Fieldnotes and Situational Analysis in Environmental Education Research: Experiments in New Materialism

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Abstract

This article details the approach taken to a recent study in an environmental education context, with a focus on the writing and analysis of ethnographic fieldnotes. This approach drew upon aspects of new materialist theory and multi-species ethnography for the writing of fieldnotes, and Situational Analysis for their analysis. These approaches represent a "site of experimentation" that arose through attempts to carry out research in a manner sensitive to new materialist theories, whilst operating within a time-bound, collaborative study. As well as highlighting potential synergies, this article also explores the constant tensions that arose when attempting to use existing qualitative research methods in combination with new materialist theories. It is not intended as a guide to conducting research in a "new materialist" or "post-qualitative" manner, but rather as an insight into the tensions, synergies and on-the-ground methodological struggles within this site of experimentation, and what was produced through the "research assemblage" thereby created. The article aims to demonstrate the ways in which existing qualitative research methods were re-oriented through this approach, as well as the onward effects of these re-orientations on what then amounted to "the data".

Key words: New Materialisms, post-qualitative, ethnography, fieldnotes, Situational Analysis, environmental education.

Introduction

The growing use of new materialist theories in environmental education research (Clarke and Mcphie 2016, Green and Duhn 2015) is indicative of a wider relational and material turn across the social sciences (Coole and Frost 2010, Fox and Alldred 2015). These theories, drawn from the work of Deleuze and Guattari (1987), Haraway (2008), Barad (2007) and others, have given rise to a number of proposed methodologies that are sensitive to new materialist theories. Prominent among these are "post-qualitative" methodologies (St. Pierre 2011), a term that encompasses a wide range of critiques of "conventional humanist qualitative methodologies" drawn from postmodernism, poststructuralism and posthumanism - collectively referred to as the

"posts" (St. Pierre 2014, 2). Importantly for research in both environmental education contexts and elsewhere, post-qualitative methodologies rest on a number of key ontological shifts which, for their key proponents, render them incompatible with many of the "normalising humanist concepts" (St. Pierre 2014, 10) central to qualitative research. These shifts have given rise to Taylor's (2016, 18) subsequent question, "if the 'usual' methodological procedures are no longer possible in the posthuman… then how to proceed?"

In partial response, this article details the approach taken to a recent doctoral study in an environmental education context, with a focus on the writing and analysis of ethnographic fieldnotes. The approach taken was a "site of experimentation" (Bridges-Rhoads 2015, 704) that arose through attempts to learn and enact new materialist theories whilst in the midst of a funded doctoral study that was embedded in a wider funded project. I[1] detail how I drew upon aspects of new materialist theory and multi-species ethnography (Pacini-Ketchabaw et al 2016) for the writing of fieldnotes, and Situational Analysis for their continuous analysis.

There is, as Bridges-Rhoads (2015, 705) notes, "no guarantee that such experimentation will produce a qualitative research... that can claim to 'do something different'", and every risk of it collapsing back into the "conventional humanist" approach critiqued by St. Pierre and others. Indeed, the approach taken here created constant tensions when used in combination with new materialist theories, not least with the drawing up in advance of a "research design" (Taylor 2016), the use of an apparently essentialising practice such as Situational Analysis (Jackson 2013), and the use of fieldnotes in the first place (MacLure 2013a). I acknowledge and explore these tensions throughout this article. This article, then, is not intended as a guide to conducting research that is sensitive to new materialist theories, but rather as an insight into the tensions, synergies and on-the-ground methodological struggles within this site of experimentation, and what was produced through the "research assemblage" thereby created (Fox and Alldred 2018). I hope to highlight the ways in which existing qualitative research methods came to be re-oriented through attending to aspects of new materialist theories, as well as the onward effects of these re-orientations on what then amounted to "the data"[2], and on myself as researcher.

Polli:Nation and post-qualitative research

This article draws upon a recent doctoral study linked to Polli:Nation - a UK-wide environmental education initiative that engaged young people from 260 primary and secondary schools in the transformation of their school grounds into pollinator-friendly habitats. Funded by the UK's Heritage Lottery Fund and run by the school grounds charity Learning through Landscapes (LtL), Polli:Nation had the stated aims of restoring pollinator populations deemed vital for the maintenance of natural heritage and food production (Goulson 2014), and "creat(ing) a network of knowledgeable and enthused young conservationists" with an improved understanding of their local environment and of wider environmental issues (LtL 2014, 13). The project involved young people mainly in practical conservation tasks such as planting flowers and building "bug hotels", and in conducting surveys of the biodiversity in their school grounds.

For the doctoral element of this research, I conceived of a study that took an ethnographic approach (Brewer 2000) to addressing the question: "What processes and features within the Polli:Nation project appear significant in terms of young people's response-making to environmental issues?" This stemmed from growing calls for environmental education researchers to focus on what participation in environmental education programmes "looks and feels like for the learners concerned", as well as/instead of the aims and outcomes of such programmes (Rickinson et al 2009, 97).

I was drawn to new materialist theories in the early stages of this PhD through literature highlighting the complex sets of factors interacting to determine the outcomes of environmental education programmes (Higgins et al 2006, Mannion et al 2013), as well as by their strong focus on more-than-human elements (Bennett 2010, Tsing 2013) – of particular interest given the study's focus on a project built around a particular inter-species relationship. Perhaps most importantly, however, I saw the potential utility of the new materialist project of re-thinking humanity as inextricably bound up with matter, through which new materialist theorists are seeking to re-frame the relationship between humans and our environments. I agreed with Coole and Frost (2010, 4) that such a re-framing is especially important in light of current environmental challenges, and with Clarke and Mcphie (2014) that this may have many implications for outdoor and environmental education practice. This, in turn, led me to an initial exploration of the literature on post-qualitative research.

