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ARTICLE

Multiple worlds and strange objects: environmental education research as an additive practice

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Abstract

The paper offers three examples of passionate immersion with strange objects and working with peculiar multispecies assemblages, such as the assemblage of a dove called Romeo and the technology to humidify a greenhouse called 'Princess', or the experiment of orienteering in forests for years, accounting for slips, scratches and tumbles as being taught by the forest — and prioritising these over the more commonplace educational narratives. The paper is structured in a nonconventional way in that most space is reserved for reports from these ongoing inquiries. The authors will each discuss how they situate themselves in relation to strangeness in research and how they proceed methodologically, locating their approaches as postqualitative. The questions each example addresses are: *What is a strange object? How do we come across them? What do we begin to do/produce with them?* The additive orientation described in the research stories is proposed to be an important constituent for new survival knowledge especially relevant for environmental education, addressing environmental problems as wicked, and demanding approaches that reach beyond methodological divides.

Keywords: strange objects; additive empiricism; postqualitative inquiry; nonanthropocentrism

Introduction

Contemporary scholars of environmental education are increasingly connected by the problems they focus on, rather than particular methods or theories. Ewa Domanska (2011) calls this the production of knowledge with survival value. With Andrew Pickering (2005), she proposes that the challenge for today's research striving for more environmentally just societies is not so much in formulating new theories and proposing new methods but in understanding and resituating our existing research practices as non- or less anthropocentric. In this paper the theoretical-practical process of such resituating is approached with a focus on so called strange objects, and with three examples from ongoing research identified as postqualitative, offered by the four authors.

The resisting object, or the strange object, according to Domanska and Pickering, is an assemblage, a collection of things and beings — in their situational, cultural-historical context — that is not easily understood with existing approaches, that is: it resists traditional disciplinary boundaries and as if requires scholars to both collaborate in their thinking as well as to change the definitions of their respective disciplines and fields.

The paper offers three examples of theoretical-empirical takes on thinking with strange objects. The authors will, in these examples, each discuss how they situate themselves in relation to strangeness in research and how they proceed methodologically, locating their approaches as

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postqualitative. The questions each example addresses are: *What is a strange object? How do we come across them?* ***What do we begin to do/produce with them?***

The paper is structured in a nonconventional way in that most space is reserved for reports from three ongoing theoretical-empirical inquiries on three specific contexts: an educational zoo called the greenhouse, horse stables, and a forest. This is done to reflect the postqualitative orientation where thinking emerges through working with diverse research materials and in this case builds towards a conclusion where the relevance of thinking with strange objects to environmental education is discussed.

The Greenhouse: Joining the Compost of Stories, Bodies, Theories

Inside the school building we cross the entrance hall,
one knows these kinds of secondary school entrance halls by heart,
they are so familiar, always similar
but when we open the greenhouse door, another world overwhelms
Scents and smells from blooming and decaying plants
bright lights
cries, shouts, sounds and chirps, accompanied by smaller rustles
and the humming sound of a humidifier
stable rotation of the air conditioner in the ceiling
we are anxious to go to there and hear what's new,
how the kids, other animals and plants are doing

In this section, we, Riikka and Tuure, ask what becomes of inquiry when the taken for granted human-centric research procedures no longer hold, drawing on our multispecies ethnographic work on child-animal relations in educational settings. The most thought-provoking of these settings was the greenhouse we enter in the vignette above. The greenhouse is an educational zoo, built in the atrium of a regular secondary school building, complete with all the technology needed to maintain sub-tropical climate, and a home of dozens of different animals and plants. We spent 5 months in this place, following the engagements between animals such as gerbils, roosters, birds, and a group of students who took responsibility over the caretaking of these animals as part of their schooldays.

