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## **Space-time scapes as ecopedagogy**

### **ABSTRACT**

This emergent field of ecopedagogy gives little conceptual, methodological and empirical consideration to the significance of spatial and temporal elements of environmental learning. This article focuses upon both spatial and temporal components of three ecopedagogic instances, examining experiences from participant's perspective. Specific (eco)pedagogic dimensions of each learning experience are compared and contrasted, and synthesized into an emergent concept/practice of ecopedagogy at a range of spatial scales and across life courses. The article concludes that regardless of the specific spatial context, space-time aware learning experiences offer tactile, embodied encounters with different natural settings. Such sensuous and affective dimensions of experience of scapes emerge as crucial to encouraging nature-culture inter-relativity for participants. Space-time-based and alert encounters thus materialize as central to the development of ecopedagogy.

### **KEYWORDS**

Ecopedagogy, experiential learning, nature-culture, space-time

### **Introduction**

The addition of the prefix 'eco' to the more conventional practices and theories of pedagogy demands that spatial and temporal elements of environmental learning experiences be highlighted conceptually, methodologically and empirically in environmental education. Ecopedagogy as a spatially and temporally attuned practice is incorporated here into critical pedagogical processes of education inspired in Freirean philosophy (Freire, 1970), in particular his elaboration of the idea of conscientisation and embodied action in local contexts. Scholars of education have argued that ecopedagogy, framed as a progression within environmental education, offers a route to a more radical form of ecoliteracy (Antunes and Gadotti, 2005; Kahn, 2010). Moreover, it has been suggested that such ecoliteracy can be achieved through transformation of human, environmental, and social relationships (Gadotti, 2010). This emphasis upon transformation of nature-culture inter-relativity, through which attention is drawn to relations between human and non-human actors (Latour, 2014) indicates the need for critical awareness of how spatial contexts and scales within temporal moments influence initial framings and practical values and utilities of a re-conscientised ecopedagogy.

Key concepts of the spatial and temporal are used within this article in a relational sense, drawing upon theorists, including Latour (2011b), as well as relational geographers (Harvey, 1996; Ingold, 2011; Massey, 2005; Schatzki, 2013; Tuan, 1976) acknowledging ecological crisis as a phenomenon occurring within unique space-time contexts, which assign "time and space coordinates to events" (Schatzki, 2013, p. 26). Doing so involves a recognition that "educators have a right, even the duty, to teach what seems to them to be fundamental to the space-time in which they find themselves" (Freire, 2016: p. 120). Furthermore, the programmes studied and discussed in this ecopedagogical elaboration of space-time scapes

occupy a decolonialised (Kahn, 2010) space, ““outside” of the hegemonic social relations and valuations” (Harvey, 1996, p. 231), allowing alternative perspectives and counter-cultural paradigms to be examined. The ecopedagogic spaces explored include those outwith everyday life, thereby constituting “loan” contexts (Freire, 2016, p. 26) that enable participants to critically reflect upon their everyday existence from within geographical and ecological settings that are other to the familiar. As such, attention is drawn to the value of growths in awareness “grounded in the stripping away of otherwise daily routines” (Payne, 2014, p.5). It highlights that effective ecopedagogy enables education to go “beyond the classroom” (Marcuse, 2015, p. 189), involving “the body, reason *and* imagination, the intellect and instinctual needs”, while inter-relating the ordinary and extra-ordinary (Schatzki, 2013, p. 34) as a crucial rhythmic interplay between places of play and inspiration and spaces of action, which enable transfer of learning through environmental education ““back into” the mundane, ordinary, normal and routine ‘living’ in the everyday” (Payne, 2014, p. 9).

This article, therefore, highlights and examines the influences of contexts in which ecopedagogy occurs. It focuses upon spatial and temporal components of experiences of informal environmental learning that might be considered ecopedagogic. It conceptually and empirically examines these experiences from participant’s perspective, as they occur, within different geographic settings and across different life stages. I draw upon three recent empirical studies, taking place in the United Kingdom (Dunkley and Smith, 2015; Dunkley, 2016; Dunkley, 2018). The first involved participant observation of children taking part in a five-day summer club for young residents of Brecon Beacons National Park, Wales. The club sought to enhance affective dimensions of a group of five to 11 year olds experiences and connections to immediate surroundings (Dunkley and Smith, 2015). Activities engaged in included pond-dipping, den-building, geo-caching and orienteering. The second case examined experiences of 315 small-business owners and employees, who participated in a ten-day sustainable training programme run at a botanical garden in a rural UK-county. The programme encouraged participants to adopt sustainable business practices and used the site’s unique context to highlight connections between everyday working and personal lives and global environmental change (Dunkley, 2018). The third example of an ecopedagogy as/in scape was a citizen science project, run by the Zoological Society London, which involved local participants, many of whom were of working and retirement age, within a river monitoring programme in north London, constituting a form of environmental action (Dunkley, 2016). A focus was placed upon how conducting “kick-sampling” engaged participants with the river tactilely and what access to the amassed data meant to participants. Despite the human, social, demographic, and geographical variations of these three studies, here I interpret and extract some underlying temporality and spatiality aspects that are worth elaborating in advancing notions and practices of ecopedagogy as/in space-time scapes.

