Transformation through aesthoecology: affectivity, connectivity, and the role of art in promoting transdisciplinarity

Christopher Turner, Emese Hall

Graduate School of Education, University of Exeter, UK

Corresponding author: Christopher Turner: aesthoecologyforum@gmail.com

Abstract:

Creative thinking relies on the rupture of conventional thinking. Aesthoecology is an onto-epistemological theory that speculates on this assertion by interrogating the vital importance of affectivity and connectivity in understanding transformational events in education. This involves the exploration of notions such as liminality, emergence, and affective anticipation, all of which are features of dynamic and autopoietic systems. These are implicit in art and design pedagogy but, in addition, are transferable to the skill sets required by other disciplines. If this is the case, then art and design as a subject area have a significance not only in their own right but also in promoting, supporting and enhancing transdisciplinary learning. Rather than being progressively marginalised, our proposal sets art and design, as a manifestation of aesthoecology, 'centre stage' as one significant solution capable of transforming our responses to the needs of students and society, particularly in these volatile and unpredictable times.

Key Words: aesthoecology, affectivity, anticipation, connectivity, emergence, liminality, temporality, transdisciplinarity, transformation.

Introduction

It is essential that art and design within higher education pay continual attention to theory, as explicitly addressing philosophical concerns enables students to identify

meaningful connections to their practice (Broadhead, 2017). This paper focuses on the theoretical significance of particular aspects of aesthetics (as affectivity) and ecology (as connectivity) and explores the ways in which their greater understanding contributes to educational processes, particularly in relation to art and design. We recognise the inherent complexity involved in the relationship between aesthetics and ecology and, drawing on our extensive experiences as researchers and educators, we propose a theory that forms a theoretical and symbiotic framework, which we refer to as 'aesthoecology' (Turner, 2019). This theory provides a vocabulary within which we can explore the significance of aesthoecology to a range of educational contexts.

The methodology we have adopted is somewhat (auto)-ethnographic in approach (Bochner and Ellis, 2016; Denzin, 2014) in that we have drawn rich qualitative data, individually, from our long-term involvements in educational practice and our intense awareness of the interactions between self, experience and all other actants – human and other than human. Our thinking adopts a posthumanist and new materialist stance that recognises that the material world is not a fixed entity but is continually in flux (Barad, 2007; Coole and Frost, 2010) and has the capacity for agency that extends beyond that of humans (Braidotti, 2013; DeLanda, 2016; Harman, 2018; Latour, 2005). Our extensive discussions on the formulation of aesthoecology have been drawn from both the difference in our areas of specialism (one author, Hall, from architecture and visual arts and the other, Turner, from biological sciences and philosophy) alongside the synchronicity that has become apparent in talking about our educational experiences and our congruent worldviews.

We propose that aesthoecology is particularly relevant at a time of significant change and challenge, such as during the COVID-19 pandemic, because we believe it illustrates the importance of creative education in dealing with random and unexpected events. Indeed, we believe that education is enriched by embracing the unexpected and by exploring the ways in which the new arises spontaneously from our actions and through a sensory relationship with our environment.

It is within the intimate and dynamic relationship between aesthetics and ecology, tempered by rhythmicity, that change and transformation are elicited in the form of emergent understanding and new knowledge so fundamental to the processes of learning. Further, this emergence supports the disruption of certainty that should be central in art and design education – especially at higher levels of study (Houghton, 2019; Kalin, 2014).

Aesthetics we define as our affectivity – the ways in which our senses play such a vital part in our immediate understanding of the environment; ecology we define as connectivity – the myriad of connections we make from our sensory information; and rhythmicity we define as temporality – the ways in which the symbiotic interaction between the affective and the connected play out over time. Aesthoecology does not envisage these elements as separate and independent, but blended and integrated, forming a web or a matrix in which the very nature of the process allows for the insight and imagination required for transformational learning.

