual event taking place in Bath, UK. It is an intergenerational, transdisciplinary project using diverse landscapes and habitats to address the climate emergency and is a good example of a community project that illustrates the idea of ‘schools without walls’. Similarly, the inside-out classroom model [73] relies on ‘deep in-person experiential learning’ with a

core emphasis on cracking open conventional pedagogy to let relevance flow inward and outward, breathing life into learning at a time when education is poised to strongly impact quickly shifting ecological realities in which we, learners and instructors, find ourselves as actors and potential change agents. [73] (p. 47)

Katherine Burke [74] successfully translates these aims into eco-pedagogical practice. In a geography unit on ‘deep time and earth systems’ (p. 120), for example, she describes a 4.6 km hike in which participants are taken back to the start of time, imagining themselves as specks of dust in a swirling gas cloud. Every two steps of the walk represents one million years of time. Participants pass through the formation of planets, the construction of RNA, the start of photosynthesis, and the appearance of single-celled organisms, and then only in the last 40 cm of the 4.6 km walk does the recognisable human appear. It is only in the last centimetre or so that the Industrial Revolution occurs, followed by a minuscule speck of dust-sized movement within which the sixth mass extinction emerges. Imagine the richness of this walk as an intergenerational, transdisciplinary opportunity for extensive dialogue on all these issues and more. An extension of the walk would involve future thinking and what-if conversations. Stirring the imagination, raising possibilities and approaching problems from oblique angles encourages new ways of engaging with the natural world and the impact we are having on it.

A recent chapter [75] in the work of Vella and Pavlou (eds.) [76], brings together Issues-Based Art Education, the global climate emergency, aesthoecology and drawing activity. The claim is that drawing exemplifies emergence and the ways in which one can

explore future thinking to prepare for an imagined future that is largely unpredictable. They tentatively propose that ‘tackling the current global climate emergency requires a similar creative process to that of aesthoecologically informed drawing activity, which relies upon emergence and the production of the unexpected’ [75] (p. 157). In the same book, Danker et al. [77] (p. 249) report on their projects to integrate art into climate change actions, which enable eco-education to become more relatable, understandable, and emotionally appealing to community members.

Community arts-based collaborations engaged the greater community at various scales, from learning communities of students taking climate change conversations home to community organisations providing diverse ideas and voices suited to the community’s aptitude on this topic. Such a diverse range of voices discussing community-wide climate change effects is necessary for building community resilience to climate change [77] (p. 254).

These are significant examples of where the relational (art, climate change, ecology, family community) becomes a relationship through which action becomes real, meaningful and inter-generational. This is eco-politics driven by the people for the community, in an informed and engaged way.

Every curriculum programme should foster an awareness of individual and collective responsibility and encourage critical reflection on personal, societal, and eco-political behaviours that would contribute to the mitigation of the effects of climate change. These would include energy use, transportation, waste management, and food production. A critical evaluation of these factors would focus on the ethical dimensions of climate change, including eco-justice, equity and the rights of future generations and marginalised communities. A pluriverse of scholarship is crucial for ensuring a just and ethical planetary future. Many ecological discourses rely heavily on Western academic traditions but actually require greater emphasis on those voices most affected by environmental degradation and those who have suffered through colonial extraction and exploitation [71]. Escobar [78] engages with the ‘politics of the possible’ (p. 2), an ontological politics to envision a pluriverse—a world of many worlds—to tackle the planetary crisis. A discussion of compassion and empathy stresses the interconnectedness (relationality and relationship) of all that inhabit the planet and the responsibility that is incumbent on the human species to rectify the causes and impact of climate change and environmental damage that it has created.

These issues lend themselves to transdisciplinarity. Eco-pedagogy transcends boundaries. It is because we have not seen climate, environmental, political, economic and justice issues presented holistically in education settings that we find it difficult to understand the multi-factorial causation of our current position. Encouraging, facilitating and developing critical thinking and problem-solving skills through collaborative working and real-world applications should be applied [79]. This model of transdisciplinarity (type 2), characterised by the inclusion of stakeholders in participatory problem-solving, can be positively applied to tangible, real-world problems [80]. This is not only a transdisciplinary model, but it is also a call for inter-generational and lifelong perspectives and involvement. Sylvia Wynter’s argument that knowledge and the category of the human must be radically rethought [81] reinforces the deep political and ethical imperative of adopting decolonial ways of knowing, being, and relating.