Through these three cases, specific ecopedagogic dimensions of learning experiences will be compared and contrasted, and then synthesized into an emergent concept and practice of ecopedagogy as/in scape. As such, this article offers insights into how this empirically informed ecopedagogy might be studied, developed and practically implemented at a range of spatial scales and across different life stages. The article concludes that the space-time and geographical and social, contexts in which ecopedagogy occurs need to be emphasized in the development of environmentally conscientized pedagogic interventions. Regardless

of specific spatial settings, it emerges that space-time aware learning experiences, whether formal or informal, offer tactile, embodied encounters with different ecologies, as experienced in different versions of environmental education and learning cased in each study. Such sensuous and affective dimensions of experience of and in scapes emerge as a crucial medium through which fostering enhanced nature-culture interconnectivity does occur for participants. Based upon this conceptual, empirical and practical research, it is more confidently argued, therefore, that space-time-based and alert encounters are central to the development of ecopedagogy in, any scape given variations in their scope.

With the ongoing development of ecopedagogy as/in scapes in mind, the article will conclude with a selective discussion of some key study implications for pedagogues and methodologists. Attention will be drawn to the significance of extraordinary and everyday spaces to ecopedagogy. As such, I caution against (over)romancitisation of “wild” encounters within environmental education, demonstrating how affective qualities of nature-culture connections, experienced in the everyday worlds of learners can have key implications for eco-literacy development. In contemporary societies that are devoid of ‘feedback loops’ that Latour (2011b) argues would enable us to feel the ‘consequences of our actions and build a collective public’ (p. 80), the blending of nature-culture connections, within mundane everyday spaces with encounters in spaces that inspire, emerge from this research as essential to ecopedagogy. The next section will explore the notion of ecopedagogy, as it has been conceived as an albeit vague notion in terms of praxis (Reid and Payne, 2011). It seeks to unpack the concept, drawing upon its theoretical underpinnings and emergent critiques.

### **Ecopedagogy: An evolving concept within space-time scapes**

Richard Kahn’s (2010) version of critical pedagogy within the ecopedagogy ‘movement’ draws upon Freire (1970), but also Ivan Illich and Herbart Marcuse. Kahn argues for radical ecoliteracy development responding to environmental crisis. Within this movement, it is claimed that ecopedagogy offers an alternative ‘political’ and social route to developing ecoliteracy, rejecting mainstream education’s conventional anthropocentrism, while adopting a stronger democratic ethos and focusing upon everyday encounters (Antunes and Gadotti, 2005) rather than abstract ideas and ideals. In this critical and radical sense of practice, ecopedagogy is concerned with generating change through critical pedagogic processes, drawing upon the Freirean concept of conscientisation (Freire, 1970). Conscientization regards learners as active agents who become ‘literate’ through developing experiential awareness of practical issues confronting them existentially. Being in possession of a knowledge about themselves and wider social and cultural factors governing their situation is thought to enable human, environmental and social relationship transformations (Gadotti, 2010).

Yet while Kahn’s (2010, p. x) call to educators to respond to ecological destruction by teaching “for the world” has been acknowledged as rousing, it is also criticised, given uncertainties concerning whether his version of radical ecoliteracy enables structural changes regarded necessary (Reid and Payne, 2011). Furthermore, Kahn’s (2010) ecopedagogy is ahistorical, existing outwith post-critical environmental education literature, which recognises the potentials of alternative critical curriculum experiences, such as “vagabonding slow ecopedagogy” (Payne, 2014, p. 10), through which Payne (2014, p. 2) stresses Freirean (1970) concepts of

processes of becoming, deconstructing and destabilising through being outdoors, a process he refers to as “phenomenological deconstruction”.

Freire (1970) prioritized local conscientizations of the pedagogy of the oppressed in his 1960s/70s time-space of writing, what now and more is that learners need to become conscientized about global environmental changes that his later writings began to address (Ghisloti et al, 2015). The oppressed now arguably includes non-human beings (Ghisloti et al, 2015). Raising consciousness of connections between human and ecological spheres and networks then is a fundamental endeavour for ecopedagogues given that, as Latour (2009) argues, the fallacy of disconnect between human and non-human worlds hinders societal responses to environmental crisis. Latour (1993) argued that modernist values established during the enlightenment separated ‘nature’ and ‘culture’. Belief in a modern world, distant from a pre-modern, ‘natural’ world drives neo-colonialism, encouraging Western societies to dissociate themselves from the past. It also encourages these cultures to consider themselves separate from ‘other’ cultures yet to be modernised. It is here that the need to recognise the “relation of dependence” (Harvey, 1996: p. 231) between subjects and objects within different space-time emerges. Latour (1993, 1998) challenged the modernist paradigm, exposing the fallacies of a rigid nature-culture divide (Latour, 2011b), proposing an alternative ‘non-modern’ constitution, which gained widespread acceptance among geographers (Bingham and Hinchliffe, 2008; Braverman, 2014; Lorimer, 2012; Massey, 2005).