St. Pierre (2014, 3) explains that the term "post-qualitative" is a "large and ambiguous" one, and that her use of it began largely in response to "positivist" qualitative research methodologies that had persisted despite the influence of postmodernism, poststructuralism and posthumanism during the 1990s and early 2000s. These approaches have been collectively referred to as the "posts" (St. Pierre 2014), and have concerned themselves principally with the deconstruction of concepts central to humanist qualitative methodology, including "validity", "voice", and "authenticity" (Lather 1993, 2000). For St. Pierre (2014, 2), the resultant ontological shifts render thinking in "the posts" incompatible with what she labels "conventional humanist qualitative methodology". This incompatibility has, in turn, led to her adoption of the term "post-qualitative".

Lather (2016, 125) has recently written of a "re-turn or second coming of postmodernism", and draws upon a hugely heterogenous range of theories and methodological shifts to summarise the learnings from this ontological turn. To me, two such fundamental shifts from conventional humanist methodologies stood out as being key to adopting a methodology sensitive to new materialist theories for the study in question. The first is to resist the tendency to focus on identifying order, regularity, and a linear relationship between cause and effect (Fox and Alldred 2015), instead "rethinking… causality as entanglements with surprising effects" from which "unpredictable novel possibilities are always emerging" (Fenwick et al 2015, 123-124). The second is a de-centring of the researcher to focus instead on material and more-than-human entanglements, of which humans are a part. For Jackson (2013, 741), the privileging of human experience in conventional qualitative methodologies is rooted in Cartesian dualist thought, which "affirms the existence of reality in the mind and therefore the thinker's existence *outside the realm of the material*". In fact, she continues, materials and humans are inseparable: "The material is not purely produced by human intention, nor does human agency pre-exist or transcend the material: *they mutually constitute one another*" (744).

For Taylor (2016, 18), accepting the co-constitution of humans and materials means that research can no longer be thought of as an "individualized cognitive act of knowledge production", and is instead "an enactment of knowing-in-being that *emerges in the event of doing research itself*"

(Emphasis added). Crucially, then, planning such research in advance is highly problematic. Although a number of wider orientations are offered for conducting research in a manner sensitive to new materialist theories (Lenz Taguchi 2012, Vannini 2015, Mannion 2019), this key ontological shift accounts for the lack of prescriptive guidance on how such research ought to be carried out. Indeed, for St. Pierre (2014, 10), "there's no recipe, no textbook that explains, step-by-step, how to 'do' a Foucaultian power-knowledge reading or genealogy; there's no 'research design' or 'research process' for how to 'do' Derridean deconstruction". The notion that humans and materials "mutually constitute one another" also calls into question other accepted norms within qualitative research, such as the idea of data as existing separately from the researcher (Brinkmann 2014), and as I will explore later in this article, essentialising practices such as coding (St. Pierre and Jackson 2014).

"The rush to application"
Despite its sound ontological basis, carrying out research that was truly post-qualitative proved problematic in this particular research context. This was, in the first instance, due to my relative lack of familiarity with the new materialist theories underlying it when commencing my doctoral studies. By the time I had gained a fuller understanding of the ontological shifts described above, I had already been caught up in what St. Pierre (2017, 2) calls "the *rush to application*, to methodology". This includes a perceived need among doctoral students to quickly decide upon a research design before they have fully considered how a given theory might be applied to their specific research context.

In this study, the temptation of this "rush to application" was compounded by both the structured, time-bound nature of doctoral research in general, and the instrumental requirements of this funded project in particular. In most UK universities, doctoral researchers are required to undergo various systematic and formal assessment processes during their studies. This was a typical PhD in this sense, with the first year being largely structured around the ten-month Progress Review – a written and oral assessment that required a clear outline of my research design and proposed methods. Furthermore, of significance to this study in particular was the parallel requirement to provide an evaluation of Polli:Nation as a whole for the funders and partner organisations. This created a restriction in terms of time and scope: the research had to

take place in Polli:Nation-participating schools, and had to be completed during the 2016-17 academic year. Moreover, the stated purpose of my University's involvement in the project was to "ensure evaluation of behavioural change outcomes as well as natural heritage outcomes" (LtL 2014, 3), implying a need to somehow "evidence" this within the available timeframe. These factors combined to create a strong felt need for early clarity around data collection and analysis, and a subsequent unwillingness to simply wait for "situations of breakdown, surprise, bewilderment, or wonder" (Brinkmann 2014, 722) to occur.

Ahead of my ten-month Progress Review, I had designed a study that would eventually comprise thirty sessions of participant-observation in twelve schools in Scotland, followed by focus groups with pupils in twenty participating schools across the UK. Nonetheless, I was well aware of a tension that had not been fully resolved between new materialist/post-qualitative thinking and the apparently "humanist qualitative study" (St. Pierre 2018, 2) I was embarking upon. Before beginning participant-observation, then, I drew upon two approaches to the writing and analysis of fieldnotes that I felt would increase the study's sensitivity to new materialist theories. Firstly, I would draw upon multi-species ethnography (Pacini-Ketchabaw et al 2016, Taylor and Pacini-Ketchabaw 2015) for orientations on the writing of fieldnotes. Secondly, I would create situational and relational maps, both drawn from Situational Analysis (Clarke et al 2017), throughout the research process. In the following sections, I outline these methods, their links to new materialist theories, and the tensions that arose when employing them within the research context described here.