Domanska (2011) understands posthumanities research as a theoretical frame for identifying a research object that is disobedient to dominant theories, our present knowledge and the possibility for conceptualising it as it transgresses disciplinary borders. In the vignette above, the mere existence of animals in a school reveals the taken for granted spatial and temporal arrangement of the school institution — an arrangement so familiar that we know it by heart. In these conditions, within the normative forces at play, not much is needed for an assemblage to become seen as strange and to begin to unsettle our habitual researcher routines:

We came here to do ethnography about child-animal relations
But in the greenhouse we lose our efficacy
we get indecisive
halted and overwhelmed by strange encounters

When entering the multispecies ethnographic field, we were not only meeting new students and teachers, but also new animals, technologies and atmospheres. All of these, in different ways, made us realise how little we knew, and how little our previous skills as researchers helped us to go on. Weaver and Snaza (2017) write about the necessity of listening in more-than-human research, which for them enables us to re-enter the worlds we are examining 'as students, as newcomers' (p. 1061). Vinciane Despret (2016) has coined the notion of 'polite visiting' as a research approach that emphasises the element of surprise and curiosity within the process of becoming-with on research fields. She advocates the possibilities of intra-active exchange and transformation in research 'visits', saying that those you went to visit are never quite who or what you expected, and you yourself are not quite what you thought either. In the fields of social sciences, humanities and arts, a specific animal turn has been identified during the last decades, whereby a renewed interest has emerged towards the ways in which other critters are involved in a range of processes previously thought as human-only adventures and achievements (e.g., Rautio, Tammi, & Hohti, 2021; Weil, 2010). The assemblages we found in the ethnographic setting of the school greenhouse ignited and sustained the strange, the surprising, and the curious elements of inquiry, thus fuelling our personal 'animal turn'.

> Romeo and the other birds enjoy sitting on 'Princess'
> while it is working, humming and spraying water all over
> sometimes they knock on the machine as if to turn their shower on.
> The greenhouse birds also like electric wires,
> they do tricks on them, and sleep on them
> rather than on the wooden sticks hung in the ceilings meant to serve as bird swings
> it is not always easy to guess what the birds like to sit on,
> says Armi, one of the biology teachers

We began to make sense of the greenhouse as a coming together and co-animation of various bodies and processes, drawing on human geographers (Kraftl, 2020; Massey, 2005), relational ontologies (Barad, 2007; Deleuze & Guattari, 1987) and multispecies ethnographers (Van Dooren, Kirksey, & Münster, 2016). Above all, we listened to stories, and each story seemed to change and mutate something in the intra-active fashion we described above. A mutual dynamic caught our attention, in which bodies and stories were constantly coproducing each other. We started a field note practice of hanging with the events and stories, and writing new ones, compiling an archive of stories we named 'compost' (after Donna Haraway). We found inspiration in the fragmental and partial 'found' stories and their capacity of changing each other in Ursula Le Guin's 'carrier bag theory of fiction' and Donna Haraway's (2016) 'bag lady story telling'. Instead of a clear and predetermined object of research, this method allowed all kinds of things to be picked up along the way without knowing how they will start to work with each other, bubble, boil, and sprout new stories. It became a strange practice of working with peculiar multispecies assemblages, such as the assemblage of a dove called Romeo and the technology called 'Princess' that was used to humidify the greenhouse, and of prioritising them over the more commonplace educational narratives.

Immersed in the strange encounters, smells, sounds and feels, it happened often that we did not leave the place as planned but stayed there, feeling energised somehow. And so did some students, we noticed, who often left only when the janitor closed the doors of the school building late in the evening. Coming from field work conducted in another school, we both registered a clear difference in atmosphere and experience of time. We talked about this sense of another temporality, and about the ways the singular institutional time opened up as a multispecies temporal multiplicity in the greenhouse. Perhaps it was this more multiple temporality that created a different energy, and on the other hand, made us halt and refrain from the automatic application of research procedures, which were not only based on human temporal scales but also anthropocentric theories and ethics and the related oculo- and speech-centrism.

The jazz percussionist Milford Graves, in an interview with Wahei Tatematsu, suggests that 'free musician does not mean you do anything you want to do. It simply means the capability or sensibility to be able to respond to the environment you are in and make a music according to the environment that you are in' (Graves, 1993). He further explains that this artistic approach has to do with harmonising and vibrating with whatever is present in the situation, whatever moves or stimulates the body. Multispecies scholars talk about passionate immersion in the lives of others (Tsing, 2010) and research as developing arts of attentiveness (Van Dooren et al., 2016) that nevertheless are always partial. In her notion 'becoming-instrument', literary scholar Kaisa Kortekallio (2019) suggests that as much as the researcher is performing inquiry, s/he is played out by it. These are among the insights that help to view the researcher's body as an environed sensorium through which material-semiotic currents pass and diffract. In the research we conducted in the greenhouse, this meant that our 'compost' stories were not so much about individual authorship, rather, storytelling presented us a possibility of joining something — an ongoing stream of stories and bodies in coproduction — and at times becoming critical hosts for 'visits' (Despret, 2016) ourselves, while linking the practice to further academic thinking-writing assemblages. Some of the stories came to us as odours or haptic sensations such as the metabolic stories that could first and foremost be smelled, or the technological stories we felt as tropical warmth and dampness. Here, a story, or storying, became a multispecies matter.