6. Conclusions

This paper stresses the importance of reimagining relationality in adopting an aesthoecological worldview in times of ecological crisis. It offers a forward-looking reflection on the potential for relationships to guide humanity through profound ecological and behavioural change, shaping a more sustainable and ethical future. This is essential for

securing an eco-political future, one important feature of which is eco-education envisaged through the lens of aesthoecology.

The adoption of aesthoecology can encourage dialogue, energise action, cultivate deeper connections with environments, and stimulate sustainable practices through community engagement. Examples of sustainable public spaces, inspirational architecture, or green infrastructure promote the value and appreciation of biodiversity and resilience to climate change. Greater understanding of inclusive and holistic approaches can help to foster cultural diversity and Indigenous understanding, contributing to the creation of resilience and adaptability, not least to the emotional stress and anxiety invoked by climate change.

Navigating this intersection between aesthetics and ecology offers both a challenge and an opportunity. Aesthoecology involves aesthetic appreciation and ecological awareness. In times of crisis, often considered as critical turning points, it is important to understand underlying philosophical concepts, such as aesthoecology, and to use those concepts to effect meaningful change and, therefore, this paper encourages the reader to engage with those possibilities.

The paper stresses the importance of cultures of lifelong and inter-generational learning, empowering individuals to remain informed and adaptable in a world that is rapidly changing. Education beyond schools, colleges and universities, facilitating community engagement and creating immersive and innovative lifelong learning experiences, is discussed. Only in this way can education empower individuals to foster greater understanding and awareness of the climate crisis, eco-politics, decolonisation, and education to help to navigate a more sustainable future.

Funding: The research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: No new data were created or analyzed in this study.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Lovelock, J. *Gaia: A New Look at Life on Earth*; Oxford University Press: Oxford, UK, 2000.
2. Naess, A. *The Ecology of Wisdom*; Penguin Modern Classics: London, UK, 2016.
3. Gleik, J. *Chaos*; Abacus: New York, NY, USA, 1994.
4. Morton, T. *Hyperobjects*; University of Minnesota Press: Minneapolis, MN, USA, 2013.
5. Boarta, T. Chaos theory of change. Designing Education; ChangeMakers UCL Project. 10 July 2021. Chaos Theory of Change—Designing Education for Tomorrow. Available online: <https://reflect.ucl.ac.uk/designingeducation/2021/07/20/chaos-theory/> (accessed on 2 April 2025).
6. Arkmansoy, V.; Kartal, S. Chaos theory and its application to education: Mehmet Akif Ersoy University Case. *Educ. Sci. Theory Pract.* **2014**, *14*, 510–518.
7. Gates, S.L. Ecological interconnectedness: Entwined selves, transcendent and immanent. In *Roots, Routes and a New Awakening*; Giri, A.K., Ed.; Palgrave Macmillan: London, UK, 2021.
8. Chappell, K.; Turner, C.; Wren, H. *Creative Ruptions for Emergent Educational Futures*; Palgrave Macmillan: London, UK, 2024.
9. Turner, C. Education as Aesthoecology. Doctoral Thesis, University of Exeter, Exeter, UK, 2019.
10. Abram, D. *The Spell of the Sensuous*; Vintage: Vancouver, WA, USA, 2017.
11. United Nations Environment Programme. *Convention on Biological Diversity Report*; Environmental Law and Institutions Programme Activity Centre: Nairobi, Kenya, 1992.
12. Moure, M.D.; Jacobsen, J.B.; Smith-Hall, C. Uncertainty and climate change adaptation: A systematic review of research approaches and people's decision making. *Curr. Clim. Change Rep.* **2023**, *9*, 1–26. [CrossRef]
13. Klenk, N.; Meehan, K. Climate change and transdisciplinary science: Problematizing the integration imperative. *Environ. Sci. Policy* **2015**, *54*, 160–167. [CrossRef]