Could I call this a post-qualitative approach? St. Pierre (2018, 8), while asserting the impossibility of pinning down post-qualitative research to any defining features, is insistent that "*a study cannot be made post qualitative after the fact. To repeat, one begins post qualitative inquiry without a methodology*" (Emphasis in original). Perhaps, then, it was already too late. Perhaps choosing even *more* methodological approaches to draw upon only exacerbated the extent to which this study was not post-qualitative. Instead, then, I characterise what follows as a site of experimentation (Bridges-Rhoads 2015) - an attempt to learn new materialist theories whilst in the midst of doctoral research. As well as exemplifying the tensions that come with pursuing research that is sensitive to new materialist theories, I hope to go beyond discussions as

to what this approach "is", to instead consider what was nonetheless *produced* through this unique research assemblage (Fox and Alldred 2018).

Theoretically-sensitive fieldnotes

During early participant-observation sessions, my approach had been to follow a well-known formula for taking fieldnotes – taking short-hand "jottings" (Emerson et al. 1995) while participating in Polli:Nation activities, then expanding these into a detailed descriptive narrative as soon as possible after these notes were made (Mack et al. 2005). Later, however, I made two key changes to the way I collected fieldnotes. These changes, I felt, served to both focus my attention more fully on the more-than-human elements present, and to encourage me to "think with and write with philosophical texts" (Bridges-Rhoads 2017, 2).

The first of these changes was to leave my pen and notebook behind. It felt to me that the perceived obligation to constantly take notes had taken me further away from the role of "participant" than I had intended, and more towards being an "observer". No longer taking notes, I felt, enabled me to be better attuned to more-than-human elements and inter-species encounters, and to better develop what Pink (2009) calls "embodied knowing". I shifted instead to writing notes as soon as possible after each session. This shift was inspired by an article by Pacini-Ketchabaw et al (2016, 155) in the emergent field of multispecies ethnography, which also provided orientations for the second key shift I made.

The second change I made with regard to fieldnote-writing was to develop a series of questions specific to this study, to prompt my note-taking after each session. These, I felt, served to connect the fieldnotes more clearly with new materialist theories and focus my attention on more-than-human elements. I drew upon a range of questions, drawn from two key sources. These were, firstly, the emergent literature on multi-species ethnography – a form of relational ethnography (Desmond 2014) that has been applied principally in early-years contexts (Ogden et al 2013, Taylor and Pacini-Ketchabaw 2015). The central feature of multi-species ethnography, for Pacini-Ketchabaw et al (2016, 151), is to avoid being human-centric in research encounters, instead "tracing how our lives, children's lives and the lives of other animals in our common worlds are entangled, interconnected (and) mutually dependent". Secondly, I developed

questions based on key ideas from new materialist theory. These drew most closely upon the idea of "concepts", "percepts" and "affects". The idea of directing one's thinking through the selected use of particular theories has clear resonances with the "diffractive" approach to data analysis drawn from Barad (2007). Recent articles advocating this approach (Mazzei 2014, Lenz Taguchi 2012), however, are concerned with using theory to analyse *existing* data such as audio recordings of interviews. Here, I conceived instead of an approach that enabled me to explore those theories whilst in the midst of carrying out the research itself.

Devising questions based on new materialist concepts was accompanied by a slight sense of unease at using terms that I had only recently begun to engage with. Was my understanding of them "correct"? I proceeded, however, with something like the approach advocated by Strom (2018), who stresses that "it did not matter if I did not understand every single word of what I was reading. What mattered was if I found anything that *worked for me*" (106). This claim is based on Deleuze's own recommendation to avoid trying to read too deeply into his work, because "(t)here is nothing to explain, nothing to understand, nothing to interpret. It is like plugging in to an electric circuit' (1990, 8). I also kept in mind Springgay and Truman's (2017, 4) assertion that "(y)ou are not there to report on what you find or what you seek, but to *activate thought*" (emphasis added).

Concepts, percepts and affects were, in this case, ideas that *worked for me* as ways to think about how young people experienced and came to understand the activities making up the Polli:Nation project, and how these were bound up with the more-than-human elements present. In very brief terms, following Semetsky (2015), I understood affect to be a *force* that is present within an assemblage, potentially giving rise to feelings. This differs from a percept, which is the perception of the feeling itself, after it has been "felt" (Colebrook 2002). A concept, broadly speaking, is an idea. For Semetsky (2015), it is an idea that is "invented in practice" – that is, arising through a given situation and serving to facilitate understanding of the nature or purpose of that situation. Importantly, these concepts are *becomings*, rather than fixed entities. In Polli:Nation activities, I came to label the concepts in circulation as, for example, "young people as (becoming) conservationists", "young people as (becoming) community activists/ active citizens", and "Polli:Nation as (citizen) science project".

The box below (Figure 1) contains extracts from a set of fieldnotes taken on a day of participant-observation in a Polli:Nation-participating secondary school, where a group of seven pupils were engaged in the commonplace activity of building a "bug hotel". The pupils were part of the school's department of Additional Support Needs (ASN), and participated in the project for the same two periods every week. It is not the full set of fieldnotes taken on that day. The extracts have instead been selected in order to exemplify some of the questions I drew upon, to give an impression of how the questions operated, and the shifts made from conventional fieldnote writing to an approach re-oriented within a new materialist framing.

Figure 1: Extract from fieldnotes from a participant-observation session in a Polli:Nation-participating secondary school, using a series of theoretically-sensitive questions.

What human/more-than-human encounters were there?

- While gathering dry leaves from the ground, Liam finds a large woodlouse, and lets it crawl over his hand. He comes and shows it to me. He calls it a "slater" - I'd forgotten that's what people call them in this part of the country. Unlike some of the boys in the group, who display high levels of energy, Liam is quiet, thoughtful, and does his own thing within the group. He tells me how slaters are actually crustaceans, because they have a shell. I complement him on his knowledge and ask him where he's learned it. "I just like animals and stuff", he shrugs. At this point, one of the other boys, Brian, quickly takes the slater off him and throws it towards one of the girls, who is scared of insects. She screams and runs away. Liam waits until the commotion dies down, then goes and finds the slater, and places it carefully at the side of the path, among the leaves.