Latour’s (2013) recent extension of this discussion within the Anthropocene is relevant for ecopedagogues, as our inter-relativity within a finite cosmos becomes adversely clear. Living in the Anthropocene necessitates revealing inter-relativity in as many spheres as possible (Latour, 2011b), a concept that is explored within Zane Ma Rhea’s (2018) article in this SI. When practicing ecopedagogy as/in scapes, it is argued here that contemporary ecopedagogues are challenged to make certain aspects of what Latour (1993) calls actor-networks visible. This involves making space-time connections between the micro local, meso cultural/ecological, and macro global/planetary visible. Eco-pedagogues must then make space-time connections to expose chains between networks that extend, as Latour (1993, p. 144) states, ‘from my refrigerator to the Antarctic by way of Chemistry, law, the State, the economy, and satellites’. Latour (1998) argues that to tackle the ecological crisis we must ‘ecologise’, which involves dissolving object-subject boundaries and recognising ‘all the entities that participate in the pluriverse’ (Latour, 2011b, p. 79). Latour (2014, p. 4) called for an alternative ‘geostory’, acknowledging earth as a ‘closed cosmos’ and recognising human and non-human shared agency. Doing so halts the modernism myth, recognising intimacy between a multitude of active agents, across space and time.

Interpreting a Latourian Anthropocene (globally) informed, Freirean (1970) (locally) conscientized notion of time-space in developing the concept/practices of ecopedagogy as/in scapes thus involves seeking methods of engagement that (re)connect a human and non-human world at different scales within a local-planetary continuum, which varies across a range of spatial and temporal contexts. Environmental education scholars have begun discussing the deconstruction of dualities, including the global-local, through environmental education. For example, Ghisloti et al (2015, p. 124), who consider the applicability of Freirean (1970) concepts to (post)critical pedagogy, argue that: “The more a person is rooted in their locality, the more chance they have to globalise” (p. 132). Ecopedagogic methods are considered in this article within temporal and spatially specific contexts, while,

ecopedagogy is an approach that must adapt to participants spatial and temporal situations, while emphasising present and future agency.

### **Interpreting the space-time scapes of ecopedagogy**

The proceeding conceptual outlining of ecopedagogy as/in space-time scapes grapples with what Payne (2014: p. 10) refers as the “dark matter of how to conceive, implement, interpret, and adequately *represent* a radical form of education”. Unveiling an empirically driven ecopedagogy theorization requires synthesis of research findings concerning effects of three UK-based environmental learning initiatives, taken as overlapping instances of eco-pedagogy in praxis, within varying life course stages. Within each case, methodologies employed recognised challenges of representing participants Ecopedagogic experiences (Payne, 2014). Each study explored the extent to which the spatial-temporal contexts of learning, whether within a national park, a botanical garden or local river-scape, could be a medium for exposing ecological interdependencies. The three studies also sought to explore the capacity of ecopedagogic experiences to effect participant’s relationships with their surroundings and to influence participant’s everyday lives and practices. Methods employed to gain these insights, included a bricolage of ethnographic methods, including participant observation, whole cohort surveys and in-depth interviews (see: Dunkley and Smith, 2015; Dunkley, 2016; Dunkley, 2018). This article focusses on the space-time scapes of each intervention and infers significances of each instance to drive a theorisation of an emergent account of ecopedagogy.

While acknowledging this selective synthesising methodology’s limitations, it is argued here that the cases selected provide insight into unique informal learning contexts, outwith institutional contexts, helping progress post-critical environmental education. The ecopedagogy in space-time scapes represented in each instance is underpinned by an ethos that learning environs play a crucial role in developing narratives and nurturing values and that ecological concientisation is a process of becoming (Freire, 1970).

### **Representing the space-time affordances of ecopedagogy**

Here, the thematically oriented ecopedagogic dimensions of three environmental learning experiences described will be compared and contrasted. A priority for development here is an emergent concept and practice of ecopedagogy as/in space-time scapes. Omitted from this discussion, due to the word limitation, are enduring effectiveness, programme content valuations and other factors, including participant’s preconceptions and existing knowledges. Such discussions, together with detailed programme descriptions are available via Dunkley and Smith (2015); Dunkley (2016); and Dunkley (2018).