14. Marcuse, H. *One-Dimensional Man*; Routledge: New York, NY, USA, 2002.
15. Freire, P. *Education: The Practice of Freedom*; Writer and Readers Publishing Co-Operative: Hardwick, MA, USA, 1976.
16. Ranciere, J. *Dissensus*; Bloomsbury: London, UK, 2010.
17. Thomas, L. *The Intersectional Environmentalist: How to Dismantle Systems of Oppression to Protect People + Planet*; Souvenir Press: London, UK, 2024.
18. Marcuse, H. *The Aesthetic Dimension—Toward a Critique of Marxist Aesthetics*; Beacon Press Books: Boston, MA, USA, 1978.
19. Ingold, T. Rethinking the animate, re-animating thought. *Ethnos* **2006**, *71*, 9–20. [\[CrossRef\]](#)
20. Witt, S.; Clarke, H. (Ma)kin(g) sympoietic more-than-human educational futures. In *Creative Ruptions for Emergent Educational Futures*; Chappell, K., Turner, C., Wren, H., Eds.; Palgrave MacMillan: London, UK, 2024; pp. 123–153.
21. Wren, H. Journeying with affective embodied empathy for an ethical understanding of environmental education. In *Creative Ruptions for Emergent Educational Futures*; Chappell, K., Turner, C., Wren, H., Eds.; Palgrave MacMillan: London, UK, 2024; pp. 95–121.
22. Braidotti, R. *The Posthuman*; Reality Press: Northampton, UK, 2013.
23. Barad, K. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*; Duke University Press: Durham, NC, USA, 2007.
24. Braidotti, R. *Posthuman Knowledge*; Polity: Cambridge, UK, 2019.
25. Haraway, D. *Staying with the Trouble: Making Kin in the Chthulucene*; Duke University Press: Durham, NC, USA, 2016.
26. Bennett, J. *Vibrant Matter: A political Ecology of Things*; Duke University Press: Durham, NC, USA, 2010.
27. Harman, G. *Object-Oriented Ontology: A New Theory of Everything*; Pelican Books: Torrance, CA, USA, 2018.
28. Morton, T. *Ecology Without Nature*; Harvard University Press: Cambridge, MA, USA, 2009.
29. Bianco-Wells, G. Ecologies of repair: A post-human approach to other-than-human natures. *Front. Psychol.* **2021**, *12*, 633737.
30. Conroy, J.C. *Betwixt and Between: The liminal Imagination*; Peter Lang: Lausanne, Switzerland, 2004.
31. Turner, V. *The Forest of Symbols: Aspects of Ndembu Ritual*; Cornell University Press: Ithaca, NY, USA, 1967.
32. Intergovernmental Panel on Climate Change (IPCC). *Climate Change 2021: The Physical Science Basis*; Working Group 1 Contribution to the Sixth Assessment Report; Cambridge University Press: Cambridge, UK, 2021.
33. Cohen, J.M.; Lajeunesse, M.J.; Rohr, J.R. A global synthesis of animal phenological responses to climate change. *Nat. Clim. Change* **2018**, *8*, 224–228. [\[CrossRef\]](#)
34. Møller, A.P.; Czeszczewik, D.; Erritzoe, J.; Flensted-Jensen, E.; Laursen, K.; Liang, W.; Walankiewicz, W. Citizen science for quantification of insect abundance on windshields of cars across two continents. *Front. Ecol. Evol.* **2021**, *9*, 657178. [\[CrossRef\]](#)
35. Møller, A.P. Parallel declines in abundance of insects and insectivorous birds in Denmark over 22 years. *Ecol. Evol.* **2019**, *9*, 6581–6587. [\[CrossRef\]](#)
36. World Wildlife Fund (WWF). *Living Planet Report: A System in Peril*; WWF: Gland, Switzerland, 2024.
37. Cardinale, B.J.; Duffy, J.E.; Gonzalez, A.; Hooper, D.U.; Perrings, C.; Venail, P.; Narwani, A.; Mace, G.M.; Tilman, D.; Wardle, D.A.; et al. Biodiversity loss and its impact on humanity. *Nature* **2012**, *486*, 59–67. [\[CrossRef\]](#)
38. Carson, R. *Silent Spring (Penguin Modern Classics)*, 1st ed.; Houghton Mifflin: Boston, MA, USA, 2000.
39. Ord, D. Forty Seven Years Since Silent Spring: What Has Changed? *Ecologist*, 11 August 2009.
40. Grasso, M. Oily politics: A critical assessment of the oil and gas industry's contribution to climate change. *Energy Res. Soc. Sci.* **2019**, *50*, 106–115. [\[CrossRef\]](#)
41. Powell, A. Tracing Big Oil's PR War to Delay Action on Climate Change. *The Harvard Gazette*, 28 September 2021.
42. McKinnon, C. *Climate Change and Political Theory*; Polity: Cambridge, UK, 2022.
43. Kuta, S. What Wild Animals Were Really Doing During COVID-19 Lockdowns. *Smithsonian Magazine*. 9 June 2023. Available online: <https://www.smithsonianmag.com/smart-news/what-wild-animals-were-really-doing-during-covid-19-lockdowns-180982351> (accessed on 6 October 2024).
44. Le Quéré, C.; Jackson, R.B.; Jones, M.W.; Smith, A.J.; Abernethy, S.; Andrew, R.M.; De-Gol, A.J.; Willis, D.R.; Shan, Y.; Canadell, J.G.; et al. Temporary reduction in daily global CO₂ emissions during the COVID-19 forced confinement. *Nat. Clim. Change* **2020**, *10*, 647–665. [\[CrossRef\]](#)
45. Xia, T.; Zhang, Y.; Crabb, S.; Shah, P. Co-benefits of replacing car trips with alternative transportation: A review of evidence and methodological issues. *J. Environ. Public Health* **2013**, *2013*, 797312. [\[CrossRef\]](#) [\[PubMed\]](#)
46. O'Dowd, A. World is woefully unprepared for another pandemic, experts warn. *Br. Med. J.* **2024**, *385*, 1355. [\[CrossRef\]](#) [\[PubMed\]](#)
47. Mahase, E. Politicians are failing to prepare for next pandemic, warns head of European Health Agency. *Br. Med. J.* **2024**, *386*, 2155. [\[CrossRef\]](#)
48. Caniato, M.; Bettarello, F.; Gasparella, A. Indoor and outdoor noise changes due to the COVID-19 lockdown and their effects on individuals' expectations and preferences. *Sci. Rep.* **2021**, *11*, 16533. [\[CrossRef\]](#)
49. Wetzal, C. Birds Flocked to Pandemic Silenced Cities. *Smithsonian Magazine*, 23 September 2021.

