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New Materialisms and Environmental Education: Editorial

David A. G. Clarke^{a1} and Jamie Mcphie^b

^aMoray House School of Education and Sport, The University of Edinburgh, Edinburgh, UK; ^bOutdoor Studies, University of Cumbria, Ambleside Campus, Ambleside, UK

Abstract

In this editorial, we introduce the 17 papers that make up this special issue of *Environmental Education Research* on new materialisms and environmental education, and discuss themes of significance arising from this collection. The papers are grouped in the special issue under the following headings: (1) pedagogical/research orientations; (2) critiques; (3) dark endings?; and (4) concepts mattering; but as we show here and in our introduction to the collection, they can also be connected in multiple ways to any other and a range of other relevant topics. As with our Introduction to the collection, we trust this commentary provokes and inspires, if not energises and materialises the furthering of axiological pathways away from dominant onto-epistemologies of environmental education research.

Keywords: *Environmental Education Research, New Materialisms, Post Qualitative, Environmental Pedagogies, Posthumanism*

¹ CONTACT David A. G. Clarke dave.a.g.clarke@gmail.com Moray House School of Education and Sport, The University of Edinburgh, Edinburgh, UK

Introducing the papers

The 17 papers within the special issue are uniquely diverse in their articulations and interpretations of new materialisms when thought alongside environmental education and its research. Other than the obvious links to scholarship on the new materialisms and environmental education, all of these papers are creative in what we see as their Deleuzian inspired turn to *thinking with* and the fashioning of new concepts, in order to wrestle with contemporary environmental and educational challenges. As guest editors of this collection, we have ordered the papers into four groupings: pedagogical/research orientations; critiques; dark endings?; and concepts mattering. In truth, each paper has elements of each of these labels within them and could be connected in multiple ways to any other. But in order to meet the reader half way, in this editorial we briefly introduce each paper through these themes in order to comment on their particular offerings.

Pedagogical/research orientations

We begin with papers which we regard as most obviously applying, thinking with, or otherwise living with concepts from the new materialisms in more traditional ‘pedagogical’ or ‘research’ focused realities. Such papers help illustrate some of the broader themes of the new materialisms we commented on in our Introduction to the collection, in that they provide illustrations of more-than-human entanglements of pedagogical, empirical and speculative research.

There are nine pedagogically themed environmental education papers that ruminate with the new materialisms in educational establishments, written by authors attempting to do empirical research differently by focusing on relations that ‘matter’. Extracting the concept ‘pedagogy’ from more static or mechanical versions, these papers illustrate how new materialist strategies might lead to various forms of play with educational concepts, in order to break free from traditional essentialist boundaries or what might be seen as staid pointillist practice. For example, via ‘relationally attuned [...] climate pedagogies’ (Verlie and CCR15, 2018), ‘remaking pedagogies’ (Hofverberg, 2019), ‘pedagogical strategies’ (Jukes and Reeves, 2019), ‘water and art as philosophical muse’ and ‘relational pedagogies’ (Crinall and Somerville, 2019), thinking and ‘hesitating’ ‘with microbes’ as ‘more-than-human agencements’ in ‘moldschools’ (Tammi, 2019) we witness scholars from around the world re-working pedagogical possibilities by emphasising the relational qualities of the matter that co-create distributed agencies in environmental education. Similarly, articles on ‘thinking with the

elements' (Piotrowski, 2018) 'Assemblage Pedagogy' (Mannion, 2018), 'research assemblage' (Ruck and Mannion, 2019), and 'immanent environmental ethics' (Rousell, 2018) all endeavour to muddy arbitrary humanistic boundaries and binaries, and instead include the idea that we are always already 'of' the world, not simply in it or on it.