#### ***(i) Stimulating genealogical connections in childhood – the local-national park***

Establishing early life connections with ecological surroundings is significant given that, as hooks (2009: p. 26) states, ‘estrangement from our natural environment is the cultural context wherein violence against the earth is accepted and normalized’.

This was appreciated by ecopedagogues at Brecon Beacons National Park, hosting the summer-club that was the context for the first study. Rather than focusing upon subject specific knowledge, the ecopedagogy used encouraged transferable skill development and imaginative engagement with scapes. Through activities including orienteering, the club enabled children to explore and 'read' landscapes, navigating between maps and physical spaces and learning to identify permanent features, such as the park's river. Children engaged in pond dipping activities, identifying invertebrates, an activity that enabled educators to explore with children complex photosynthesis processes. Furthermore, a "mini-beast hunt" involved searching for insects on dryland. These classification activities enabled children to connect to minutia of lifeforms within the landscape, while a mountain walk and river-crossing enabled macroscale landscape engagement, introducing children to geological timescales, while also exploring the significance of historical features, including standing stones.

An interdisciplinary ecopedagogy was employed in the club, drawing into context history, geography and science as important 'content' considerations. Yet there was also an affective component to the pedagogy, in that Club educators also focused upon providing sources of inspiration and nurturing a sense of temporary emplacement in the Park. The capacity of this immersive ecopedagogy is perhaps best demonstrated within the final programme activity, a walk around *Craig-Y-Nos* country park. Children were encouraged to choose their route. As Relph (1989: 26-9 in Harvey, 1996: p.301) states, places "are constructed in our memories and affections through repeated encounters and complex associations...place experiences are time-deepened and memory-qualified" and the group chose to return to the site where older children, who had participated in the club the previous year, had had a campfire. Many older children, who had been coming to the club for several years, seemed to enjoy sharing their associations with the country park with younger children, while educators also enjoyed sharing their park memories with children. This instance highlights the significance of space-time and memory, over repeat 'stays/visits'. Space-time emerges from this study as 'recyclical' and routinized, with affective outcomes for children and teachers. Another example of this emerges from an analysis of conversations amongst the children and pedagogues during a group walk, which revealed the landscape as storied for many group members. Educators asked students to identify their favourite park places and told stories about their favourite places. For example, one educator, a mother of two within the group, tells the story, as she leads the group along a path of pine trees, that former resident, opera singer Adelina Patti planted - she believed the air cleansing properties would improve her voice. Another educator, a mother of one of the group, tells the children how she met her husband clearing foliage from the park lake, while the children shared stories of toasting marshmallows on campfires and 'scary' woodland walkways. These two 'memorable' childhood and pedagogue experiences of 'recyclable' space-time encounters and their elevation of affective dimension were, it seems, powerful aspects of experiential environmental learning while moving.

Distance from the non-human world that Latour (2009) observes is not Tuan (1976, p. 56) argues experienced by children who live: "in a vivid world much of the time... Unburdened by worldly cares, unfettered by learning, free of ingrained habit, negligent of time, the child is open to the world". Visceral, sensory engagement with ecological surroundings, experienced by children within this study nurtures affective ecological bonds. Such engagement is time-space sensitive and has significant

repercussions for ecological sensitisation throughout life courses (Chawla and Cushing, 2007). Places of childhood are key locales for identity and social relation constitution and have 'formative impacts on our sense of self' (Castree, 2003: p. 163). Children develop subjective interpretations or senses of place, whereby over the times of the space, that place acquires 'unique qualities' (Williams, 2009), relating to specific emotional experiences and events. For example, regardless of change, memories of temporality of home nurture a sense of belonging (hooks, 2009), thus many individuals develop timeless affinities to childhood homes (Massey 2005).

As modernism implies space-time compression and places become more globally interconnected, Harvey (1996: p.246) argues that "more rather than less of the world's population cling to place and neighbourhood". One's roots thus become increasingly significant throughout life courses. For ecopedagogues involved in the club, nurturing a sense of place rootedness helps establish a sense of belonging (hooks, 2009) within locations of knowledge embodied through a slower-ecopedagogy that ecophenomenologically and nomadically deconstructs the 'fast'scapes of human-environment encounters and relations (Payne, 2014). There appears to be an awareness amongst the ecopedagogues that children would become 'wayfaring beings' (Ingold, 2011: p. 148). This knowledge leads them to seek to 'anchor' the children within the scape. The ecopedagogy employed within the club recognised the transdisciplinary potentials of ecopedagogy within space-time scapes, and the importance of enabling children to develop affective connections with their home surroundings (Tuan, 1976). This is achieved through direct experiences, enabling connection to scapes at a micro and macro level, and through storying the landscape with connections to the deep past, and to the park's potential role in children's futures. A sentimental ecopedagogy thus emerges, providing children with initial experiences of technological and emotional tools needed to engage with and become conscious of (Freire, 1970) present ecological surroundings, while also making connections across space-times, which Latour (2011b) argues is a pre-requisite for tackling ecological crisis.