This combining of modalities relies heavily on the senses not as individual components but as synaesthetic patterning (see Smilek *et al.*, 2007), which can be explored in an ecological way through time. Eagleton (1990), for example, talks of the aesthetic as perfecting reason but in a confused mode. Confused in this sense can be better and more positively read as con-fused, referring to integration and the combining of different sensory pathways – a complexity giving rise to new levels of emergence. For example, this con-fusion is apparent in Duncum's (2012, p. 182) call to expand the sensorium – 'the sum total of ways we experience the world' – within contemporary art and design education. For Duncum, the sensorium is holistic and inclusive, recognizing diversity of many kinds in both creating and engaging with (visual) culture. This all strongly resonates with aesthoecology.

In this paper, we explore the temporal elements of affectivity and connectivity through reference to ideas of liminality, anticipation and emergence. We believe that these elements are common to learning in all subject areas but are perhaps most pronounced and tangible in art and design education. Consequently, we believe that these are transferable qualities supporting a move towards transdisciplinarity

(Baptisa, 2021). Transdisciplinarity represents a more creative educational response in times of rapid change and uncertainty (see Marshall, 2014) than an education that separates disciplines into somewhat artificial and distinct areas of learning and conventional knowledge acquisition (Klein, 2015; Scholz and Steiner, 2015). Additionally, transdisciplinary practice calls for fresh consideration of assessment (van Baalen, DeGroot and Noordegraaf, 2021), challenging the positivist paradigm of assessment that sits uneasily with art educators' beliefs (Houghton, 2019).

We describe the idea of aesthoecology as an onto-epistemology, a way of being and a way of knowing, which permeates learning in art and design and contributes to skills and attributes that cross boundaries and open horizons. This elicits a range of important transitional moments reliant on the body's capacity, at any one time, to affect or to be affected. Affect is an embodied way of knowing and, according to art educators such as Serig (2012, p. 123): 'artistic research within institutions of higher education requires a metacognitive stance to this embodied knowing'.

We propose that the crossing of a liminal threshold, which moves being and knowing on to a different ontological level (Massumi, 2015), is a process of transformation and is largely irreversible (Meyer and Land, 2006).

These transitions and associated emergent events, which are so implicit in and fundamental to the theory of aesthoecology, support the move to a greater understanding and exploration of the transformational potential of transdisciplinarity (Marshall, 2014). We urgently need initiatives that can face the immense and urgent challenges of our time, and this requires radical change at all levels in our education system. Transdisciplinarity creates a holistic approach to knowledge acquisition and creation, which relies on understanding the nature of boundaries and the dynamics of connectivity (Baptisa, 2021; Evans, 2015). However, van Baalen and colleagues (2021) note that, despite a growing interest in the potential of the arts within transdisciplinary practice in HE context, guidance on its mobilization lacks coherence, and further research is needed. We posit that

aesthoecology can make an important contribution, offering a new lens and vocabulary to researchers and practitioners alike.

The theory of aesthoecology

Aesthoecology, as an onto-epistemological theory, represents an insight into complex and dynamic aspects of learning. It is a way of expressing, and exploring, the inherent educational relationship between aesthetics and ecology (MacCormack and Gardner, 2018) that is so entangled that it can be considered as a symbiotic relationship that forms, transforms and changes our perceptions and understanding over time. In contrast, a reductionist model prefers to isolate and separate the content and processes of learning and its subsequent superficial measurement of effectiveness (see Houghton, 2019).

In the context of this paper, the key ideas to be explored from this broad definition focus on our understandings of the relevance of the aesthetic and ecological more closely examined as the affective and the connected. Affect is a complicated notion in the various guises of which there has been a considerable interest over recent decades, particularly in relation to education (Addison, 2011; Massumi, 2015). Gregg and Seigworth (2010, p.5), for example, point to its intriguing complexity:

> There is no single unwavering line that might unfurl toward or
> around affect and its singularities, let alone its theories: only
> swerves and knottings, perhaps a few marked and unremarked
> intersections as well those unforeseen crosshatchings of articulations
> yet to be made, refastened, or unmade.

Aesthoecology recognises that change is both complex and dynamic and occurs continuously; it has a temporal dimension, the pace and direction of which are more turbulent and variable than those of learning that has a linear trajectory. The extent to which we influence change, or indeed induce change, depends on our relationship, individually or collectively, with the immediate environment. That

relationship is mediated through our senses and emotions (Friberg, 2021), and that represents our aesthetic (affective) domain.