In 'From action to intra-action? Agency, identity and 'goals' in a relational approach to climate change education', Blanche Verlie and CCR15 (2018) explore how and why they should become 'climate killjoys' in an attempt to decentre the human from climate pedagogies where a more response-able agency is revealed to emerge through relationships. Thinking with Karen Barad's concept of intra-action, Blanche as tutor and CCR15 as class, demonstrate the impossibility of dualistic analysis of people's impacts on the climate within the confines and affordances of a unit on an Australian university environmental education course. They note 'that these processes of change might be indicative of a more mutual enmeshment, where neither 'entity' would exist in its current form without the other', and that this understanding 'often seems to elude our full appreciation'. Verlie and CCR15 posit that a focus on climate intra-action enacts approaches that are not as accessible to more humanistic interpretations, namely: intrasectionality, acting-with, and diffraction. Responding to the particular problem of the location of ethical responsibility within a nondualist interpretation, Verlie and CCR15 suggest that 'intrasectionality navigates this [critique] by accounting for the dynamic processes of connecting-excluding that compose situated-but-dynamic hierarchies'. In our reading, Verlie and CCR15 are making novel contributions that both circumvent and reinvent the problem of the location of ethical obligation in a post-dualistic 'higher' environmental education. This essential work pushes at the margins of what it is currently possible to think in environmental education practices in university courses, forcing deep reconsideration of the manner in which we formulate participation in ethical research and pedagogy.

Hanna Hofverberg (2019) explores secondary school students' encounters and correspondence with crafting materials in 'Entangled threads and crafted meanings – students' learning for sustainability in remake activities' to reveal the stories that emerge and the educational possibilities for remaking pedagogy. Hofverberg shifts the scale of the sustainability at play to the everyday materiality of recycling clothes in the classroom. Researching remake activities through Ingoldian correspondence, the practice of making can be witnessed as a co-constitutive activity of material-body relationality. The form is not imposed on the materials by the young adults in this research, but is rather formulated *with* them through experiments in learning. For

us, Hofverberg's offering speaks to both the practical understandings of students' engagement with remake activities as activities of and for sustainability, but also pushes at conceptions of the human maker as the master in creative activities. Here we see the dual possibilities of a new materialist take, which on the one hand, concerns itself with more traditional ethical orientations towards reusing, remaking and recycling, while on the other, also helps demonstrate an ontological reorientation of the relationship between (presumed) intentionality and human action. Here, we believe, we see an application of the critique of the hylomorphic model which Ingold (following Deleuze and Guattari who in turn follow Paul Klee) describes as the realisation that 'the essential relation, in a world of life, is not between matter and form but between *materials* and *forces*' (Ingold, 2010, pp.92-93). Form (as either a plan to turn old clothing into a new accessory or, for instance, a curricula or pedagogical plan or policy) is not conceived outside of relations with the world, in a perceived realm of abstraction, but instead always (cor)responds to/with it as force and action in movement. This understanding should curtail overly universalising pedagogies and educational policies, as the precautionary principle leads away from the potential ethical blindness of grand, untethered gestures, and points instead to minor interventions, cautious experiments, and tiny changes. We could regard this not only as an ethical orientation, but one that is wrapped up with the very nature of the possible. Reading Hofverberg's contribution helps us better perceive these challenges.

Scott Jukes and Ya Reeves (2019) offer 'methodological and pedagogical insight into using new materialist theories in creative and productive ways' in their paper, 'More-than-human stories: Experimental co-productions in outdoor environmental education pedagogy'. They introduce a number of concepts at work within new materialist discourses (including material agencies; mutual entangled relationships-assemblages; and becoming part of a more-than-human world) to build on storying approaches and place-responsive pedagogies to develop their concept of *more-than-human stories*. In this instance, the more-than-human story being offered is *One Single Moment*, a picturebook written by Ya when she was a pre-service teacher participating in a ski-touring journey in the Australian Alps, for which Scott was an educator. The authors offer *One Single Moment* as an example of creative empirical materials, rather than as 'data', which might suggest a 'brute fact gathered'. In offering further exposition on *One Single Moment*, the authors reveal insights into student-educator-place-theory-picturebook relationships at work in the presence of the aforementioned concepts, and demonstrate the temporal nature of the education continuing to be at work. Their paper offers guidance for experiments in practice, but also many provocations for our understanding of places as

becoming educational. This has pedagogical potential. For example, one such provocation reminds us of something a senior scholar said to us at the Cambridge University PhD summer school organised by fellow early career researcher, Elsa Lee. We met Professor Marcia McKenzie, there as a ‘keynote’, a chance encounter with whom was the initial provocation for this special issue. After we performed a paper we were working on about distributed agency in a park, we were told that things cannot have agency without humans being present, as part of that particular agential assemblage. We disagreed. We reason(ed) it’s rather like that age-old question about the tree falling in the forest. The sound of the tree falling in the forest is only ever a sound for those temporal anomalies gifted with ears to translate changing vibrations in the air into sound. The resulting sound waves/particles are a unique experience and yet also a shared experience for the multiple material phenomena involved in the processual event. But - acknowledging the agency of the ‘more-than-human world’ which Scott has ‘been playing with’ - places are lively actors in themselves and have their own narratives, regardless of any human intra-actions (not forgetting that humans are places too for many species).