How do human and more-than-human elements respond to these encounters? How might they have experienced them?

- What to say about the slater? It was clearly in its usual environment – damp, dark places. Being in amongst those dead leaves was exactly that sort of place. And having looked up a bit about slaters… They are indeed "isopod crustaceans" that feed on dead plant material (so probably searching for food when Liam found it?), and are usually active at night (so are they sort of drowsy this time of day?) They use their antenna to feel their way around. They still breathe

through gills as their ancestors lived underwater. As for how it might have experienced today, though… Crawling over new surfaces (people's hands), then being chucked through the air, then picked up again. It's hard to know if any of that registered beyond a brief sensation…

- Brambles: Are they growing at this time of year? We noticed how they'd been "re-rooting", ie, growing from one spot, then sticking into the ground again in another. The parent helper pointed that out – don't think I knew they did that. It's amazing how long they are too. You pull one up at one end, and are left with a long spiky string of it, tangled with other bits and sometimes re-rooting. Now they're being uprooted and chucked into a waste pile over by the polytunnel. Same with the weeds in the sensory garden.

What was affectively palpable today? (Affect)
- Again, the human/ non-human encounters – or, for the young people, the chance to see, touch, handle insects (or crustaceans in this case) up close. Usually they are spontaneous/ unexpected encounters.

- Mrs C as an "activist" teacher/ unique character: This is only the second time I've met Mrs C, and her attitude and demeanour really come across as she tells me about how she's been running the Polli:Nation project so far. She puts a great emphasis on doing things her way, being herself, and not caring what impression she gives. I have noted already how a school's level of activity within Polli:Nation seems to depend on a passionate and outgoing teacher. She is a strong character to carry a project like this forward. It seems to depend on that a lot.

- That woodland really is unique. It offers the chance for free exploration, out of sight from the teachers. From the teachers' point of view, it is small enough that the pupils can be let out of sight – it's a fenced-off area, and no real harm can come to them. Stretching several hundred metres from one end to the other, the woodland is bounded at one end by a small stream (which the group call "the Burn") and several gardens belonging to neighbouring houses, and at the other, a fence and locked gate which separate it from the rest of the school grounds. Mrs C says she really appreciates the woodland as a valuable resource for outdoor learning, but it's only her that uses it for most of the year. It being behind a fence and locked gate means it can only be used as part of a timetabled class like this. On the way into the woodland today, I also notice

some rhododendrons, a few silver birches, a carpet of leaf litter, and the pungent smell coming from the Burn, which had some of that froth in it that forms in eddies on burns and rivers.

What (new?) ideas/ "concepts" are in circulation? (Concepts)

- Giving a "home" to slaters, other bugs, bees, etc. Anthropomorphism when thinking about the bug hotel. As I've said before, this seems to be an activity that young people really get into, perhaps because of the relatability of giving something a "house" or "home". "So this is the Presidential Suite?", Liam grinned, pointing at an area at the top of the bug hotel, after Mrs C had joked about the hotel getting its "first customer" when they hadn't finished it yet.

- Different ideas/ reactions to other species: What was interesting today was the contrasting responses to the slater from Liam and Brian. Picking it up and throwing it, vs carefully placing it among the leaves. That caring attitude (a "commonworld" perspective?) is also quite different from the "stewardship"/ "other species as 'useful'" point of view the project is founded on, too. So could I say that other species such as the slater (and more obviously for this project, the bees) carry the capacity to provoke different affective responses in young people? Something to be scared of, something to take care of, something that's "useful" to humans? And Polli:Nation seems to create the spaces for these different kinds of "othering" to happen

- Idea of "weeds" vs "plants", or more widely, "nature vs non-nature". Or even "types of nature". As the groups were pulling out weeds from the planters in the sensory garden, Brian noticed Danny pull out something that wasn't a weed, and exclaimed "Haha, that's a plant!"

- Young people/ citizens as conservationists. The idea that we can "help" other species ("environmental stewardship") through building this protective space for them. And that the other species need "protection".

"Language practices" and "performative privilege"

The changes outlined above represent small steps aimed at better attuning myself to more-than-human elements and inter-species encounters, and developing a higher degree of "embodied knowing" (Pink 2009). Clearly, however, there are ongoing tensions when applying these orientations alongside new materialist theories, mainly owing to ontological concerns with an over-reliance on "language practices" (MacLure 2013a). The first tension was simply the

continued use of fieldnotes. As MacLure (2013a, 664) reminds us, any data gathered from fieldnotes, interviews, focus groups and scholarly papers are inherently humanist, and have serious limitations when dealing with elements outside of "the ideational and cultural aspects of utterances (spoken or written)". Whilst I had stopped writing fieldnotes whilst actually *in* the research situation, I nonetheless continued to rely on notes written afterwards as key data from these participant-observation sessions (although these sat alongside photos and situational maps). Furthermore, directing my note-taking with questions arguably exacerbated the separation between my own participation in Polli:Nation activities, and the "inner mental activities inside a separated human being" (Hultman and Lenz-Taguchi 2010, 536) when interpreting them afterwards. One could, then, experiment with not writing fieldnotes at all, or at least without the use of pre-conceived research questions to guide our analysis. Yet we would, of course, still encounter a reliance on textual representation at some point – whether through writing for publication, or a PhD thesis. As Bridges-Rhoads (2015, 709) reflects, although she may write as a "situated speaker" (after Richardson and St. Pierre 2005), the expectation is still that "I am the researcher. I have to produce a text about that research. That is what qualitative research is".