The birds take part in composing the soundscape of the greenhouse
with the waterfall at the turtle pond
humming of the ventilation system
electric lights going on and off above the plants and cages
the 'whap whap' of the propel in the roof
and the occasional knockings in the cages and terrariums
one day we start recording the soundscape simultaneously
though we are located in the different parts of the greenhouse
the birds sounded different
differently attentive
an invitation to listen perhaps
what about the murmur of guinea pigs,
sniffing sounds of rabbits and gerbils,
the sounds and rhythms of the lizards?
Those of the stick-insects?
Soon the students rush in
feet knocking on the floor
chatting, laughing, cursing
there are small groups packed on the benches
and caretakers changing water and food cups for the gerbiles, the rabbits . . .
their movements are what we hear in this urgent sequence
a soundscape takeover

Multispecies scholarship advocates a situated approach to the particularities of an assemblage to complement the commonplace scientific approaches. When considering the particular nonhuman animal with a young person in the particular school space, at a particular moment, engaging in particular movements, evoked an estrangement, an opening up of strangeness in the familiar.

We have, for instance, been asking, what is the knowledge that is produced in the events when students are involved in touching, such as stroking the gerbils that they take care for (Tammi & Hohti, 2020). Through this, we were taken to notice once again the limitations of our habits as education researchers, and moved on to dance theory, viewing the dancing-touching events as matters of balancing. Engaging with microbes and mould (Tammi, 2020), and insects (Hohti & MacLure, 2022) has taught us how mere movement away from the familiar scales of the human, to very small bodies, and taking life ways such as swarming into account, is enough to make these animals appear as strange, and unsettle our habitual (often oculocentric) research apparatuses (see Andersen et al., 2017). Thinking about the endless variety of insect species, for example the at least 4600 cockroach species existing in the world, opens up not only the variety of life modes, but also the incompleteness of our theories, as each of these species could be seen as requiring their own theory instead of one anthropocentric grand theory.

We have here described multispecies ethnography as an additive practice, which has blurred disciplinary boundaries and made us engage with unconventional storytelling, music, and dance theory. When pondering strange relations across species and bodies of different kinds, and the potentially infinite versions of worlds, we are pushed to leave scientific mastery, and to move onto the terrains of the amateur (Halberstam & Halberstam, 2011; Hohti & MacLure, 2022). Beyond the single anthropocentric theory, we anticipate many more theoretical influences in the direction of 'low theory' (Halberstam & Halberstam, 2011), or 'minor science' (Deleuze, following Drummond & Themessl-Huber, 2007), which do not simply investigate but also seek to account for mutual change and creation as they go.

A Girl and a Horse as a Strange Object

This story is one between a 10-year old girl (self-identified) and a 12-year old horse who took part in a research project on children's relations to other animals. It began as an ordinary story but became a strange object along the way. I, Pauliina, will account for this process and highlight my methodological responses as both reacting to strangeness and making further room for it — constructing a strange object as a methodological device. The story that unfolded over the 6-month research period, did not find neat existing framings, and seemed to resist simple framings altogether. As space was given to this resistance — by accommodating more and more tentative framings as add-ons and not subtractions (see Latour, 2016), the strange object brought into being finally shed light to the surprising simplicity of the story of a girl and a horse.

In the project in question, children's animal relations were approached through multispecies ethnography emphasising the viewpoints of the child and as much as we could stretch — that of the other animal. Emphasis was on the shared 'biosociality' (Ingold, 2013): on not only what human children and other animals are (biologically) or what they do (socially) but both. Other animals were taken to co-produce the world they share with humans, while simultaneously performing their specific forms of agency and creating their own worlds. These premises of our work were geared at mapping complexities and working without existing framings. The single ethnography, among many, of the girl and the horse, became strange nevertheless.