More broadly, these *it-narratives* could be communities of microbiota continually pulsating in multiple directions rather than simply responding to things outside of their perceived boxes of taxonomic status, just as humans are not place-responsive in any cause-and-effect linearity. Life is not dot-to-dot. And so, places are not educational of themselves in a unidirectional manner. They cannot teach us as if we were a *tabula rasa* waiting to receive wisdom from some highly gendered romantically conceived Nature, ‘out there’. We are the ‘there’ itself. We are place/s. We are made of place/s. So what does it really mean to know place/s? There will always be secrets to/in places that hide in differing timelines, outside of our evolutionary heritage, our sensory bandwidth. There are countless narratives happening all the time, that perform at different scales, and temporal, spatial and sensorial frequencies, that we simply cannot perceive or even conceive (even with extra-sensory cyborgian additions like radar or ultraviolet detectors).

Even then, another spiral and perturbation is that conceptions themselves perform ecologically in more ways than we can fathom. If we, as assemblages of multiple complex materials, can be said to have this concept called ‘agency’, then so can other places of assembled multiple complex materials, including forests, shopping malls and even the world, and beyond. While we often think of agency as *intent*, as with Verlie and CCR15, the conjoined nature of actions or reciprocal performance doesn’t really have a starting point which we could pinpoint to state

with accuracy that that's where and when a decision was made. Starting points have always already begun in a multidirectional torrent of events. These accumulate other events and physical processes over time to eventually form what many people now 'think' as agency. Perhaps intent, or agency, might be better rephrased or simply understood differently to the Cartesian ghost or Freudian ego - as something like an assemblage or conglomeration (bearing in mind that each of these concepts would perform differently). The human is not so special in this multispecies/multilithic interpretation (fabric? If we return to Hofverberg), as we are just another conglomeration of events and physical processes - anthropoglomerate. This is where provocations from Jukes and Reeves, and inevitably others, might take *us*, anyway.

Sarah Crinall and Margaret Somerville (2019) also move us to consider binaries of solid and fluid states and the muddying of these, in how they problematise sustainability. Thinking with Deleuze, they draw on Grosz and 'ontologies of water that do post-qualitative research playfully' in their paper 'Informal environmental learning: the sustaining nature of daily child/water/dirt relations'. Post-inquiry, or post-qualitative inquiry, argues that qualitative inquiry within the social sciences has become overly procedural and that opportunities for thinking with theory can be sought in an attempt to produce new thoughts, and indeed new worlds, as researchers grapple with empirical materials (St. Pierre, 2019). Crinall and Somerville offer their understanding of art, derived from Deleuze and Grosz, as bodily affective, to an everyday artfulness of walking with early years children *as* sustaining. They invite their paper to be read 'as an experience of sensation' in what we perceive as another attempt to reinterpret the ethical location of sustaining, and sustainability. This is away from or enveloping parcelled notions of the environment, or nature, demarcated by discourses of lack, to instead create/explore sustaining material relationships both in the events of everyday walking with children, and with the very act of reading their paper. In the first sense, this notion of sustainability as sustenance helps us conceive a broadening of environmental education, one in which the dichotomy between health, wellbeing, environments, and bodies of all kinds is disrupted. We intuit both radical possibilities and dangers in this approach. In the second sense, in which sustenance might be gleaned from the reading of their paper, we see affinities with the powerful potential of evocative research approaches, but also wonder at the distance (spatial and temporal, but also affectual and conceptual) involved in attempts to affect (or is it infect? or inflect? ...) readers from/with new materialist orientations. We find ourselves both hoping for their success, but understanding that, as with all educational endeavours, the ends to which we travel can never be guaranteed.