50. Polak, M.; Wiacek, J.; Kucharczyk, M.; Orzechowski, R. The effect of road traffic on a breeding community of woodland birds. *Eur. J. For. Res.* **2013**, *132*, 931–941. [\[CrossRef\]](#)
51. Summers, P.D.; Cunnington, G.M.; Fahrig, L. Are the negative effects of roads on breeding birds caused by traffic noise? *J. Appl. Ecol.* **2011**, *48*, 1527–1534. [\[CrossRef\]](#)
52. Pountney, R. Let's talk about the weather. The activist curriculum and global change education. *Br. Educ. Res. J.* **2025**, *00*, 1–16. [\[CrossRef\]](#)
53. Gardiner, S.M. *A Perfect Moral Storm: The Ethical Tragedy of Climate Change*; Oxford Academic Online: Oxford, UK, 2011. [\[CrossRef\]](#)
54. Capra, F. Principles of life. *Resurgence Ecol.* **2024**, *346*, 23–27.
55. Martin, K.; Mirraboop, B. Ways of knowing, being and doing: A theoretical framework and methods for indigenous re-search. *J. Aust. Stud.* **2003**, *27*, 203–214. [\[CrossRef\]](#)
56. Tailbear, K. Beyond the life/not life boundary: A feminist Indigenous reading of cryptopreservation, interspecies thinking and the new materialisms. In *Cryptopolitics: Frozen Life in a Melting World*; Radin, J., Kowall, E., Eds.; MIT Press: Cambridge, MA, USA, 2017.
57. Ganambarr, R.; Ganambarr-Stubbs, M.; Ganambarr, B.; Maymuru, D.; Bronfenbrenner, U.; Bawaka Country. Toward an experimental ecology of human development. *Am. Psychol.* **1977**, *32*, 513.
58. Tuck, E.; Yang, K.W. Decolonisation is not a metaphor. *Decolonization Indig. Educ. Soc.* **2012**, *1*, 1–40.
59. Topa, W.; Narvaez, D. *Restoring the Kinship Worldview: Indigenous Voices Introduce 28 Precepts for Rebalancing Life on Planet Earth*; North Atlantic Books: Berkeley, CA, USA, 2022.
60. Tynan, L. What is relationality? Indigenous knowledges, practices and responsibilities with kin. *Cult. Geogr.* **2021**, *28*, 597–610. [\[CrossRef\]](#)
61. Lewis, T. *The Aesthetics of Education*; Bloomsbury: London, UK, 2012.
62. Bronfenbrenner, U. *The Ecology of Human Development: Experiments by Nature and Design*; Harvard University Press: Cambridge, MA, USA, 1979.
63. Barnhardt, R.; Kawagley, A.O. Indigenous knowledge systems and Alaska Native ways of knowing. *Anthropol. Educ. Q.* **2005**, *36*, 8–23. [\[CrossRef\]](#)
64. Katingima Day, N. The aesthetics of African music making through the eyes of Utu: An alternative approach to music making. In *Creative Ruptions for Emergent Educational Futures*; Chappell, K., Turner, C., Wren, H., Eds.; Palgrave Macmillan: London, UK, 2024.
65. Turner, C. Exploring aesthocology: Affective anticipation, liminality and emergence as features of alternative educational futures. In *Creative Ruptions for Emergent Educational Futures*; Chappell, K., Turner, C., Wren, H., Eds.; Palgrave Macmillan: London, UK, 2024; pp. 123–153.