***(ii) Extending the ecopedagogic narrative in space and time – interrelations with distant plants***

The botanic garden within which the second study was conducted, contained greenhouses hosting the world's largest captive rainforest. Organisers took advantage of these sensational settings, to reveal human-nature inter-relativity (Latour, 2011b). Educators led business owners and employees on rainforest biome tours, showcasing plants as foods, building materials, fuel and medicine. Understanding interrelations between these plants and participant's daily lives involved extending the narrative to emphasise potential actions within working contexts to contribute to tackling climate change and enhance the business potentials of a 'low-carbon economy'. Garden 'backstage' areas were used to showcase how mundane issues, including cleaning, procurement, cooking, water and waste management were dealt with. A resource efficiency framing, found to resonate with the business community, encouraged reflection upon environmental effects of these practices. During visits to water, energy, procurement and waste management centres, participants learnt about trade-offs in sustainability decision making. Resource efficiency was packaged with tangible examples from specific areas, while attention was drawn towards key issues, including seasonality time and

extending responsibility through controlled supply chains. Learnings concerning nature-culture inter-relativity were further grounded within the participants every day, through a workplace exchange. Participants spent two-days at another participant's workplace considering issues including, resource efficiency and wider community engagement spaces.

The ecopedagogy discussed here differs to that encountered within the first case, given its focus on private and public actions of adult participants (Stern, 2000). The programme attempted to transfer understanding gained within a relatively unknown space-time to the conventional/normal orthodox everyday space-time of home/work (Payne, 2014). Participants were supported in this journey with access to knowledge and financial support (£500 to spend on sustainable business innovations), while business practices changes were monitored. Emphasis was placed upon participant's personal responsibility for practical action, while it was assumed that access to the community of practice of 315 programme participants would facilitate the county's eco-economy development. To assess distance travelled by adult learners, participants completed a pre and post self-assessment. Key findings include that by the end of programme, knowledge of actions that could be taken to improve sustainable businesses practices rose by 53% to 94%; awareness of opportunities existing within the low carbon economy rose by 53% to 76% and participant's confidence in their ability to improve their sustainable performance rose by 49% to 99% (Dunkley, 2011).

The juxtapose of the extraordinary and the everyday that constitutes an effective ecopedagogy for local business leaders, providing inspiration and a means of affecting change. Through highlighting front and backstage garden areas, pedagogues could demonstrate connections between natural resources drawn from Southern hemisphere rainforests to local contexts of businesses in South-West England. Edward, an accountant describes the embodied-conscientization (Freire, 1970) effects of participating in the programme in terms of inspiring action:

"I've started off on the journey with an awareness that we all need to do more to try and reduce carbon and become more sustainable...My attitude now [following participation] is that I can actually see that I can make a difference and I can actually do things, within my life, within my business, and I'm also in a position where I can actually spread the word to other businesses, through my work as an accountant"

For working adults, reflexive spaces can be curtailed by more immediate concerns, particularly when lived-contexts are economically unstable. The programme raises consciousness (Freire, 1970) of the scale and scope of the impacts of home/work practices within modern context (Latour, 2011b). It does so by involving participants in a process of "decoding" (Freire, 1970: p.78) whereby they move:

"from the abstract to the concrete...from the part to the whole and then returning to the parts; this in turn requires that the Subject recognize himself in the object (the coded concrete existential situation) and recognize the object as a situation in which he finds himself, together with other subjects".

Involvement in this decoding process enables participants to “begin to behave differently with regard to objective reality”. This is significant given that business organisations denote the largest contributors to environmental problems (Stern, 2000). Adulthood is the life stage at which modernist values (Latour, 1993), separating nature and culture and privileging an economic paradigm (Latour, 2014) are most influential. As such, engaging adults with ecopedagogy in their ‘matured’ space-time contexts of everyday life is crucial to dealing with the pressing issue of environmental crisis. Thus, a key challenge for ecopedagogues in adult education is making social and geographical relations more visible/accessible through a sensitive space-time ecopedagogical contexts of life course unfolding’s and ecobecomings. Botanic gardens, first established in the seventeenth century, evolved throughout the enlightenment to become ‘botanical theatres for staging the unfolding dramas of theology and science’ (Mabey, 2015: p. 23). Now, they arguably have an important role as ecopedagogic spaces, helping address plant-blindness (Wandersee and Schussler, 1999), a common yet little understood phenomenon of modern society (see Dunkley, 2016). Botanic gardens emerge from this study as scapes that enable learners to reflect upon their business practices and purchasing decisions. The ecopedagogy involved enabled conscientization (Freire 1970), connecting local business owners to “place beyond place” (Massey, 2005: p. 192), exposing globalisations effects and connecting disparate locations via a continuous flow of people and resources, resulting in a necessity to recognise inter-relativity and co-dependency at a planetary scale (Harvey, 1996; Latour, 2011b; Massey, 2005). As such, botanic gardens spaces emerge as capable of exposing “*geographical and social ignorance*” (Harvey, 1996, p. 194), making what have become abstract connections between valued local and global environments and everyday work/life practices visible. The programme “deconstructs” (Freire, 1970) global-local connections and is an instance of what Harvey (1996: p.233) might consider “an extension of moral responsibility (and values) throughout the whole intricate geography and sociality of intersecting markets”.