The context of this story is the North of Finland. I began working with Katie, age 10, by interviewing her about the significance of animals in her life. Katie was chosen as a participant in the project because she expressed deep affinity with 'animals' but did not have an animal related hobby or any companion animals at home. My work with Katie was initially planned as a series of three to four interviews at her home. Towards the end of the first interview it had become apparent that Katie was keenly interested in horses but had not been around them that much because taking up riding lessons didn't appeal to her. This was the first moment when I sensed strangeness — a peculiarity of a kind. I responded to this strangeness by deciding to invite Katie, with her parents' permission, to meet me for the next interview at the stables where I keep my horse. She was excited and her mother reported later on that she waited for the meeting anxiously.

Katie, I, and my horse — a 12-year old Finnhorse cold blood mare Hilima — met at the stables and went for a short ride along the nearby country roads. Katie on Hilima, me by foot. We ended up talking very little about my planned interview themes but all the more about Hilima, observing what she did and how she behaved. This was another point of strangeness that I decided to respond to: the unfolding research event did not match my expectations or existing ways of understanding what was going on. The ways in which I kept responding were accommodating and inviting if not actively proliferating this sense of strangeness. I wanted to make room for it. On our way back to the stables I asked Katie if she wanted to keep visiting Hilima with me, instead of us meeting at her home for interviews. Her answer did not surprise me. We proceeded to meet up at the stables eight times over a period of 6 months. Each meeting, lasting from two to three hours, included daily chores with Hilima such as bringing her in from the paddock, grooming and feeding, and then riding either in the arena or in the nearby woods. One time we went harness driving. During our meetings not very much was said at all. The things we talked about had to do with observations of the horse and me guiding Katie how to do the things we were engaged in. On one hand the silence was expected but on the other hand it contributed to the strangeness of the unfolding story of the girl and the horse. So I responded by asking Katie to keep a diary of our meetings, just to have one more avenue for building an understanding of the story.

Only 2 weeks into our meetings, Katies mother began to spontaneously send me messages and emails about her observations of Katie at home (I proceeded to request that she ask Katie's permission for each message). This was again a further step in the process of the story becoming a strange object. I responded, again, by opening up more frames and avenues for communication and materialisation of the phenomena at hand. I told Katie's mom that I would welcome any insights and messages from her as long as Katie knew about them. She then began to message me, quoting their discussions and letting me in on how Katie had begun to get attached to Hilima, to the extent of being sad and crying when suddenly missing the horse in the middle of a family holiday abroad. Together with Katie they began to send me pictures of Katie via Whatsapp, pictured waiting for the next research meeting wearing a horse-themed shirt or holding treats and surprise gifts for the horse, sometimes jumping in the air in excitement.

As moments of strangeness piled up, I would respond each time by opening up more and more paths. The avenues travelled included materials Katie brought up in our discussions (e.g., tv series, books), messages from Katie's mom and the journal I asked Katie to keep. The initial story was meant to unfold only by sitting down to talk with Katie, as a fairly conservative unstructured interview. Katie was not a strange object nor was her relationship with Hilima, but the strangeness I encountered in trying to accommodate her preferred relating to a horse led me to create a strange object for my research. This object is my methodological construct. As the process unfolded I accommodated more and more paths in order to create a space for Katie and Hilima to exist.

One of the things I did half way into our meetings was to read Katie's favourite horse-themed book, and to watch a tv series on horses that she recommended. Amalya Ashman (2017) outlines the main features of 'pony-fiction' as resistance of stereotyped expectations and societal constraints placed on girls. The outline of a typical pony story includes gaining the trust of a troublesome horse. The subjectivity of the horse is close to nonexistent but is explored through the young female protagonist. Ashman describes the familiar storyline in which a girl tames and trains a wild horse alone as a fantasy related to dominating another animal completely. These frames feel, again, like outsider talk about something which the children, mostly girls in question, feel passionately about. The frames or themes that seemed to matter to Katie at the stables and with the horse were those of being a good human from the point of view of the horse. This is what Katie returned to over again, asking Hilima out loud: *Do you like it when I ride you?*