Aesthetics and affectivity

Affectivity is an important, and undervalued, way of exploring the world within which we exist – our world, our ecology – and the one that we seek to understand further through connecting lines and entanglements of experience (Deleuze and Guattari, 2013), which we continually build into knowledge. Affectivity provides a sense of freedom to nurture our imagination, to develop our cognitive capacities and to envision new ways of being (Guyer, 2013). Education should cultivate students' awareness of being to the same extent as increasing their knowledge. It is arts education that foregrounds 'the significance of educated emotions and the intrinsic value of objects and relationships' (McIntosh, 2013, p.13), because making art – and making meaning of art – requires the fusion of the cognitive with the affective (Addison, 2011).

The affective represents feelings, emotions and a continuous empathy and connection with our ecology. These connections may be with other people, with our own emotional states, with objects or, as has become so topical during periods of lockdown, what is erroneously and variously understood as 'nature' (Goodwin, 2007; Morton, 2009; 2012). Sensing, experiencing and forming connections become the basis for affective change (see Massumi, 2015).

The affective is a core component of the aesthetic. Culturally and historically, it is difficult to suspend the understanding that the aesthetic is the sole domain of the arts. However, a broader definition, as in the original Greek term 'aisthetic', relates specifically to transformational experiences through the affect of perception (Ranciere, 2013).

Art and design become an educational manifestation of these experiences and, in that way, represent the social and cultural aspects of aesthoecology. Thus:

> I want to argue for a return to affect not as a therapeutic panacea
> to recalcitrant social ills and injustices but as a means to recognise a
> phenomenon central to human interaction, one that underpins the
> processes by which materials are transformed into meaningful and
> useful things: the domain of art and design (Addison, 2011, p. 364).

Consequently, Ranciere's notion of the 'factory of the sensible' defined as 'the formation of a shared sensible world, a common habitat, by the weaving together of a plurality of activities' points us in the direction of considering the advantages of transdisciplinarity, which might be described as 'the sedimentation of a certain number of intertwined acts' (Ranciere, 2013, p. 39). At the very least, connectivity is an essential element of learning within and between disciplines but, particularly, it could be argued that, in the arts:

> Art integration is a rich and complex approach to teaching and
> learning that not only aligns with new initiatives in education that
> prioritize conceptual and procedural skills but could also contribute
> to education's transformation (Marshall, 2014, p. 104).

We can creatively go further than art integration. In accepting the interconnectedness of materiality by considering that all forms of matter possess a vibrant agency that can extend our sensibilities beyond symbolic or cultural meaning, educators need to adopt a thinking, contemplative and experiential pedagogy that concerns being with things (Bennett, 2010; Harman, 2020). Being with things is a transdisciplinary approach that transcends the limits of 'traditional' subject areas. Increasingly, the arts are being employed in this 'new type of education' (van Baalen, DeGroot and Noordegraaf-Eelens, 2021).

Ecology and connectivity

The importance of connectedness is inherent in the human species. This has become even more apparent during the current pandemic. That is not to say that all connectivity is beneficial; closeness to other people during this last year has proved to be the optimal situation for the spreading of the COVID-19 virus. Conversely, the

isolation of people from each other, and the separation of individuals from families, has been in many cases detrimental to mental health and wellbeing (O'Connor et al., 2021). We are as connected to viruses and other micro-organisms, for example, as we are to our immediate families; it is just the nature and quality of the relationship that varies. Within art and design education, connections between people, object and places can be crafted through project design (Mäkelä and Löytönen, 2017).

New materialism takes this understanding of connectedness one step further. It is able to challenge anthropocentric cultural practices and the dualism of mind-body, self-world and nature-culture (Fox and Aldred, 2017) and highlight the assemblages of animate and inanimate effect (Turner, 2019). Material entities with which we engage recognise that the material world and our engagement with it are continually in flux and invested with dynamic agency (Barad, 2007; Braidotti, 2013; DeLanda, 2016; Latour, 2005). Indeed,

> the potentiality of pedagogy emerges in and through the multiple and indirect agencies of materiality (places, environments and organic matter) in teaching and learning processes' (Mäkelä and Löytönen, 2017, p. 242).