### ***(iii) Returning to local spaces – connecting through citizen science***

The third case concerns an in-depth study of experiences of a subset of twelve citizen science volunteers in North London. Citizen science (Irwin, 1995) initiatives are increasingly commonplace. Harnessing citizen science methodologies can help fulfil ecopedagogy aims at a community scale, given the aptitude of a scientific lens in making invisible connections visible (Latour, 1993) and its capacity to stimulate processes of conscientisation (Freire, 1970). The first way this is achieved is through connecting people to the minutia of ecological matter, enabling reflection and learning previously unobtainable. The second means whereby citizen science can be considered an enabling methodology for ecopedagogy is through the capacity of data generated to empower community environmental action (Cooper, 2016). The project under study here (“*London River’s*”) is coordinated by the Zoological Society of London (ZSL) (<https://www.zsl.org/conservation/regions/uk-europe/londons-rivers>). It harnesses the Anglers’ Riverfly Monitoring Initiative (RMI) methodology (<http://www.riverflies.org/rp-riverfly-monitoring-initiative>) to monitor freshwater invertebrates through kick-sampling. Participants conduct monthly sampling, in groups of two or three. The group then discuss research results at annual forums.

The citizen science project explored attracted individuals particularly from an older generation, who were often drawn to participate because the activities enabled

return to childhood experiencing of spaces to which they had a life-long affinity. The kinaesthetic is significant here. Harvey (1996: 248) argue that: "*it is bodily sensations that provide the primary locus for all of our experience of space and time*" and thus, "*it is through the sensations of the human body that our common sense notions of space and time initially get constructed*". Citizen science appeals because it encourages sensory engagement with local environs. Fred explains his lifelong connection to the river he monitors, underpinning his desire to participate in the London Rivers project:

"I'm always in the river, with the waders, and the groups...When I was ten years old, I used to be going out with my friends with my fishing nets and playing in the river. So, it seems like I've come back to what I was doing as a child".

In the above excerpt, Frank described how in retirement, he has regressed to conducting childhood activities, now made possible through volunteering river monitoring. On-going contact, over time, and experience of the river is fundamental, but the mode of experience has changed from childhood 'play/discovery' to adult 'leisure'. Desire to attend to local contexts may be driven by the fact that, as people age, 'the future shrinks, so does the spatial horizon and the old can become emotionally involved with immediate events and objects in a way that is reminiscent of a child' (Tuan, 1976: p. 57-58). Just as ecopedagogues seemed to appreciate in the first case, connections to ecological surrounding formed in childhood persist throughout life courses and may be a context to which individuals return when provided the temporal space to do so.

The tactile characteristic of citizen science encounters makes them, in one sense, an effective ecopedagogy. Through close observation of natural phenomenon, in this case, invertebrates living within a riverbed, the methodology offers means to appreciate inter-relativity between the visible and invisible world, in the way that Latour (1993; 2014) explicates. To this end, Oliver explained the effect of participating in the citizen science project on his ecological awareness.

"If I hadn't got involved in this [*London Rivers*], I wouldn't have known about the pollution incidents ... So, I've got more observant... I've got more aware of the natural surroundings, especially around the river".

Within the above passage, Oliver refers to what Freire (1970) regards as the significance of naming things to processes of transformational change. The "naming of the world" cannot Freire (1970: p. 64) argued, be considered "the task of an elite". Citizen science as an ecopedagogy in scape is considered an act of communion, between learners and leaders (ecologists/ scientists/ policy makers/ community groups). While, for participants, identifying and naming invertebrates is a form of inter-relativity, which empowers local people.

The pedagogic impacts of citizen science involvement are little explored (Wals, Brody, Dillon, & Stevenson, 2014), yet it is argued here that such projects can be viewed as a form of ecopedagogy through their capacity to raise consciousness of environmental issues and actions that can be taken to mitigate environmental damage, enabling people to act upon local environmental concerns (Freire, 1970). Citizen science represents an ecopedagogic methodology that enables public action upon environmental issues (Stern, 2000), participating in citizen science thus

constitutes a form of environmental citizenship (Ellis and Waterton, 2004). This is significant given the critique that environmental educators have historically faced for placing too great an emphasis upon the private individualistic actions of learners, for instance, recycling and energy saving (Chawla and Cushing, 2007).