Next, in the paper, ‘What if schools were lively more-than-human agencements all along? Troubling environmental education with moldschools’, Tuure Tammi (2019) deconstructs ‘the animal turn with a turn to microbes’ by asking ‘what moldschools might teach us or ask from us in terms of environmental education and ethics’. Tammi deploys the concept of agencement, more commonly and perhaps misleadingly translated from Deleuze and Guattari as ‘assemblage’. For Tammi, agencement indexes the movement in bodies ‘becoming-with’, and shows ‘how the phenomenon of moldschools’ emerges ‘in the intersections of building and cleaning, practices, materials, technologies, microbes, policies, and more’. Combining this conceptual work with empirical materials gathered from a moldschool, Tammi emphasises the material-discursive enactment of making moldschools.

Tammi’s paper also demonstrates how the practice of education is always already environmental, regardless of location or subject matter. We are all becoming-with microbes and ‘world-making practices’. Indeed, Tammi suggests that, ‘through these encounters the school is no longer what it was thought to be, and its human inhabitants are not quite what was anticipated either. In other words, material-discursive mold troubles anthropocentric epistemologies and ontologies: the commonly held dichotomies (e.g. nature/culture, body/mind), school routines, relations with materials, and more’. As with the previous papers, the exciting perspective taken here suggests to us that environmental education researchers might gain similarly deep insights into the material-discursive nature of educational contexts by following surprising or under acknowledged intra-actants where they are. Tammi demonstrates the diligence required for this kind of work, which necessitates a careful mapping of affects across boundaries which can often appear sedimented in thought and conventional humanist research practices.

Another entry point to these aspects can be found in, ‘“An atmosphere, an air, a life:’ Deleuze, elemental media, and more-than-human environmental subjectification and education’, a conceptual piece from Marcelina Piotrowski. Piotrowski (2018) articulates ‘ways of engaging with more-than-human forms of subjectification in environmental movements’ by ‘thinking alongside an ‘elemental Deleuze’ to include the ‘classical elements: air, water, earth, fire’. Piotrowski points to the importance of environmental movements as locations for public pedagogy and political education, and thus for subjectification or forming ways of being. In attempting to interpret subjectification from a posthuman, rather than humanist orientation,

Piotrowski flattens the perceived peak of human intentionality to locations dispersed among relational entanglements with matter. The elements perform as the media for these experiments, and Piotrowski shows how the philosophy of Deleuze renders philosophy itself as always already a worldly act. By, for instance, focusing on how the air, water, earth, and fire create the realities of which we are manifest, Piotrowski argues that the political subjectivities of adults ‘cease to function as beings, and need to be examined as composites of folds, as process-ontologies that are vital because of elements’ process-power’. The upshot is a resistance to depictions of human sovereignty in environmental movement education research, typically understood via traditional educational institutions like schools, through experiments in (re)thinking matters of educational subjectification with Deleuze. The Deleuzian term ‘a life’ is significant for the manner in which it depicts a posthuman politics of locations and timings of ‘life’. We agree with Piotrowski as she calls for environmental education researchers to understand the imbrication of subjectivities with materialities, rather than focusing necessarily on the formation of beings (through, for instance, capacity building in orthodox humanist subjectivities as ‘pupils’ in schools). However, we also wonder at the complexities and practicalities of calls of this nature and urge researchers to further explore the ‘challenge’ that Piotrowski identifies.

Perhaps a way of exploring is neither from within to without, or from outside to in? Greg Mannion (2018) provides advice on how to entangle ‘from the middle’, ‘drawing on data from a place-responsive heritage education project’ and ‘employing theory from Deleuze and Guattari’ in the paper, ‘Re-assembling environmental and sustainability education: orientations from new materialism’. Mannion expresses how ‘humanistic approaches to education in general appear to have failed us to date in many ways to adequately address issues such as climate change and wider global precarity,’ and so reconnoitres how some ESE has engaged with this critique by turning to the new materialisms. Mannion’s concerns lay with what might be thought of as the ‘practical’, ‘how to do it’, orientations to questions about research and pedagogy with new materialisms and investigates ‘assemblage theory’ as a potent(ial) toolbox for what he terms ‘assemblage research’ and ‘assemblage pedagogy’. These concepts are demonstrated through the project, *Stories in the Land*, a ‘place-responsive, arts-based, outdoor environmental education programme that connected participants from different generations from schools, youth groups and their communities with local places through journeys on the widespread network of ‘drove roads’ across Scotland’. Both ‘assemblage pedagogy’ and ‘assemblage research’ are argued to operate along ethical lines, where the ‘good’ is viewed as