Additionally, Fenwick et al (2011, p. 4) point out that material things are 'performative and not inert; they are matter and they matter'. This resonates with ideas of vital materiality (Bennett, 2010) in which the barriers are broken down between human and the material world. This intimate and organic connectivity is the lifeblood of the craftsperson who, through a process of creative materiality, becomes at one with the materials with which they work (Fenwick, Edwards and Sawchuk, 2011). The artist always has an affective connection with the objects with which they engage (McIntosh, 2013). Further, according to Addison (2011, p. 365), 'making and looking at works of art is potentially a transformative event'.

This posthumanist (Barad, 2007; Braidotti, 2013, 2019) and new materialist (Bennett, 2010; Coole & Frost, 2010; Harman, 2018) ontology supports an emergent philosophy that determines that nothing exists by itself and that things are only what they are in relation to other things. Everything is interdependent (Morton, 2012).

Simplistically, this might be seen in linear terms as a chain or a web of some sort. However, it has become much clearer in recent years that these relationships are much more complex and invasive than that. This has important significance in our mis-understanding and historical use of the word 'nature'. Adoption of an onto-epistemology of aesthoecology might go some way to providing a new world view, which is able to challenge dangerous assumptions that uphold a nature-culture dualism that distinguishes nature from civilization to the detriment of both. In the words of Karen Barad (2007, p. 379), 'Knowing is a distributed practice that includes the larger material arrangement.'

We need to visualise the vibrant connections (Bennett, 2010; Harman, 2020) between the human and non-human and to recognise the complex entanglement of networks operating organically and dynamically at all levels and between all actants (Fox and Aldred, 2017; Morton, 2009; Turner, 2019). These networks are variously referred to as an assemblage (DeLanda, 2016; Deleuze and Guattari, 2013), as a mesh (Morton, 2012), or as plasma (Turner, 2019). Art and design education is well placed to capitalise on these complexities because it relies on intelligibility as 'an ontological performance of the world in its ongoing articulation' (Barad, 2007, p. 379). It is also therefore important that within transdisciplinary learning the arts are not seen as merely instrumental (van Baalen, DeGroot and Noordegraaf-Eelens, 2021).

Aesthoecology and relationality

The connection of aesthetics and ecology to education can be explored through an understanding of the relationships between space, place and time. These ideas of connectivity exist in different levels of magnitude, such as the meta-state, the meso-state and the micro-state of connection (Turner, 2019). The meta-state, for example, refers to large and complex issues that draw us in on a global scale. Morton (2013) refers to hyperobjects. These represent entities of vast dimensions, the most obvious and contemporary

example of which is global warming. There is no single cause, the effects appear wide ranging and the impact(s) can appear unpredictable and erratic. Because of this, hyperobjects are not easily escaped from, or as Morton (2013, p. 28) puts it, 'The more I struggle to understand hyperobjects, the more I discover I am stuck to them. They are all over me. They are me.'

The COVID-19 virus is also an example of the meta-state. It comes upon us as if from nowhere and yet it is everywhere, and its impact can be devastating. Its unfamiliarity and impact make the overall effect irreducible in any attempt to understand the overall ramifications. Everyone's experience will be different. The overall effect becomes an object, not just as an assemblage or conglomerate of individual actants, but as a completely new phenomenon. The meta-state, at its greatest, is represented by the concept of Gaia:

> a complex entity involving the Earth's biosphere, atmosphere, oceans, and soil; the totality constituting a feedback or cybernetic system which seeks an optimal physical and chemical environment for life on this planet (Lovelock, 2000, p. 10).

The meso-state is concerned with becoming more aware of connections across boundaries and forming intra-connections in the places that are inhabited. Students and educators alike live in a progressively complex world and, rather than being seen as 'entities existing in the surrounding world', might be more clearly viewed as 'living as an entangled part of the intra-relational world' (Ceder, 2015, p. 35). This represents a multi-dimensional and complex ecology.