66. Rittel, H.W.J.; Webber, M.M. Dilemmas in a general theory of planning. *Policy Sci.* **1973**, *4*, 155–169. [\[CrossRef\]](#)
67. Maibom, H.L. *Empathy and Morality*; Oxford University Press: Oxford, UK, 2014.
68. Matravers, D. *Empathy*; Polity Press: Cambridge, UK, 2017.
69. Anderson, A. Climate change and sustainability literacy: A mixed methods study of attitudes to climate education in secondary schools. *Clim. Change* **2024**, *177*, 169. [\[CrossRef\]](#)
70. Natanel, K.; Albakri, H.; Ali, A.; Dart, A. Steps toward a decolonial feminist ecology. In *Creative Ruptions for Emergent Educational Futures*; Chappell, K., Turner, C., Wren, H., Eds.; Palgrave Macmillan: London, UK, 2024; pp. 267–289.
71. Ghemmour, R. Reimagining research methods curriculum in education otherwise: A decolonial turn. In *Creative Ruptions for Emergent Educational Futures*; Chappell, K., Turner, C., Wren, H., Eds.; Palgrave Macmillan: London, UK, 2024; pp. 223–243.
72. Hay, P. Creative pedagogies: Schools without walls and the forest of imagination. *Int. J. Art Des. Educ.* **2024**, *43*, 396–414. [\[CrossRef\]](#)
73. Milstein, T.; Alhinai, M.; Castro, J.; Griego, S.; Hoffman, J.; Parks, M.M.; Siebert, M.; Thomas, M. Breathing life into learning: Ecocultural pedagogy and the inside-out classroom. In *Environmental Communication Pedagogy and Practice*; Milstein, T., Pileggi, M., Morgan, E., Eds.; Routledge: New York, NY, USA, 2018.
74. Burke, K. *Earthwards: Transformative Ecological Education*; Hawthorn Press: Gloucestershire, UK, 2024.
75. Turner, C.; Hall, E. Drawing and the global climate emergency: Affective and connective explorations. In *Art, Sustainability and Learning Communities: A Call to Action*; Vella, R., Pavlou, V., Eds.; Intellect Press: Bristol, UK, 2024; pp. 147–161.
76. Vella, R.; Pavlou, V. (Eds.) *Art, Sustainability and Learning Communities: A Call to Action*; Intellect Press: Bristol, UK, 2024.
77. Danker, S.; Kahn, S.; Feilen, K.L. Changing climate, changing communities. In *Art, Sustainability and Learning Communities: A Call to Action*; Vella, R., Pavlou, V., Eds.; Intellect Press: Bristol, UK, 2024; pp. 247–255.
78. Escobar, A. *Pluriversal Politics*; Duke University Press: Durham, NC, USA, 2020.
79. Dillon, J.; Achiam, M.; Glackin, M. The role of out-of-school science education in addressing wicked problems: An introduction. In *Addressing Wicked Problems Through Science Education*; Contributions from Science Education Research; Springer: Cham, Switzerland, 2021; Volume 8. [\[CrossRef\]](#)

80. Scholz, R.W.; Steiner, G. The real type and ideal type of transdisciplinary processes: Part II—What constraints and obstacles do we meet in practice? *Sustain. Sci.* **2015**, *10*, 653–671. [[CrossRef](#)]
81. McKittrick, K. *Sylvia Winters: On Being Human as Praxis*; Duke University Press: Durham, NC, USA, 2015.

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