A second, related tension is an unease with what Petersen (2018, 11-12) describes as the danger of "speak(ing) on behalf" of someone or something – in the case of the example above, of the woodlouse. "The power to narrate somebody's (or in this case something's) story", she says, and re-producing it through language practices such as writing, is in danger of engendering "another form of oppression" on the part of humans over other species. Pacini-Ketchabaw et al (2016, 157) stress that it is more a case of "sensing and following… rather than rushing in to interpret and represent them". In their paper, one of the authors, Mindy Blaise, recounts an experience of conducting multi-species ethnography with dogs. Here (similarly to my experience with the woodlouse), she admits that "I have no idea what dog knowledgeabilities might be or how they will emerge because I am not a dog", but stresses that the key is in "suspending my pull towards meaning making for long enough to sense dog worlds and dog agencies on dog terms" (Pacini-Ketchabaw et al 2016, 156).

As shown in the fieldnote extract, however, such suspension of meaning-making proved difficult in this particular study. To me, anything I wrote about the woodlouse felt at least like some kind

of attempt to interpret, or to write *about* the woodlouse from a human perspective. This rush to interpretation was, as previously discussed, undoubtedly encouraged by the questions I had set myself when writing fieldnotes. It was also, however, most likely exacerbated by the difficulty in sensing anything of the knowledgeabilities of woodlice (compared to, say, those of dogs), and the comparative ease in considering the significance of different pupils' responses to the woodlouse: one throwing it, one voicing a care for its life. The fieldnotes therefore primarily focused on how relations between pupils and more-than-human elements were altered via these encounters, but crucially, placed their emphasis predominantly on the pupils.

It is possible that in these early attempts to think with more-than-human elements, I am only at the beginning of what Taylor (2017, 1455) describes as a "practice that requires a dedicated apprenticeship". Even so, I am persuaded by Petersen's (2018) argument that that "(a)s long as researchers operate in the realm of the discursive and affective… we uphold a significant performative privilege, which cannot and should not be denied through rhetorical denouncements of privilege" (11). With "performative privilege", Petersen is referring to the aforementioned ability to "speak on behalf" of someone or something, and the "inevitable" tendency for practices such as writing to lend a particular authority to the researcher's interpretation (12). She illustrates this with reference to another article of which Blaise is an author (Bannerjee and Blaise 2013). In this article, the authors describe a study carried out in Hong Kong focused on air, in which "we did not set out to research air, rather Hong Kong air found us" (241). Petersen (2018), however, refutes this attempt to denounce the "privilege" of the researcher, suggesting that in fact, "participants were on the lookout for some non-human actor to walk and think with, and therefore were under particular conditions of openness to being found" (10). In other words, despite these attempts at open-ness, the identification of and decision to include air as the subject of the study was still, ultimately, a human one. Likewise, through thinking and writing about it, the researchers "inadvertently (came) to produce a-i-r, 'air', on their own terms" (12). This was my distinct sense with regard to any attempts to think with more-than-human elements during this study.

"Produc(ing) something other"

Whilst the fieldnote extract above makes clear some of the tensions discussed in the previous section, this new approach to taking fieldnotes was one that had clearly activated thoughts relating to new materialist theories, thereby producing new ways of thinking in the midst of my research encounters. The following two points illustrate this with reference to the fieldnote extract above.

Firstly, before the Polli:Nation project began, I had identified some of the key discourses underlying it. These included what I had labelled a "utilitarian view of other species" and a somewhat anthropocentric "stewardship" perspective towards the conservation of pollinators (Taylor 2017). Drawing upon the idea of concepts, however, and keeping in mind that these are "invented in practice" (Semetsky 2015), encouraged me to pay attention to *new* ideas that were in circulation, rather than simply looking for manifestations of these underlying discourses. In the example above, whilst there *were* clearly moments that pertained to these pre-identified discourses, I also noted the woodlouse's "capacity to provoke different affective responses in young people". Such responses include the beginnings of what, following Taylor (2013, 2017), I labelled a "commonworld perspective". For Taylor (2017, 1456-7), this refers to a perspective that goes beyond "the rational quest to know about the world from a distance that characterises western epistemologies", to instead consider humans as "members of interconnected and interdependent multispecies common worlds" (Taylor and Pacini-Ketchabaw 2015, 511).

Secondly, despite the challenges with the suspension of meaning-making highlighted in the previous section, it is clear that these re-orientations ensured that the ongoing agencies and affective capacities of more-than-human elements were, to some degree, sustained through the practice of writing fieldnotes. My feeling is that this, in turn, served to reinforce my sense that other species "co-shape" (Taylor and Pacini-Ketchabaw 2015, 512) the processes by which these ideas were formed or re-produced. At this stage, there are perhaps no obvious ways in which this fundamentally shifted my thinking – it is, as I say, a feeling. The influence of multi-species ethnography on the fieldnotes in Figure 1, however, is clear. As well as the woodlouse/slater, the extract above also contains references to the pungent smell of the stream, the rhododendron bushes and silver birches, the twigs and dry leaves on the woodland floor, the long spikey "strings" of re-rooted brambles. Despite my sense of the impossibility of denouncing my

performative privilege within the research assemblage outlined here, I am also persuaded by Bowden's (2015, 78) view that our "human intentional action" ought still to be viewed as inextricably bound up with the "nonhuman forces" making up a given assemblage. That is, while we cannot escape our human perspectives, acknowledging and exploring our co-constitution with other species and materials can nonetheless serve to produce new ways of knowing, and of doing research (Childers 2013).

As will be demonstrated in the following sections, the new thoughts activated by this new way of taking fieldnotes also fed into the process of creating situational maps – a method central to the wider approach of Situational Analysis.

