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RHIZOMATIC PATCHWORKS: A POST-QUALITATIVE INQUIRY INTO CHILD–ENVIRONMENT–RESEARCHER AESTHETIC ENCOUNTERS

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Abstract: *This paper examines the child–environment–researcher aesthetic encounters that emerged through a post-qualitative methodological approach called rhizomatic patchworks. Rhizomatic patchworks is an arts-based analytical process grounded in relationality, when posthuman theories and children's storying provoked the researchers' material and digital experimenting and thinking, manifesting in visual-textual assemblages through digital art. Drawing from an ethnographic research project on children's digital storying at a Finnish primary school, we illustrate how the rhizomatic patchworks processes made us attentive to the various ways aesthetic dimensions entwined and became part of the children's and our own relating with local environments. Aesthetic encounters emerged across intertwining events and modes of children's storying and the researchers' theoretical thinking and digital artmaking practices, allowing us to sensuously engage in frictional, troubled, and complex intersections of children's stories and environments. Our article shows how rhizomatic patchworks can offer educational research creative, transformative and embodied ways to attend materially and digitally to the more-than-human phenomenon of aesthetic encounters in environmental education and discusses the ethical challenges and potentials of this methodological approach.*

Keywords*: post-qualitative inquiry, methodological approach, rhizomatic patchworks, aesthetic encounters, environmental education, digital art*

Introduction

Educational research has seen a flourishing of posthuman and post-qualitative work immersed in the unfolding of affects, atmospheres, intensities and material encounters within pedagogical practices and events, which strongly relate to aesthetics (Dernikos et al., 2020; Peppler et al., 2020; Rousell and Williams, 2020). However, the concept of aesthetics has gained little attention in posthuman environmental educational research, although aesthetic relating is an important

experiential quality of our sustainable and ecological relations with the world (Iared et al., 2016; Neimanis, 2017; Rousell and Cutter-Mackenzie-Knowles, 2020). One reason for this is suggested to be the humanist baggage within aesthetic philosophy to create human–nature and body–mind dichotomies (Dixon et al., 2012; Rousell and Cutter-Mackenzie-Knowles, 2020). Nevertheless, scholars have suggested the value of and need for exploring and further developing a posthuman aesthetics within environmentally and ecologically engaged educational practice and research (Dixon et al., 2012; Hickey-Moody, 2013; Rousell and Williams, 2020). Posthuman aesthetic methodologies can make "the hard-to-grasp scales of living…less abstracted, potentially more sensory" and potentiate new forms of ethical and responsible inquiry (Neimanis, 2017: 42).

Following Neimanis (2017), we suggest that by extending on phenomenological perspectives, which emphasize the sensory dimensions of living, toward a posthuman understanding of aesthetic dimensions as emerging through more-than-human encounters, we can start to develop methodologies that are attuned to the sensory, embodied and situated conditions of research and education. A posthuman engagement with the aesthetic dimensions of inquiry and pedagogy, acknowledges the affective power of both human and nonhuman material agencies, which we also refer to as aesthetic agencies, to affect within more-than-human assemblages (Bennett, 2010). Assemblages are transforming constellations, or as Bennett (2010) would call them "groupings of diverse elements of vibrant materials" that encounter in open-ended and continuously moving ways (23). Thus, attuning to aesthetic encounters within educational and research assemblages exceeds human cognition and knowledge, bringing attention to the sensibly distributed nature of experience as entangled with affects, bodies, environments, societies, and technologies that coexist in our ecological worlds (Rousell and Williams, 2020).

Aesthetics is also closely related to philosophies and practices of art. In post-qualitative research artistic practices are recognized as enabling aesthetic and playful modes of interrogating the rich methodological, theoretical, and practical configurations of research (Dixon et al., 2012). Furthermore, art creates aesthetic encounters that often involve unexpected combinations of bodies, materials, events, and ideas, which force us to question our preconceptions and responses (Hoogland, 2014). Along these lines, Swanstrom (2016) invites aesthetic engagement across "natural and digital ecologies" through digital art practices, to complicate and question notions of human agency and distinctions between material, social and technological dimensions (142). Our paper responds to these calls, by considering how sensuously attentive posthuman perspectives and arts-based post-qualitative approaches can offer a transformative means to attend materially and digitally to and experiment with the aesthetic dimensions within educational and research assemblages, thus contributing to more nuanced methodological approaches.