By the end of our research process it was clear that beyond the available modes of being with horses — owning one or having a goal-oriented hobby with one — Katie's preferred mode of spending time with a horse does not really exist outside of the research space that we have created — the strange object. In retrospect, what was set out to be a simple case study of one child's self-identified affinity to animals in general, was allowed to evolve into an actual long-lasting relationship or web of relations including not only the child and the horse but myself, the horse's paddock companions, the child's family and the cultural constructs enabling and fuelling these relations: for example the book club, the posters in Katie's room, the tv series she loved and that I watched as well, the braiding bands and grooming brushes she brought for Hilima. While this was not planned, it was a mode of responding that I myself identify as a postqualitative one: proliferating the avenues of exploration (or what would more conventionally be called data), understanding research as an unfolding process, and treating the methodological construct as a co-produced research space — a strange object — that in itself becomes the object of research.

In the case of Katie and Hilima — a girl and a horse — the co-created strange object revealed a simple longing from Katie's side to engage with another being respectfully, curiously and at ease. The space for this quite straightforward longing to actualise would need an enabling framing but none of the currently existing ones that Katie had access to, provided this space for her and a horse. The strange object of this research space is an estimation and a testimony of the possibility of such a framing.

The Strangeness of Thinking-with the Forest

How to think with the forest?
There is no shared language
but entanglement of bodies with various temporalities and rhythms
breathing, moving.

The research experiment started to evolve organically based on what I, Henrika, was doing in my daily life at the time. I had started to orienteer as a sport hobby and realised soon that running with a map and a compass in local forests beyond the ready-made paths and forest roads started to resonate with my ongoing research. I was working with philosophical and theoretical groundings of environmental art education (Ylirisku, 2021), and the orienteering practice raised new questions of anthropocentric human-nature relations I was critically analysing in the research. It seemed that I had taken posthumanist concepts unpacking human exceptionalism with me to the forest and that the orienteering practice produced encounters with forest materialities that aroused affective, bodily responses that called for further attention. Maybe the forest was teaching my human body new ways of collaborating, responding, and taking notice.

Oh no! The thicket is so dense here
it is impossible to go through.
The woody bodies resist
the momentary human manipulating intentions.
Things get too close,
touching, scratching, slapping.

Instead of offering a theoretical analysis of reorienting the conventional humanism-bound conceptions of human-nature relations (guiding environmentally oriented art education), I wanted to keep the posthumanist onto-epistemological relationality (e.g., Barad, 2003, 2007; Braidotti, 2013) in line with research methodology (see St. Pierre, 2014, p. 3). Embodying the posthumanist theories through a very situated, local practice that offered a possibility to merge thinking, reading, writing, and doing appeared generative to develop further.

I decided to build on the proposal of Springgay and Truman (2018) to consider research methods as techniques for being inside a research event (p. 83). So, I put posthumanist theories to work through a research experiment that functioned as a 'speculative middle' (Springgay & Truman, 2018). As Springgay and Truman (2018, p. 87) point out, perceiving research practices as speculative middles rely on situatedness and responsiveness since things start to unfold from the process itself and cannot be known in advance. Thus, the idea of methods as processes of gathering data and reporting on what you find turns to a way of 'being in the world that is open to experimentation and is (in) tension' (Springgay & Truman, 2018, p. 87).

I bent the orienteering practice away from the sports context into a propositional catalyst (Springgay & Truman, 2018) that in a concrete manner provoked becoming entangled in more-than-human relations. Moving in different local South-Finnish forest terrains with the orienteering intention (navigating from point to point as fast as possible) invited the human body to events and becomings open to a multiplicity of directions and ways of being — to both pleasant encounters, and awkward and painful tensions. I wrote journal entries right after the orienteering practice, took documentary photographs while being in the forest, read more theory, and made new photographs by enacting certain events or forest encounters that were recurring or aroused complex embodied responses.

I had a strong intuition that I had to keep on orienteering, despite the fact that I felt like being lost inside a thicket astir with movement and life. It was challenging to try to sense what, of all that took place in the forest, was meaningful for the research. A further problem was that I struggled with my own habitual anthropocentric orientation. The focus on the experience of an individual human and the centrality of the researcher 'I' ran through all the ways I was able to communicate of the more-than-human relationality. I seemed to be stuck with the phenomenological approach of describing the human embodied experience. Relying on human language appeared limited and attempts to think beyond human meaning-making seemed clumsy. As if the whole setting was resisting and strange: it appeared overwhelming to try to think with nonhuman agencies, such as forest plants, insects, and weather.