Situational Analysis - Introduction

Situational Analysis (SA) is an emergent approach to qualitative data analysis that has grown out of grounded theory, and whose principal aims are to redress the "positivist tendencies" of the grounded theory method in order to "understand the dense complexities of a particular situation broadly conceived" (Clarke et al 2017, xxiv). Three books principally authored by Adele Clarke (Clarke 2005, Clarke et al. 2015, Clarke et al. 2017) provide practical and theoretical orientations for the use of SA. Practically, SA is characterised by the extensive use of maps throughout the research process. These are divided into three main types of map: Situational and relational maps, social worlds/arenas maps, and positional maps. It should be noted that for the authors, all three types of map should be used during the research process in order to engage as fully as possible with the "situation broadly conceived" (Clarke et al 2017, 361). In this article, however, I focus on situational and relational maps which, for me, stood out as being of greatest relevance to a post-qualitative methodology.

"Messy" situational maps are usually the first to be carried out in SA. These are usually created from the very start of the research process, and can therefore be based on early fieldnotes. Messy situational maps consist of simply laying out "all the major human, non-human, discursive, historical, symbolic, cultural, political and other elements in the research situation of concern" (Clarke et al. 2015, 100). The process of making these maps is simple, with the researcher plotting on the page any "elements" of the situation that come to mind. At this early, "messy"

stage, there is no specified way to position these elements on the page. Relational maps are then created based on these existing situational maps, with the researcher drawing lines between elements on the map in order to explore the relations between these elements. The researcher takes one element of the map, and beginning with this element as a "starting point", then traces its relationship with each other element in turn (Clarke et al 2017, 140). The process is then begun again with another element as the starting point, and repeated with each element. For Clarke et al (2017, 197), simultaneous creation of memos is also key in the process of creating situational and relational maps – that is, making notes detailing one's thoughts provoked through creation of the maps.

The stand-out link between new materialist theories and SA is the direct influence of Deleuze and Guattari's (1987) concepts of rhizomes and assemblages on situational and relational maps in particular. Clarke et al (2017, 96) see the maps as "provid(ing) a direct means of operationalising these concepts", and as fitting with Deleuze and Guattari's (1987, 21) description of a rhizome as "pertain(ing) to a map that must be produced, constructed, a map that is always detachable, connectable, reversible, modifiable, and has multiple entryways and exits and its own lines of flight". In the horizontal, non-hierarchical positioning of elements on situational maps, and tracing of the relations between elements through relational maps, these can together be seen as a pictorial representation of a rhizome (Clarke et al 2017, 92). Adding to this, Clarke et al (2017, 95) explain that they see both SA as a whole, and "the situation broadly conceived" that it seeks to explore, as assemblages. Relational maps, they argue, address the key question "how is (the assemblage) working?" (95). In summary, the authors state that since "situational and relational maps were inspired in part by Deleuze and Guattari's (1987) rhizomic assemblages, we see SA as fairly compatible with those approaches" (366).

Broader links can also be made between new materialist theories and the theoretical orientations of SA as a whole. As well as the aim of engaging with the complexities of a given "situation", Clarke et al (2017) point to the importance of "taking the non-human explicitly into account" (xxv), researcher reflexivity and the importance of "making sure we include ourselves, as researchers, in the maps we are producing" (35), and the rejection of a "tripartite framework" that upholds the perceived separation between "micro", "meso" and "macro" elements in social

research (62). Additionally, Clarke (2005, 29) argues that the simple process of map-making itself offers the potential to analyse qualitative data in a manner more sensitive to new materialist theories, simply through presenting data in a new and re-assembled manner, thus "provok(ing) us to see things afresh".

"Elements" and "producing order"

In the study detailed here, I began creating situational maps after my first session of participant-observation, and despite the synergies outlined above, a key tension in relation to new materialist theories quickly emerged. It was clear already that seeking to identify the distinct elements present within a research encounter carried remnants of the desire, rooted in Cartesian dualist thought, to "produce order and regularity in the guise of categories that erase difference and privilege identity among seemingly similar things" (Jackson 2013, 742). For Jackson, it is from this deep-rooted, essentialist thinking that the practice of coding, so commonplace in qualitative research, stems. The focus on *patterns* inherent in the practice of coding, say St. Pierre and Jackson (2014, 716), is "unthinkable" in Deleuzian ontologies that "describe the world as unstable and becoming". MacLure (2013b), however, argues *for* coding in spite of this ontological mismatch, since it encourages a long, slow "immersion in, and entanglement with, the minutiae of 'the data'" (170). She encourages researchers to think of coding as "an experiment with order and disorder" that is "not a static representation or translation of a world laid out before us… but an open-ended and ongoing practice of *making* sense" (171).

Was Situational Analysis, however, representative of the sort of coding that encourages such static representations? Or was it sufficiently open-ended and experimental? Certainly, Clarke (2005) and Clarke et al (2015, 2017) do not explicitly address the difficulty in using the reductive term "elements", and use it in a fairly commonsense manner throughout their books. As Mathar (2008, 13) points out in a review of Clarke's first Situational Analysis book (2005), the method "does not ask… how these different elements are being produced and how they condense themselves into elements". Clearly, the categorisation required to create situational maps is bound up with the researcher's own pre-conceived impressions and prior experiences. In the example map in Figure 2, this is perhaps most clearly illustrated by the element "relaxed atmosphere". By this, I reflected through memos, I meant the "atmosphere" produced by some of

the other elements I had included: a small group, the chance to ask spontaneous questions, the chance for spontaneous close-up encounters with other species, and the opportunities for what I labelled "free play/exploration" in-between planned activities. Labelling this as "relaxed" was, of course, my own judgement, deep-rooted in my own experiences of school, and professional experience in outdoor learning contexts.

Further indicative of the potentially essentialising nature of Situational Analysis is Clarke et al's (2017, 182) provision of orientations for the creation of "ordered" situational maps, based on the researcher's existing "messy" maps. Here, the researcher begins to categorise the elements they have identified into broader categories – for example, "more-than-human elements", "discourses", or "key people". Clarke (2005, 89) notes that the creation of these ordered maps "isn't necessary", perhaps indicating her awareness of the potential tensions (Mathar 2008).