The methodology employed can be regarded as one that exposes the 'feedback loops' that Latour (2011a) discusses, exposes participants to relationship between human pollution and effect upon river invertebrates. This connects this local space to the spaces of scientific laboratories and environmental protection bodies. These benefits are then made visible to the participant through their local experiences of a cleaner river spaces and over time, return of indicator species.

## **INSERT TABLE 1 HERE**

### **Conclusions: Towards a sensing ecopedagogy**

From Table 1, the synthesising of key space-time, and embodied conscientizations into ecopedagogical commonalities inform an emergent concept and practice of ecopedagogy. While avoiding a reductionist ecopedagogy, given its propensity to occur within any space and time that it comes to decolonize (Kahn, 2010), the synthesis presented here explored a move towards ecopedagogy within space-time scapes. Ecopedagogical experiences varying in form and appealing to individuals at different life stages and within differing context were presented, yet within each instance sensory experiences of contextual emplacement emerge as facilitators in raising awareness of nature and culture inseparability. The three instances of ecopedagogy described expose inter-relativity in a spatial-temporal context. Through efforts to make the invisible visible (Latour, 2011b), the space-time scapes explored enable processes of ecological conscientisation (Freire, 1970).

The studies analysed imply that contexts of ecopedagogy are varied and numerous, yet despite the capacity of national parks and botanical gardens to inspire, they also suggest that learning situations need not be exceptional environments. Instead it is the connection between ecologies and everyday lives that emerges as significant. Effective ecopedagogy therefore involves emphasising participant's agency to affect change in a manner that is space-time appropriate, during an immersive/repeat/re-cyclical experience(s) of a local setting and beyond as an accumulating memory of life course type development/maturation. This may mean focusing upon generating affective ties with ecological surroundings during childhood (Chawla, 1998), given that these can indicate what individuals attend to in later life (Tuan, 1976). In childhood ecopedagogy, futures may also be emphasised. As the final case demonstrated, ecopedagogy can inspire a sensibility towards ecological surroundings in early years that continues through life and into retirement. Participant in this case often reminisced about the joys gained from observing and tactilely experiencing riverscapes as children. Without the pressures of a working life, particularly time intensification with spaces arguably mean these participants could return to a more visceral enjoyment of these ecologies. Yet, for those within mid-life, ecopedagogy need also address the everyday impacts that learners can make within the workplace and in community. Ecopedagogy can be thought of as a continuous, ever becoming process of recycling and remembering nature-time-space encounters and imaginations, introduced to children at the earliest possible stage, yet developed throughout life courses.

The studies presented here reveal that ecopedagogic interventions that stress interconnectivity can encourage people of all ages to connect affectively to place, becoming involved in further conservation actions in a life stage appropriate manner. For the young, this means conscientization (Freire, 1970) of initial connections, that lead to commitment to 'place beyond place' (Massey, 2005: p. 192) or to environmental action in the future. In the case of the retirees, as with the children and campfire, what we see is the combination of constant revisiting/recycling/memorying of selective significant experiences, that enable ecological conscientization. Geographer, Philo (2003: p. 12) draws upon Bachelard (1969), arguing that "*the reveries of childhood*" "*remain within adults as 'the durable character of childhood'*" (Bachelard, 1969: p. 20)", while "*intimations of childhood, flickers and hints of what we experienced in childhood, do stay within us and can be accessed*" (Philo (2003: p. 12). Eco-pedagogues used story-telling and experiential learning techniques to create alternative future imaginaries, while focusing upon mundane objects and spaces, and drawing the connections between these and distant plantscapes or upon microscopic features of the natural world to explore the interconnections between the visible/invisible elements central to human wellbeing and addressing environmental change.

The informal environmental education and citizen science projects, described here could be considered to operate in marginalised/ decolonised spaces (Harvey, 1996; Kahn 2010). What makes them effective is their existence outwith schools, universities, workplaces, in "place beyond place" (Massey, 2005). Such spaces make it possible to expose space-time connections (Latour, 2014). Freire (1970: 42) proposed that revolutionary leaders had an "understandable bias against pedagogy", which had resulted in them "using the "educational" methods employed by the oppressor". Ecopedagogy may be considered as the antithesis to Education for Sustainability, considered by some as maintaining the status-quo (Kahn, 2010). Freire (1970) describes "consciousness as a method", through which individuals come to know their reality critically and then are involved in the "task of re-creating that knowledge" (p.43). The three programmes discussed in this article could be considered as instances of such a pedagogy, involving participants in meaningful dialogue, whereby children decide which park areas to visit, based upon their memory of place, business owners are encouraged to direct journey towards sustainable practices and community are involved in local pollution monitoring activities.