> Think, think, we are together, we are becoming-with.
> What kind of thinking gets activated from being sweaty, dry, cold,
> bitten, stroked, confused, surprised, amazed,
> when engaging with the forest materialities?
> Wow, there is a purple mushroom over there!

The strangeness motivated me to search for theoretical and methodological support from disciplines beyond arts and art education. For example, the ways of turning attention to multispecies relations in early childhood education research and childhood studies (e.g., Pacini-Ketchabaw, Taylor, & Blaise, 2016; Taylor & Pacini-Ketchabaw, 2015) and examples of using more-than-human walking methodologies (Springgay & Truman, 2018) offered ideas on how to focus on emerging multispecies relations and encounters. It appeared it was possible to merge these methodological inspirations with my expertise in artistic thinking. Artistic thinking can be considered as a specific way of thinking, usually connected with artistic practice, that unfolds as attentiveness to sensory and embodied ways of knowing and further, offers a curious, experimental orientation useful for navigating ambivalence and open-ended processes (see e.g., Varto, 2008a, 2008b; Mäkikoskela, 2015). Furthermore, theoretical inspiration from feminist new materialist scholar Neimanis (2017) allowed grasping ways of cultivating a posthumanist phenomenology: attunement, listening, and observation of the embodiment, but in a way that disrupts the idea of a coherent, autonomous bodily self.

The research experiment continued over several years. I kept orienteering almost weekly during the snowless seasons, carried on reading, taking photos and trying different kinds of writing experiments. Slowly my human body got used to variations of forest types, different weathers, and encounters that appeared in the beginning disgusting, indifferent, or too complex to handle. As if the strangeness of the experiment would have started to dissolve through the repetitive practice. The variety of nuances of the human-forest entanglement started to open up and become more familiar, and through this familiarity it became possible to start paying attention to the dimensions of more-than-human relationality beyond the habitual anthropocentric comfort zone. The long-termed practice revealed that my orienteering human body prefers some predictability, pleasantness, and is keen to keep a distance to nonhuman bodies while moving in (with) the forest. However, getting used to being touched by nonhuman creatures and materialities (and touching them) opened new connections and possibilities to become more attentive to the messiness of more-than-human entanglements — our constantly changing 'dance of relating' (Haraway, 2008, p. 25). The encounters and entanglements that at first appeared uncomfortable, forbidding, and awkward opened unexpected possibilities to disrupt anthropocentrism, and suggested new ways of relating with the more-than-human world.

> The orienteering human researcher
>
> lies still in the moss bed in the spruce forest.
>
> 'Together we even our temperatures.
>
> We become cooler — we become warmer.
>
> The moisture in the moss creeps to the shirt, to the skin.
>
> Maybe some water bears (tardigrades) climb into the shirt, to the skin.' (Ylirisku, 2021, p. 139)

I ended up writing visual-textual stories of partial aspects of becoming-with (Haraway, 2008) the forest that highlighted entanglements with dense thickets, encounters with awkward insects, and different scales and temporalities in the intertwinement of nature and culture. Furthermore, I theorised the insights and threads unfolding from the experiment with other posthumanist scholars, and this in turn allowed new questions and speculations for future environmental art education to emerge.

In this particular experiment thinking-with the forest was fuelled by a persistent commitment to decentre the human again and again, despite constant failures and tumbles. The strangeness colouring the thinking-with the more-than-human started offering invitations for residing in tensions, ethical frictions, more-than-verbal insights, and clumsy incompleteness that might remain unaddressed in more conventional qualitative research (and maybe also in environmental education).

Conclusion: Additive Environmental Education

While diverse in topics and concrete research practices, the three examples all share an attitude we recognise as typical to most postqualitative inquiry: what Bruno Latour (2016) would call an additive empiricist take. This is when the phenomenon under study is approached by actively engaging with it: adding, complicating, slowing down and hesitating, in order to explore and to multiply the possible versions and future directions of a given phenomenon. Latour identifies this as the 'and-and' (instead of 'either-or') approach to research, typical to philosophers such as Isabelle Stengers, Vinciane Despret and Gilles Deleuze.