We suggest that there are parallels in learning and in the institutions of education. This meso-state might be broken down into constituent entities but function holistically, supporting emergent events. The school, the college, the university are superficially made of individual entities – the subject, the faculty, the rooms, the lecture theatres, teachers and students. Together, they form a loosely coupled hyperobject where there is no obvious join, but, as a collective, they take on an identity that is bigger than any of the actants and in which the actants morph into one whole. The collective becomes an organism – an organic and autopoietic entity,

which develops independently from its constituents (Luhmann, 1995; Mingers, 1995). Moreover, 'the performative learning space affects learning in its own right' (Mäkelä and Löytönen, 2017, p. 255) – an argument demanding close attention.

The micro-state relates entirely to the individual and consists of continually transcending boundaries and horizons that at any one time can be vast or miniscule. It is by accepting these transitions that the ideas of superficial constructed boundaries are negated. So, the paradox is:

> If everything is connected to everything, what exactly are the things
> that are connected? In some significant sense, if we already know
> what they are, if we already have a box in which to put them, they
> are not truly different beings (Morton, 2012, p. 38).

The argument here centres on the various ecologies that we inhabit and how we make sense of that in an affective way. Our lives appear to be continually in transition but within different time frames (Lefebvre, 2013). Greater understanding of this temporal transition lies in engaging with the phenomenon of liminality and threshold events (Conroy, 2004; Massumi, 2015; Turner, 1969).

Liminality, transition and emergence

Liminality represents a space, a period during which transition can take place (Horvath, Thomassen and Wydra, 2018; Turner, 1969; van Gennep, 1960/1909). It is characterised by thresholds, the crossing of which indicates irreversible change and which Conroy (2004) considers as betwixt and between. Kalin (2014, p. 198) discusses the 'liminal space' between art and social concerns, arguing that art education must address this, recognising the paradoxical world wherein it resides through confrontation and disruption.

It might be argued that we exist within dynamic concentric circles of liminality all of which interact with each other in varying time frames. The energies of influence on the individual diminish in moving one to the other and the amplitude of connection

increases. Emergence, i.e., the creative appearance of the new, is the state of crossing threshold boundaries and always results in a new state of creative energy. There is no going back. This is a threshold of the aesthetic mediated by ecological positioning and, as Ingold (2008, p. 1797), says:

> A world that is occupied … is furnished with already existing things. But one that is inhabited is woven from the strands of their continual coming-into-being.

Aesthetics emphasises the affective and temporal aspects of emotional responsiveness. Aesthoecology pays particular attention to the ecological spaces and dynamic processes that lead to transition. These in-between spaces, the periodicity of betwixt and between (Conroy, 2004), are both 'a point in time and state of being' (Barradell and Kennedy Jones, 2015, p. 541–542). In biogeography, these transitions are typified by rocky shores, the edges of lakes or the margins of woodland. Turner (1969), in anthropological terms, likens these liminal entities to, for example, the wilderness, to being in the womb or to an eclipse of the sun and moon. These metaphors have a useful place in understanding both aesthoecology and educational processes. The overlaps and the significance of the interweaving are uncanny.

Places of liminality might be considered as interstitial spaces, spaces where the new can emerge, a creative distinction arising as a rupture of previous thinking. According to Holmwood and Scales (2018), this is a relatively new idea in higher education, which recognises that liminality focuses on shifts in thinking and learning, creating opportunities for deep learning. Liminality leads to a constant state of emergence 'which entails being on the edge of awareness and in sensitive anticipation of the next event' (Turner, 2019, p. 132). This condition for emergence arises from lower-level entities that, without any need to organically cohere, randomly produce new and higherlevel entities (Osberg and Biesta, 2020).

Affective anticipation

Anticipation is a precursor to emergence. It is a period of affectivity, one of expectation and readiness to face a continuously unknown future. This assumes that we attempt to predict what is likely to happen as we cross the threshold of the now and transition into the future. It presumes that previous knowledge, the events that have occurred to us in the past, are likely to influence or be replicated in one form or another. In making that prediction, we assume that we can influence or control events that are likely to occur. We rely heavily on these assumptions, both consciously and sub-consciously, in our planning and continuously prepare for that eventuality (Poli, 2010).