The ecopedagogy in scapes is also decolonising in that it moves beyond the "narrative character" (Freire, 1970, p.45) of education for sustainability, as a performative method of engaging active subjects, on the ground and in scapes that are directly observant of the objects upon which those active participants choose to direct their gaze. Ecopedagogy in scapes acts as a counter-balance, to a situation whereby reality is rendered static and predicable. An ecopedagogy as/in scapes moves away from alienating educational practices and what Freire (1970) calls misguided banking education. The ecopedagogy as/in scapes discussed here, also refuses to "project an absolute ignorance onto others" (p.45), acknowledging the relevant knowledge that individuals at varying life stages and contexts, have of local and wider environments and building upon them. As such, it is a non-alienating pedagogy. The concept of ecopedagogy that emerges from this study is, in the Freirean (1970: p.46) sense, one of reconciliation, where the boundary between student and teacher are dissolved to appreciate that each has something to learn from the other and that both gain from this process. Care on the educator's part is

central to such a process for the educator must care enough “to have the world revealed” and must want also “to see it transformed”. Through this care, the ecopedagogy works with learners to intervene in their own environments, rather than seeking to transform the way that those individuals perceive their environments. As such, ecopedagogy is best placed outside of formal education institutions, in scapes that enable participants to contemplate radical action to transform situations (Payne, 2017). Effective ecopedagogy encourages learner creativity, rather than attempting to control thought processes, in the hope that in turn this will lead them to adjust their behaviour. As such, ecopedagogy in scapes is a form of liberation and one that views students as “beings in the process of becoming” (p.57), dealing with realities that are incomplete. This necessitates that “education be an ongoing activity” (p.57). As such, the informal environments that enable learning about environmental issues at a variety of life stages denote a form of Freireian (2014) “pedagogy of hope”, given that potential for participants to suffuse political or practical change in present/future space/times.

Viewing ecopedagogy in these space-time scaped affective ways helps to understand its impacts, given that such experiences may not always led to immediate, measurable actions and outcomes. Further longitudinal impacts studies of ecopedagogic experiences are crucial for devising effective ecopedagogic practices. This article reveals that sensory ecological experiences are central to ecopedagogy, as is learning within contexts that de-colonise (Kahn, 2010) and incite processes of conscientisation (Freire, 1970), making invisible connections between global and local spaces visible (Latour, 2011b). Gaining insights into impacts of sensory ecopedagogic interventions demands a more visual, embodied methodology that can reveal visceral, kinaesthetic impacts of effective ecopedagogies. Future ecopedagogical research scapes should therefore be field-based and use a range of more involved, long-term methods that provide in-depth insight into experiences across life courses, for as Ingold (2011: p.12) states: “To be...is not to be in place but to be *along* paths”.

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<b>Case</b>	<b>Conceptual and empirical dimensions</b>
Case 1: Summer Club: National Park	<p><b>Central theme:</b> Affective connecting children to a landscape to nurture sense of care and lifetime connection to that landscape.</p> <p><b>Indicators:</b>  Human/non-human inter-relativity (Latour, 2014);  Memorying-scapes; making connections to local ecologies;  Nomadically slow vagabonding ecopedagogy (Payne, 2014);  Affective dimensions (Tuan, 1976) – love of place;  Emphasis on processes of “becoming”;  Informal learning;  “Free time activities”;  Free-choice learning;  Operating outside of the curriculum;  Human/non-human connections;</p>
Case 2: Sustainability training, eco- attraction	<p><b>Central theme:</b> Ecopedagogic narrative extended in space and time for adult learners: human/ non-human and global/local inter-related.</p> <p><b>Indicators:</b>  Led-ecopedagogy: slow timespace/embodied learning enables the transferability of that which is learnt during environmental learning programmes “back into” the mundane, ordinary, normal and routine ‘living’ in the ‘faster’ everyday” (Payne, 2014: p. 9).  Emphasis on current knowledge; levels of confidence and processes of “becoming” – as outcomes.  Life-stage specific pedagogy: focus upon contextualisation within context of business practice.  Free-choice learning.  Value ascribed through allocation of business hours to activity.  Operating outside institutional context of the workplace.  Temporal dimensions: emphasis placed upon appropriate “pace” of programme.  Global/local/ human/non-human connections;</p>
Case 3: Citizen science: River-scape	<p><b>Central theme:</b> Re-establishing/maintaining existing connections to the river corridors running through urban neighbourhoods (see also, Stewart, this issue).</p> <p><b>Indicators:</b>  Global/local/ human/non-human connections;  Slow vagabonding ecopedagogy (Payne, 2014): activity without clear beginning and end.  Affective dimensions (Tuan, 1976) – love of place.  Participant-led ecopedagogy.  Free choice learning.  Value ascribed to activity through decision to volunteer.  Operating within local ecological spaces.  Focus placed upon fit within context of everyday life for participants.  (Re)memorying scapes.</p>

**Table 1: Conceptual and empirical dimensions of the case studies.**