attempting to attain an immanent ethics of increased connection, and capacity to affect and be affected, to the middles we find ourselves of. In our reading, we sense Mannion pushing at several tensions within the turn to new materialisms in environmental education research and pedagogy. By orientating his contributions towards ‘orientations’, and in effect advising directions of travel for both researchers and pedagogues, we see Mannion as doing essential work in facilitating access. While in providing a ‘tool box’ and set of recommendations, Mannion offers a conceptual map that he acknowledges should not be seen as comprehensive. The tension we see is between this essential work, and the non-methodological (post-qualitative) and often anti-prescriptive challenge brought by some who sense deep implications for the very nature of research within the social sciences brought by the disruptions of the new materialisms. This tension remains practically and philosophically unresolved, bringing further burdens to those attempting to do good research whilst operating within the limitations of contemporary higher education institutional and research models, particularly those in precarious research positions.

To elaborate, in ‘Fieldnotes and situational analysis in environmental education research: experiments in new materialism’, Andy Ruck and Greg Mannion (2019) explore ‘the constant tensions that arose when attempting to use existing qualitative research methods in combination with new materialist theories’. Ruck and Mannion attempt to provide ‘an insight into the tensions, synergies and on-the-ground methodological struggles within this site of experimentation’. In so doing, they explore how their sympathy for new materialist theory, and its (non)methodological post-qualitative implications, conflicted with the instrumental requirements of a time-bound, funded, structured, evaluation of the *Polli:Nation* initiative - a UK wide project which ‘engaged young people from 260 primary and secondary schools in the transformation of their school grounds into pollinator-friendly habitats’. In particular, Andy Ruck explains how his research practices within his doctoral studies were altered as he came to the discourses surrounding new materialisms: fieldnotes become ‘theoretically sensitive’ whilst ‘performative privilege’ became an ongoing concern. Ruck and Mannion try to provide insight and encouragement to researchers by highlighting how they negotiated the space between what they see as ‘demonstrable impact’ and ‘high theory’. Whilst there is hope in this example, we also wonder at the types of compromises qualitative researchers have to make in demonstrating a certain perception of ‘impact’? This includes the ways these compromises help reinforce the neoliberal research impact agenda (Laing, Mazzoli Smith, & Todd, 2018) and limit the potential for alternative ethical research. These struggles are not ‘new’ either, but are

perhaps further exacerbated as the distance between conventional humanist orientated research paradigms, funding regimes and quality criteria and the contemporary moment are widened by the popularity of new materialisms? However, what the ‘ethical’ is, is also contested within this moment, necessitating experimentations with ethics itself within inquiry and further complexifying any claim to ‘impact’.

In another example of such ethically concerned research, David Rousell (2018) suggests that ‘immanent ethics cannot be reduced to a set of predetermined values or prescriptions for environmental education, but should proceed through a speculative process of creative experimentation and negotiation in the pursuit of unforeseen openings’. In the paper, ‘Doing little justices: speculative propositions for an immanent environmental ethics’, Rousell, draws on the *States and Territories* project in which a series of artworks were created across an Australian university campus. Thinking with immanence as the conceptual orientation, Rousell shows how an ethics inspired by Deleuze and Whitehead operates in the present as it encounters the problems of new realities, such as the Anthropocene or techno-scientific creations, to call for renewed notions of environmental justice brought on by the Anthropocene. In an aversion to moral principles, ‘doing little justices’ is thus an experiment in the ‘performative, speculative, collective, and minor fluctuations of a micropolitics’. An immanent ethics produces new forms of rights, where rights are no longer seen as a characteristic which humans possess, but rather ‘there is a continuous becoming, distribution, and re-assembling of rights in relation to the mutual construction of an ethical problem’. Rousell’s exploration of the ethical within environmental education research prompts us to consider the manner of *be(com)ing* implied in pedagogic practices, and how potentially new conceptions of ethics might be made more manifest within, and as a result of, altered practices.

So, with their working of methodological issues and Deleuzian inspired explorations of ethics and subjectification, the papers in this section might be thought of as performing critical endorsement of the material turn. In contrast, the following section illustrates a shift to critical caution, with authors contributing generative appraisal in historical, empirical, and philosophical terms.

Critiques

Whilst each of the contributions across the special issue offers some variety of critical perspective, it is within three papers that we sense the most elaborated productive critiques for

how we conceptualise new materialism within environmental education and environmental education research.