The research narratives examined in this paper are examples of passionate immersion (Tsing, 2010) in the lives of others. Attentiveness to assemblages as strange objects with an additive orientation delivers a focus on what they begin to produce. Instead of seeking to impose order and subtractive explanation on these objects, we as the scholars and authors attend to multiplying the explanations and celebrating the emerging possibilities and areas for further attention.

When talking about strangeness, it is important to realise that objects are of course not inherently strange by essence, but they become produced as strange by processes which call our attention. As one example of such a process we discussed institutional schooling that makes multispecies life as part of education, situated inside a school building, appear strange. Lorimer (2014) writes how awkwardness can function as a creative and productive force by keeping us awake and working against indifference. Awkward encounters across difference can potentially generate new thinking, new practices and politics. Those withlings in particular that are strange or unloved by humans, call our attention, and do not allow us to sideline our relationality with them (Authors). The nagging discomfort in this relationality ultimately tells us something about ourselves. For Lorimer (2014), the strange worlds of other animals are an invitation to lifelong contemplation and 'modest activism'. The reward of the conceptual discomfort strangeness presents to us, is shock treatment given to one's own attitudes, and an urging to think beyond human norms.

We also argue that strangeness invites a deliberate focus on the aspect of attentiveness in research methodologies, as we are required to pay attention to strangeness, to design events and go to situations in which new survival knowledge demands to be created. Maybe with age-old methods, but in new constellations or assemblages, that, in turn, challenge the understanding that a method could ever be simply a set of predetermined techniques and instructions for use. Furthermore, the attentiveness to strange objects challenges the researcher to acknowledge and pay careful attention to affective, embodied ways of knowing, and thus to critically evaluate the possibilities (and limitations) to articulate more-than-verbal dimensions of engagement with the research phenomenon.

The additive orientation described in the research stories is, we think, an important constituent for new survival knowledge to be built because it may render strangeness attractive and thus nourish appetite for more questions, explanations, variations. This is especially relevant for environmental education, addressing environmental problems that are conceptualised as wicked, and demanding approaches that reach beyond disciplines, theories and methodological divides, uniting scholars and practitioners. The recent emergence of materially and nonanthropocentrically focused scholarship in human and social sciences attests that simple human centred narratives that pinpoint both blame and possible redemption to human actions don't work (see also Ruck & Mannion, 2021; Taylor, 2020). Environmental humanities (e.g., Krzywoszynska & Marchesi, 2020; Rose et al., 2012), human and animal geographies (Johnston, 2008; Jones, 2009) or childhood studies (Authors) focus on decentring the human individual as a psychological construct and instead highlight relationality and entanglement as the onto-epistemological basis of human relations to other species and to the environment as whole (Muller, Hemming, & Rigney, 2019; Taylor & Pacini-Ketchabaw, 2018). These approaches are often, but not always, coupled with a postqualitative methodological palette that amplifies and multiplies various versions of diverse relations, rather than seeking to pinpoint clear culprits and one-way routes to salvation.

The way to transformative environmental education (research) that postqualitative approaches suggest is an additive one. This echoes the importance of democracy in environmental and sustainability education brought forward by Arjen Wals and Michael A. Peters (2017) as they point out that neither education nor science should be prescriptive tools but instead accommodate social learning, explore alternative paths, participation, pluralism and diversity of perspectives. This is what postqualitative methodological approaches can offer being additive by nature.

Postqualitative approaches can, but they don't automatically do, highlight the role of coproduction in research. The three stories of strange objects include engagement of stakeholders — human and other — and those conventionally cast in the role of learners, recipients or objects of knowledge production. This has potential to address the pitfalls of post- or materially oriented scholarship, namely the danger of glossing over social injustice and inequality between humans when advocating a focus on the nonhuman/material (Lupinacci & Happel-Parkins, 2016).

Furthermore, to move beyond mere proliferation of alternative paths, the strange objects portrayed in this paper show that the postqualitative research spaces created can — in themselves — be understood as concrete testimony of the possibilities and limitations of future societal spaces and frames of action. The postqualitative process of creating a research space, how we understand it, is in itself exploration of the concrete possibilities in a given context and with a given theme.

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