This study extends on previous research in our ECHOing (Enriching Children's Ecological Imagination) research group, which investigates environmental issues, ecological challenges, and climate change with children through arts-based and storying practices that involve various modes of imagining, experiencing, and expressing across human and more-than-human dimensions (see e.g., Byman et al., 2022; Kumpulainen et al., 2020, 2021; Renlund et al., 2022a, 2022b). In one of our studies, which involved a digital storying workshop with 7–9-year-old children in a Finnish primary school, we investigated the aesthetic encounters of children and their local environments (Renlund et al, 2022b). During this work our research group developed and used a sensuous and

creative analytic process that we named the rhizomatic patchworks. The philosophical concept of rhizome refers to the heterogeneous connections of diverse dimensions of reality that are formed through transforming assemblages (Deleuze and Guattari, 1987); hence, the rhizomatic patchworks approach allowed us to understand research practices and data sets as nonhierarchical and nonlinear relations. Inspired by post-qualitative and arts-based research (e.g., Irwin et al., 2006; Rousell et al., 2020), the rhizomatic patchworks involved analytic processes in which children's storying, together with posthuman theoretical concepts, worked as provocations for the researchers' material and digital sensing and thinking through digital artmaking practices. These artistic practices combined photographing, painting, and digital image creation, manifesting into visual-textual assemblages. In the current paper we turn our focus to how as researchers we became sensuously entwined with the researched phenomenon of child-environment aesthetic encounters, in other words how the methodological approach of rhizomatic patchworks performed child–environment–researcher aesthetic encounters. We further deliberate what ethical and environmental challenges and possibilities this methodological mixture of storying, theoretical engagement and digital artmaking brings about.

Theoretical and methodological configurations of rhizomatic patchworks

Before introducing the rhizomatic patchworks, we first dive into our thinking of aesthetic encounters as a vital part of socio-ecological worlds and of research assemblages. Then, we open how Deleuze and Guattari's concept of the rhizome has guided our methodological dispositions. Finally, we describe the ethnographic fieldwork on which our inquiry draws and how we have engaged with the children's stories through digital artmaking.

Aesthetic encounters

Our work is inspired by phenomenologically grounded environmental aesthetics and environmental education that offers a sensory, embodied, and material focus on aesthetics, moving beyond body–mind dualisms (Iared et al., 2016; Neimanis, 2017). We extend this notion through posthuman perspectives, by using the concept of aesthetic encounters to recognize aesthetics as emerging through more-than-human assemblages (Bennett, 2010; Hickey-Moody, 2013; Neimanis, 2017; Renlund et al., 2022b; Rose, 2017). Consequently, understanding aesthetic encounters as existing throughout the micro and macro scales of human and nonhuman worlding, which challenges the Western anthropocentric tradition that attributes aesthetics typically to human cognition (Dixon et al., 2012; Rousell and Cutter-McKenzie-Knowles, 2020). Aesthetic encounters perform shifting expressions of sounds, smells, flavors, lights, shadows, textures, temperatures, and motions, conveying what happens sensuously within and between encountering more-than-human materialities (Bennett, 2010; Deleuze and Guattari, 1987; Malone, 2019; Renlund et al., 2022b). Furthermore, aesthetic encounters bear the potential for children, researchers, and all humans to sense and grasp their embodied relationality and situatedness within the world (Bennett, 2010; Neimanis, 2017; Rose, 2017). Such an approach to aesthetics acknowledges material movements and sensuous relating as essential to the boundless nature of inquiry and pedagogy (Holbrook and Pourchier, 2014; Rousell et al., 2020). Thus, by child–environment–researcher

aesthetic encounters, we refer to how children, environments and researchers became entwined through various sensuously infused encounters during our inquiry.

Beyond approaching aesthetic encounters as essential for more-than-human relationality, our research is also motivated by the potential of aesthetics for change and transformation. Following Tsing's (2020), Springgay's (2018), and Pacini-Ketchabaw's (2013) theorizations of friction, we understand aesthetics as the coming together of social, material, digital and cultural forces that can simultaneously attract and repel (Renlund et al., 2022b). For movement and change to occur, matter and bodies with different degrees of affective intensities must come together, creating aesthetic friction (Hickey-Moody, 2013; Hoogland, 2014; Springgay, 2018). Thus, rather than understanding attraction and repulsion as binary forces, we approach them through the concept of friction and with relational terms as entwined and mutually created (Renlund et al., 2022b; Hoogland, 2014; Springgay, 2018; Tsing, 2020). This approach complicates the notion of the beautiful and adverse as opposite and static, aiming instead to recognize how aesthetic encounters as deterritorializing phenomena vibrate, push, and pull within child–environment–researcher assemblages.