These predictive models represent a mechanistic model of anticipating the future based on teleology, which relies on normative and linear approaches to assuming future events with relatively high degrees of certainty. The result of this effective and normative model of behaviour assumes that, if intervention or action A is imposed in the present, then outputs B and C will follow. This type of model is one that assumes linear cause and effect and is widely used in educational planning from individual level to institutional level. The pedagogy of art and design does not normally take such a linear approach, although Mäkelä and Lyötenön (2017) consider that design pedagogy results in a narrow concept of problem solving because of its emphasis on linear processes. Consequently, they assert that:

> design students could benefit from handling processes typical to fine art. They often proceed through the personal unique expression of each individual student, highlighting exploratory ways in design which are fluid, sometimes chaotic, often complex frequently involving a large element of uncertainty (Mäkelä and Lyötenön, 2017, p. 244).

Aesthoecology assumes a complex and dynamic environment based much more on uncertainty and unpredictability. It is this uncertainty, this rupture, that gives rise to creativity by engaging in a responsible and ethical way with a future that is malleable and capable of being shaped by our actions and aspirations but recognised as highly unpredictable. The creative disciplines are well placed to give rise to this

rupture, particularly the role that art and design can play as a catalyst for re-interpreting our understandings of the way things are and to perceive things differently (Budge, 2012).

The future is not predetermined but nor is it an open and empty void; it is shaped and formed by present and historical events (Facer, 2011). It retains risk and excitability, which incorporate the element of affectivity. Many of those events are made in the moment, guided by our feeling and emotions and creating the tension of an affective sensitivity. Addison (2011, p. 363) argues for this affective sensitivity 'as a necessary and constructive dynamic within educational processes specifically for art and design'.

Affectivity and anticipation are not confined to the human species alone – affective experience is a widespread phenomenon. Affectivity in this sense is the elicitation of emotional response from a range of sensory inputs, as apparent in Duncum's (2012) holistic sensorium.

Affect is a potentiality and the change that is elicited is through the making and breaking of interconnecting strands of information. Tomkins (2008) argues that affectivity, and the biological systems controlling it, facilitates focus, which directs motivational impulses. It may be a super-drive, which over-rides other drives to prevent the sensory system from becoming over-loaded.

Consider, for example, a murmuration of starlings. Individual starlings move in unison with the other starlings in the flock. They fly in a co-ordinated fashion producing amazing patterns in the sky. This is not rehearsed, and the patterns cannot be duplicated or reproduced. It requires affectivity and anticipation, focus and control. This is instantaneous pattern-making with no apparent cause or effect. It represents a melding of individuality and community, every starling reliant on the whole flock to provide the stimulus for movement, while retaining that sense of being part of something far greater.

> This highly co-ordinated ability to react in the present, and carry
> something radically new into the immediate future, suggests that

anticipation is more complex than just an extrapolation of what has
happened in the past determining some sort of preconceived future
(Turner, 2019, p. 140).

Extrapolation from the past assumes some sort of envisioning – a prediction of what
is to happen into the future and how best to make that happen. Envisioning is a key
process in personal and institutional planning (O'Brien, 2011; West-Burnham and
Harris, 2015) and one of the eight Studio Habits of Mind – transferable dispositions
that the visual arts teacher aims to instil in students (Hetland, et al., 2007).
However, envisioning in the context of linear projection from the past denies the
opportunity for radical thinking and creative change dynamics. Osberg (2018)
highlights two processes that rely on anticipating the future while also taking
responsibility for that future.

The first is concerned with creative imagining in which a desirable future is imagined
and then others are inspired to follow (Land and Jarman, 1992). Here there is a
distinction between that which might be *achieved* in common and that which might
be *conceived* in common (Osberg, 2018).