First, in 'Painting trees in the wind: Socio-material ambiguity and sustainability politics in early childhood education with refugee children in Denmark', Nanna Jordt Jørgensen and Asger Martiny-Bruun (2019) reiterate the intractability of social justice and environmental sustainability issues which much, though not all, new materialist writing also acknowledges. It is to 'common world' approaches within environmental education in particular that they offer a Merleau-Pontian critique, emphasising simultaneous 'immersion and detachment' as they consider the features of sustainability education at work for refugee children in Danish day care institutes. In particular, Jørgensen and Martiny-Bruun explore how 'human relations with the nonhuman cannot be understood independently of social relations' and 'argue against completely erasing or overlooking the experiences of being separated from the world which have been seen as a characteristic of modern Western thought'. In reading Jørgensen and Martiny-Bruun's critique we are reminded that there exists some scholarship which, whilst struggling with or even embracing the material turn, can rush to overly simplistic application, describing material interactions as inevitably an assemblage of some form or other, as if that is all that can or should be said. What is jettisoned in such an uncritical approach is any focus on the complexities of contested concepts and ethics, and the different ways of thinking they might imply, including within or against new materialisms. The upshot is that, without heeding the lessons of critical theory - which are well acknowledged in much new materialist scholarship - environmental education scholarship may fail in its egalitarian aims.

To illustrate, in their generative and subtle critique, Hilary Whitehouse and Annette Gough (2020) apply the concept of 'amnesias' in tracing the implications of forgetting the relationships between feminist new materialisms and ecofeminism, conceptual and anthropogenic climate disruption, and 'the impact of climate disruption on women'. In their paper, 'Challenging amnesias: Re-collecting feminist new materialism / ecofeminism / climate / education', Whitehouse and A. Gough are less concerned with definitions of categories and more with the challenge to 'denaturalize nature and deculturalize culture', acknowledging that 'the climate emergency is forcing a realisation there is not one conceptual model that is going to see us through'. Whitehouse and A. Gough argue for the importance of acknowledging genealogical flows in thought, not so much to critique the present, but so that 'the past and the present can be drawn together to provide meaningful impetus for research'. This form of

generative or immanent critique orientates thinking towards the task at hand by recollecting that different approaches have their conceptual strengths when considering the intractability of gender inequality and the climate emergency. Whilst we see more strident accusations of ‘amnesia’ levelled at those exploring new materialisms in environmental education from elsewhere, Whitehouse and A. Gough demonstrate the skill required in thinking and writing with immanent care - fostering understanding with what we perceive as a commitment to what Latour (2004) calls ‘the matters of concern’, rather than the matters of fact.

Rounding out this section, in ‘Anthropocentrism’s fluid binary’, Ramsey Affifi (2019) delves deeper into environmentalisms’ attempts to de-anthropocentrise environmental education and calls for ‘pedagogies that help students imagine and engage with what [...] conceptualisations actually *do* when believed’. With perhaps this special issue’s most critical commentary, Affifi recommends employing ‘humble bafflement’ in order to navigate the ‘(non)Anthropocene’. Affifi takes aim at what he sees as an abstracted project of de-anthropocentrism which he detects within new materialist discourses, and counter offers variations on centering and decentering which he argues are always at play within ‘anthropocentrism’s fluid binary’. We see Affifi’s paper as similarly offering a survey of amnesias, but also an attention to the material performativity of concepts when he asks:

‘what does a given deanthropocentrism do? Does it actually lead us to attend to the field of more-than-human presences around us? Does it invite us to relate to the birch trees and magpies around us, and to recreate our environments to enable such relationships? Does it actually compel us to stand in front of the bulldozers? Does it create beauty? Or, despite its claim to radical nonhumanness, does it instead merely invite us into more arguments, more time in front of computers, and more wandering around stuffy conference rooms?’

The answer, we think, is that it may do many things, including each of these. The multitude of directions that might be considered to be contributing to the material turn can each be evoked or practiced in multiple ways and to multiple degrees. They may both replicate the present and inspire action within and beyond the habitus of Western academia. Nonetheless it seems less of a choice we have, and more of a struggle we are in, and with which we must contend. Affifi’s provocations add significant insight for those in these struggles.