Researcher reflexivity

While Clarke et al (2017) do not directly address the issue of identifying elements, the key to their thinking is in their insistence on researcher reflexivity. For the authors, an acceptance of the importance of "reflexively analysing what 'we' do as well as what 'they' do" (56) is a key way in which SA differs from Grounded Theory, which "has long been burdened with the assumption that researchers should be tabula rasa" (35). Practically, this reflexivity involves making sure we include ourselves, as researchers, in the maps we are producing, thereby acknowledging (in accompanying memos, if not obviously in the maps themselves) how each element came to be defined as such. Following this, we might conceive of each element as an assemblage in itself - a unique entanglement of concepts, percepts and affects (Colebrook 2002) arising both through the research encounter, and through the researcher's pre-existing "ideas, hunches, and emergent concepts" (Hammersley and Atkinson 1983, 174).

This leads us back to the debate previously discussed in relation to multi-species ethnography. For some, to create situational maps will be to jump to humanist interpretation too early in the research process, when we should instead be attempting to suspend our pull towards meaning making. For proponents of Situational Analysis, however, researcher reflexivity is so important because suspension of the researcher's own thoughts, and humanist meaning-making, is *never*

possible. The key, for them, is in acknowledging this, and instead using situational maps to explore and exemplify when and how our thoughts and privileges are inextricably bound up with other human and non-human elements comprising the research situation. Clarke makes her position on this clear in the FAQ on her own website (Situational Analysis website, n.d). In response to the suggestion that SA "still retains the voice of the analyst/ researcher/author", she responds, "In my reading of the postmodern, there is no turning that can erase the situatedness of research and researchers. All we can offer is our best and most reflexive take to date in terms of understanding something". Similarly, with regard to coding, MacLure (2013b) contends that since "(a)ll language shares the fixative ambitions of coding", it is never entirely possible to abandon the human tendency towards classification.
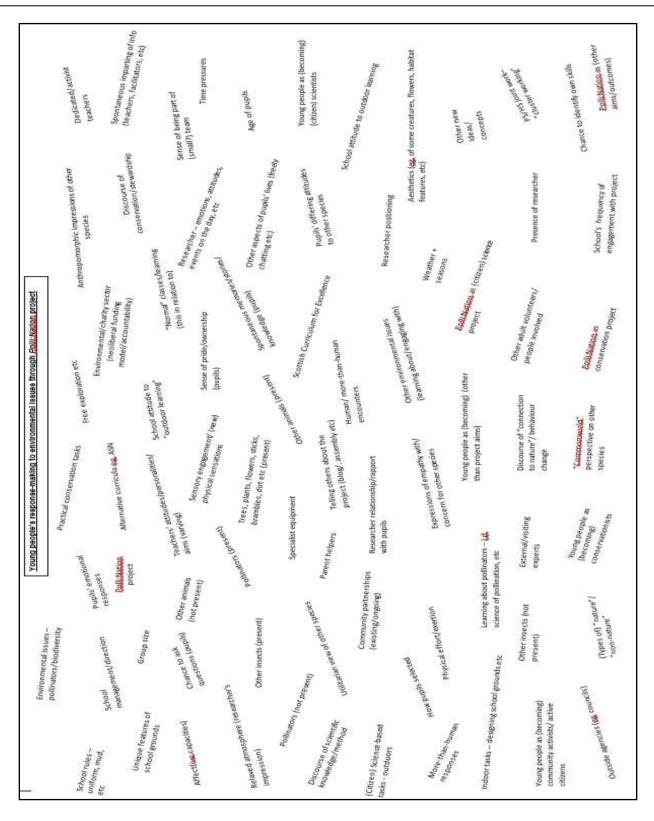
Importantly, the ways in which I conceived of the elements making up Figure 2 was also strongly influenced by the new approach to fieldnote-writing outlined previously, in which I responded to questions drawn from new materialist theories and multi-species ethnography. This can be seen in the labelling of concepts that I had identified as being "invented in practice" (Semetsky 2015), such as "young people as (becoming) conservationists", and "young people as (becoming) community activists/ active citizens". I also acknowledged the ever-present "affect(ive capacities)" within the map, as well as numerous elements emphasising relations between humans and more-than-human elements ("human/more-than-human encounters", "more-than-human responses", pollinators (not present)"). When added to the orientations of SA outlined previously, these subtle shifts suggest that if SA *does* encourage a greater degree of categorisation than is desirable when thinking with new materialist theories, this unique research assemblage has at least enabled this researcher to do so in ways that enabled greater consideration of ideas drawn from new materialist theories.

Returning to Clarke et al's (2017) drawing of links between SA and new materialist theories, the creation of relational maps - using the situational maps created after participant-observation sessions - was also key to conceiving of the map-making process in a manner more sensitive to new materialist thinking. The process of drawing links between elements (however human-defined they were), I felt, furthered my sense of the complex relations between these. The limitation of these maps, however, is that whilst they encourage one to visualise the complexities

and entanglements within the research encounter, the maps themselves do not directly encourage one to consider what is *produced* by the assemblages they represent. Clarke et al (2017, 69), with reference to Dewey (1938), do point to the idea of "the situation as itself having a *gestalt* that makes the whole greater than the sum of its parts", but aside from ongoing memoing, do not offer a prescribed way for the researcher to consider this. Again, however, I felt that this was enabled by the theoretically-sensitive fieldnotes outlined in the previous sections, which helped to further provoke new ways of thinking, and encourage me to consider what was produced.

Figure 2 overleaf shows the situational map I had produced based on all participant-observation sessions during the Polli:Nation study.

Figure 2: Situational map produced after all participant-observation sessions in the study outlined here. Relational maps are then created based on this map, by taking a particular element as a starting point, and tracing its relations to all other elements. The process is then repeated for each other element.