The second process is some type of democratic imagining in which decisions to be
made based on anticipating a future may be temporary and 'understood as a space
which keeps open the possibility to imagine and pursue alternate futures' (Osberg,
2018, p. 12). These envisioned futures are still, however, instrumental and normative
and rely on extrapolation or linearity. This negates, at least to a certain extent, the
possibility of creative and radical solutions, which can rupture conventional or
historic ways of doing things. This, again, echoes Kalin's (2014) emphasis on
deconstructive and experimental pedagogies in art and design education. Osberg
(2018) proposes an anticipation that is characterised by being symbiotic – open
ended, playful and experimental. It is not just about that which is not yet possible
but, much more significantly, that which cannot yet even be imagined.

This new radical emergence can only be detected as it comes into being and
'anticipation disappears the moment uncertainty is overcome' (Osberg, 2018, p. 15).
Therefore, affects are a way of being that represents a liminal state in which there is

an openness and readiness for change. This change may range from a state of minor adjustment to, in its most creative form, significant transformation allowing for a new trajectory to be set in train. This is the transitional series of events that represents affective anticipation – affectivity as sensation and anticipation as temporality.

Beyond the liminal space, there is a moment of realisation – something new has been captured from the playfulness of liminality. A forward momentum has occurred, not a trajectory from the past but a change that emerges from a space in the present.

Conclusion

This paper has been written to disseminate ideas of aesthoecology and to highlight the potential importance of this onto-epistemological theory for education. In the context of art and design education, particularly but not exclusively in higher education, the concepts involved in aesthoecology would appear to be of particular interest (Holmwood and Scales, 2018; Serig, 2012).

Aesthoecology represents a new onto-epistemology, broadly founded on principles of posthumanism and new materialism which, we propose, has significant relevance to a rapidly changing world. We argue that aesthetics, implicit in art and design, (Smith and Simpson, 1991) is best manifested in education in relation to affective responses to ecological positioning. This proposition conveys the central importance of affectivity, connectivity and temporality to education and the ways in which these characteristics of aesthoecology coalesce to facilitate emergence of the new.

Understandings of affect and connection, in relation to time, become a focus for realising the place of art and design education (Addison, 2011) at the centre of other discipline areas. While art and design have an important place in the curriculum of learning institutions, its pedagogy and its innate characteristics as a subject area also offer much to any process of transdisciplinarity (Marshall, 2014).

Transdisciplinarity, the blending of traditional subject areas, can transform educational institutions in better equipping students to face the challenges of a volatile world in which creative and novel thinking will provide the innovation and flexibility for solution-based problem solving (DeHaan, 2017). Practical and holistic solutions, as explored in the art and design curriculum, do not confine themselves to well-worn paths but need to emerge from playing with materials, artefacts and environments (Mäkelä and Löytönen, 2017). Through curiosity, creative play and associated dialogue, ideas will emerge that are open to further investigation, providing a rich tapestry for critical evaluation. This criticality is essential to democratic art and design education (Houghton, 2019; Kalin, 2014).

Although we have provided examples of where aspects of aesthoecology can be seen in others' research, the existence of aesthoecologically informed practice in art and design in higher education is not yet universal, and there is untapped potential. We therefore believe that radical change is required. There is a pressing need for:

> curricula that are inspired by entangling the conventional strands of learning, a pedagogy that recognises the complexity of knowledge formation, a philosophy that understands the implications of an unknown and risky future and a care that fosters the enchantment and fragility of the world and all within it. Aesthoecology supports these dimensions of dynamic change (Turner, 2019, p. 167).

In this paper, we have presented a theoretical model that opens spaces within which a rich conversation might ensue among researchers and practitioners alike. Aesthoecology offers a metaphysical language through which this dialogue might take place. Notions of affectivity, emergence, connectivity, liminality and anticipation are all present in the material world as well as in the world of ideas.

We do not offer in this paper particular examples of aesthoecology in practice. However, it is our intention to further this work by inviting contributions from others who might like to work with our ideas, or for whom our model might resonate, so we might develop the work further in due course in a spirit of collaborative professional learning and enquiry.

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All materials included in the article represent the authors' own work and anything cited or paraphrased within the text is included in the reference list.

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