In sum then, the papers in this section encourage us to pause and reflect on what the new materialisms make im/possible for us as researchers and practitioners of environmental education. Questions about how we understand the nature of critique also become relevant to how we might respond, and might well be caught up with our ontological proclivities (e.g. Latour, 2004). In the next section we see these ontological proclivities shift to darkened renderings and readings, in an attempt to activate ourselves in/of the world to ontological ends.

Dark endings?

The penultimate papers in this special issue take a darker turn, employing fictional and speculative conceptual apparatus in their dark ecologies and place-based pedagogies. For example, Jonas Lysgaard and Stefan Bengtsson's (2020) 'Dark pedagogy – speculative realism and environmental and sustainability education' discusses the 'inherent withdrawnness of the objects at play' and makes 'explicit the potential educational implications of speculative realisms' in environmental and sustainability education. They utilise Timothy Morton's *Dark Ecology*, concepts from Object Oriented Ontology (OOO) - hyperobjects, undermining, overmining, duoming, correlationism - and the author H.P. Lovecraft's speculative horror fiction to 'interrogate, substantiate and, thereby, to open up for discussions central concepts to the field'. Lysgaard and Bengtsson, for instance, explore how a dark pedagogy would endeavour to ask questions about the nature of self and attempt to account for educationally unaccounted for objects. Taking Morton's notion of the hyperobject, with its near yet massively distributed effects, Lysgaard and Bengtsson speculate on an environmental education which is less interested in subjectification or place, and more concerned with affective states of never fully grasping, never fully apprehending: 'as the hyperobject is both not-here (nonlocal) and very near (viscous), it undermines the very identity of the self engaging with it. The displacement of the self takes place in the emotional resonance of the hyperobject'. Accordingly, what OOO might offer are strange new renderings of how the self always develops as a result of an unknowable world. The argument here is that our notions of democracy, and (environmental and sustainability) education's role in this, are altered as a result.

In 'Dark places: environmental education research in a world of hyperobjects', Antti Saari and John Mullen (2018) offer further specific pedagogical conceptualisation as they take up Timothy Morton's OOO inspired concept of 'hyperobjects' as a 'springboard' for thinking 'through' strategies for living in 'dark places that are haunted' by hyperobjects such as global

warming. Theorising with place specifically, Saari and Mullen explore how Morton's concepts might further 'the post-structuralist and new materialist critique of bounded, stable places through introducing an ontology of finitude, withdrawal, and excess'. Within this approach, our expectations of comprehending places are shifted by 'working-through' the uncanniness of both our relationships to places, and the possibilities for straightforward environmental education in the local. According to Saari and Mullen, 'If our affects, desires, hopes and fears are projected into material and more-than-human environments, working-through can also take place in the form of recognizing sites of mourning, ambiguous affects and the corresponding senses of injustices. And all the while recognizing these emotions as uncanny and ambivalent rather than splitting them into good and bad or local and global'. Dark places, then, force us to reconsider the parochial or romantic in place-based pedagogies and invite understanding of places as multiple, alien, and only ever partially knowable.

Another invitation awaits in the next paper. Chris Beeman and Sean Blenkinsop (2019) sum up their narrative of, 'Environmental end game: ontos' by asking us to '[entangle] ourselves differently' through diffractive readings and experiences, 'shifting conceptualizing towards a different ontological position compatible with an immanent materialist position'. They instruct the reader to think with their paper *whilst* enacting various activities that the reader might perform. We second this call to heterogeneity in modes of literacy. We also acknowledge the challenges calls of this nature can create. The ability to respond to such calls for action is not evenly distributed, including in terms of literacies, competencies and intentionalities. Social and environmental (in)equities are often barriers to many (assemblages), where lines of flight are clipped at the wing and made inaccessible via powerful binaries themselves (as highly active performative concepts - concepts *mattering*). As we note in the introduction to the collection, these include privilege/poverty or human/other-than-human (even though the human is also the other-than-human too). It is to this idea, that concepts matter in the world, that we now turn with the final papers of the special issue.

Concepts mattering

Deleuze and Guattari played with the idea 'Monism=Pluralism', and in so doing brought forth a seemingly necessary contradiction. The unity of monism is co-produced out of the multiplicity of pluralism, just as transcendence is a product of immanence, mind is a product of body, theory is a product of practice, and culture is a product of nature (and/or *vice versa*). This could also be said for binary existence as a product of both monism and pluralism. That

Cartesian dualisms exist isn't in debate here, it's what these dualisms *do* and produce or the resulting effects of how they perform that is contentious. Several papers throughout this special issue urge a move to performing new practices and creative experimentation with new approaches, and this is just what the last two papers attempt to do with the performativity of words – concepts mattering.