Later use of situational and relational maps

Whilst situational and relational maps proved useful as a means of analysing fieldnotes shortly after participant-observation sessions, it is also worth briefly outlining what was enabled by these early orientations in the later stages of the study in question. Firstly, the use of situational maps to analyse fieldnotes enabled the identification of key features and activities making up the Polli:Nation project, which then helped to inform the focus groups I carried out in twenty participating schools. The focus groups included an activity where young people were asked to choose from a series of flashcards based on characteristics of the project identified through my iterative and on-going analysis of what seemed salient within my fieldnotes. These included, for example, "working with experts from outside of school", "doing practical conservation tasks", and "doing science outdoors". In turn, this activity facilitated insightful discussions about these elements that would almost certainly not have occurred had I simply asked "what do you find significant/ memorable about the Polli:Nation project?" Later, on completion of my focus groups, I updated my existing situational map to include new elements that had emerged during the focus groups – a further acknowledgement of the ideas produced by the assemblage the map represented.

Additionally, following on from the flashcards activity described above, I created a series of relational maps starting from the key processes and characteristics that young people had been most keen to talk about. Creating these maps helped me to continue visualising those elements as part of a unique assemblage, rather than a singular process occurring in isolation.

Discussion

This article has detailed the approach taken to the writing and analysis of fieldnotes during a recent doctoral study in an environmental education context, drawing upon multi-species ethnography, new materialist theories, and Situational Analysis. Rather than being a prescriptive guide to carrying out research in a new materialist or post-qualitative manner, it is instead an account of my lived experience of attempting to use these existing qualitative methods in a manner more sensitive to new materialist theories. Its chief contribution is to highlight the ways in which these methods came to be re-oriented through attending to ideas from the new materialist and post-qualitative literatures, as well as via the onward effects these had on what

then amounted to my data, and on myself as researcher. The re-orientations enabled by the unique "research assemblage" (Fox and Alldred 2018) included the following: Firstly, a new approach to taking fieldnotes that, through drawing on ideas from new materialist theories, activated new ways of thinking that went beyond Situational Analysis to consider what was produced by the assemblages under examination. Secondly, a greater focus on more-than-human elements through multi-species ethnography, including a greater sense of the ways in which these co-shape young people's learning experiences. Thirdly, a way of thinking in a more entangled, relational manner through the creation of situational and relational maps. And, finally, changes to the ways in which I conceived of the elements making up situational maps, owing to the ideas from new materialist theories with which I directed my fieldnote-writing.

It is important here to highlight the transitory, unstable nature of the research assemblage created through this study, and that subsequent research assemblages will most likely bring about new understandings and further re-orientations. This may be through re-reading, and/or a changed or further developed understanding of ideas such as concepts, percepts and affects. Such an altered understanding may, in turn, influence the identification of elements making up future situational maps. This lack of permanence is in fact central to new materialist thinking, with Strom (2018, 112) pointing to the need to "resist overcoding Deleuzian thought and subjecting it to petrification". She points to Deleuze and Guattari's own thinking on this, which highlights the danger, having used their ideas in a given research assemblage, "that you will reencounter organizations that restratify everything, formations that restore power to a signifier, attributions that reconstitute a subject" (1987, 9).

For some, the ongoing tensions highlighted throughout this article will be enough to render the approach discussed here "unthinkable" within new materialist ontologies (St. Pierre and Jackson 2014, 716). Indeed, by St. Pierre's (2018) definition, the presence of an existing research design already disqualifies this study from being post-qualitative. Following Strom (2018), however, I am inclined to question this incompatibility. Strom (2018, 109) argues that whilst the "strategic use of selective concepts" from new materialist theory within qualitative research might be criticised for "failing to holistically employ rhizomatic language or engage in discourse that completely breaks with Western academic writing and research norms", such an approach may

nonetheless result in "micro transformations" that serve to bring these concepts towards "mainstream" educational research. This, she suggests, might also serve to "translate" Deleuzian concepts in a manner more accessible to wider audiences, thus working against the "exclusionary" nature of "high theory". Clearly, not all will be persuaded by this argument. Nonetheless, I hope that at the very least, this article has provided a useful insight into the on-the-ground methodological struggles that come when attempting to carry out research in a manner sensitive to new materialist/ post-qualitative thinking, whilst operating within the at-times restrictive norms of academic research. In this case, these amounted to the time-bound context of a collaborative, funded PhD study where there was an emphasis on "demonstrable impact" (Hammersley 2018).

The approach set out in this article represents a series of small, initial steps towards exploring the struggles that take place when conducting research within a new materialist framing. It provides a potential starting point from which there is ample opportunity for further exploration. I suggest three further directions for this. Firstly, there is potential for further experimentation with the orientations outlined here. These may include, for example, the alternatives suggested in the section "'Language practices' and 'performative privilege'", which acknowledged the possibility of, for example, not taking fieldnotes at all. Secondly, since this article has focused on situational and relational maps, there is potential for exploration of other aspects of Situational Analysis, and their compatibility with new materialist theories. This might include the use of two further types of map identified by Clarke (2005), usually completed later in the analysis process – social worlds/arenas maps, and positional maps. Finally, as the focus of this article has been on fieldnotes, there is potential for further exploration of the tensions encountered with regard to the use of other qualitative methods - such as interviews and focus groups - in a manner sensitive to new materialist theories.

Notes

1. The first author, who carried out all research described here. The second author was responsible for setting up this doctoral study, and played a key role in the development of many of the ideas explored in this article.

2. Quotation marks are used here either to indicate the inherent tensions in words such as "data", "elements" and "research design", as well as when terms are attributable to a particular author. We place problematic words in quotation marks at their first appearance, then use them without quotation marks thereafter.

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