Noel Gough and Chessa Adsit-Morris' (2019) contribution, 'Words (are) matter: generating material-semiotic lines of flight in environmental education research assemblages (with a little help from SF)' speculates on the performative capacity of concepts derived from Deleuze and Guattari and from SF (science/speculative fiction). N. Gough and Adsit-Morris offer *cognitive estrangement* and *object-oriented thought experiments* as 'little machines' that 'can be plugged into an environmental education research assemblage to produce new material-semiotic conjunctions and configurations of researchers, empirical materials, methods and contexts'. With a series of 'ruptures' the authors explore how 'critical thinking about materiality is apparent in many areas of cultural production and practice relevant to environmental education'. With their focus on SF, we think that N. Gough and Adsit-Morris make a compelling case that the way we imagine human-nature-technological futures in many ways condition what is possible for us in the political and educational present, and that this has implications for all our futures. Indeed, as they state, 'SF and material worlds are now so entwined that they cannot be understood in isolation'.

Finally, with our own offering 'Nature matters: diffracting a keystone concept of environmental education research – just for kicks' (Mcphie and Clarke, 2018), we speculate on the performative mattering of various concepts of 'Nature' which we perceive as occurring to various degrees within the environmental education research literature. In so doing, we operationalise the new materialist concept 'diffraction' to see what thinking through nature(s) might do. In an attempt to overcome the problem of the plasticity of the term, we articulate nature, and the related notions of landscape and environment, as concepts always in process, and so offer *naturing*, *landscaping*, and *environing*. Indeed, we speculate that envisioning concepts as pedagogical playmates might reinforce their ecological physicality as performative agents, bringing to life forceful energetic processes that are still perceived by many as inert linguistic phenomena - *dead matter*.

Summary

The four themes we have explored in this editorial are ones that came through for us in our reading of the contributions to the special issue, but should by no means be thought of as describing the sole contributions of each paper. Each is, and has to be, multifaceted as it tackles multiple issues and makes multiple contributions. That being the case, we urge you to not take our word for what these papers are communicating, but to instead delve into what they make im/possible for you within environmental education and beyond.

The editing journey has been a long road. We have been exhausted and elated, challenged and confronted, exasperated and educated, carrying what at times felt like a heavy burden of collating and marrying a hugely varying diversity of styles and expressions whilst also carrying on with work, life, and young families. As is by now evident, there are many issues at stake and many voices involved in thinking about the in/significance of new materialisms and environmental education. There are, no doubt, important points left unsaid or underexplored in this special issue but we feel the collection offers some heavy lifting, exploring various avenues a little further than before, and in so doing provides many novel provocations for environmental education and its research. As with our Introduction, caught in the middle and mire of creating and curating a collection, it still/must/will/always already leaves us with a sense that the work is more open than closed to further inquiries, even as it highlights the potential of new materialisms to forge axiological pathways away from dominant onto-epistemologies of environmental education research. And thus, we conclude our introductory and editorialising comments with a final invitation: for further contributions on the topics, that join us in engaging with what the collection does and does not offer, and to rework it.

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Notes on contributors

David A. G. Clarke is a Teaching Fellow in Outdoor Learning and Sustainability Education at the Moray House School of Education and Sport, University of Edinburgh (UK). He is based in the Outdoor and Environmental Education section of the Institute for Education, Teaching, and Leadership and is a member of the University's Centre for Creative-Relational Inquiry (CCRI) and the Edinburgh Environmental Humanities Network. His teaching and research interests focus on the blurring of inquiry, life experience, and ethics in informal practitioner education in the Anthropocene.

Jamie Mcphie is course leader for the MA in Outdoor and Experiential Learning at the University of Cumbria (UK) where he is an active member of three research centres: Centre for National Parks and Protected Areas (CNPPA); Learning and Development (LED); and Centre for Research in Health and Society (CRiHS). His teaching and research interests in the social sciences and environmental humanities centre around tackling social and environmental inequities spread over varied terrains of thought-practice. His most recent publication is *Mental health and Wellbeing in the Anthropocene: a posthuman inquiry* (Palgrave Macmillan, 2019), which has a nice cover.

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