Acknowledging that the aesthetic agency of matter and bodies varies across shifting temporal, social, material, digital and cultural assemblages of children, researchers and environments raises practical and ethical questions of the role of aesthetics in education (Bennett, 2010; Deleuze and Guattari, 1987). As Hickey-Moody (2013) suggests, recognizing the affective power of aesthetic agencies can be "a starting place from which we can develop methods that have an awareness of the politics of aesthetics: methods that respond with sensitivity to aesthetic influences" (79). Thus, the notion of humans as interlaced with and becoming aesthetically affected within transforming environments (Bennett, 2010; Neimanis, 2017) has guided our explorations of child–environment– researcher aesthetic encounters, as well as our understanding of ourselves as researchers within the processes of inquiry.

A web of rhizomatic middles

Like numerous post-qualitative scholars before us working and thinking through artistic and embodied practices, we understand our process of inquiry as fluid and extended over time and space in ways that go beyond our perception and grasp (Higgins et al., 2017; Irwin et al., 2006; Lasczik et al., 2022; Rousell, 2021; Springgay, 2018). Thus, we regard our methodological approach as arising from the interplays of unfolding life threads that intertwine academic and artistic knowledge. Deleuze and Guattari (1987) describe how becoming takes place through rhizomatic connections in between and within embodiments of matter, spaces, forces, and thoughts, along with how this connective mattering creates assemblages and worlds. This relates to Higgins et al.'s (2017) theorizing of "patchworking" as a "figuration to explain the work we do in moving toward methodology as plural and productive" (18).

Rhizomatic movements always emerge in the middle, without starting or ending points, and as post-committed researchers, we acknowledge ourselves as "part of a Deleuzian research assemblage; a complex web of objects, bodies, intensities that connect momentarily to generate something new" (Higgins et al., 2017: 22). As such, post-qualitative and artistically grounded

thinking and analyzing become the fabrications of gathering, combining, and shaping scraps, threads, and pieces into new and shifting constellations (Holbrook and Pourchier, 2014). This relates to how we view the rhizomatic patchworks as a web of rhizomatic middles, involving threads and pieces of children's stories combined with posthuman theoretical musings, our own material and digital sensing and thinking in forests and parks, and our backgrounds in art, design, and education. Deleuze and Guattari (1987) describe patchworks as "an amorphous collection of juxtaposed pieces that can be joined together in an infinite number of ways" (476). In our inquiry we recognize the rhizomatic unfolding and performative power of the patchworks: how they do not merely manifest the end products of visual-textual images but rather involve an ongoing coiling and stitching of narrative patches, growing from the coming together of multiple material and digital threads.

Theory–practice assemblages through ethnographic fieldwork and digital artmaking

Part of our inquiry is ethnographic fieldwork in a Finnish primary school conducted just before the COVID-19 pandemic in autumn 2019 and early spring 2020. Sixty-two children aged 7–9 years old attended a four-month long, cross-curricular project that combined environmental, literacy, and arts education. Two digital storying workshops were held as part of this project, inviting the children to story about their local forest and outdoor environments using an augmented reality application called MyARJulle. The app introduces children to myths related to forest elves, inviting them to immerse a visual rendering of an elf character in their surroundings, to take photographs, and to imagine stories for their created images. As part of the workshops, the researchers gathered with the children in small groups to discuss the children's stories and their experiences and thoughts related to places and atmospheres of the local outdoors. These workshops allowed the children to tell their everyday environmental experiences, inspirations, pleasures, and worries (see also Byman et al., 2022; Kumpulainen et al., 2020, 2021; Renlund et al., 2022a; 2022b). We approach storying, including storytelling and story crafting, as an arts-based and sensuously rich practice that occurs through encounters of human and more-than-human agencies (Facer, 2019; Haraway, 2016; Phillips and Bunda, 2018). This rhizomatic approach provides researchers and participants with a means to experience, imagine and express new perspectives to more-than-human relationalities through nonlinear and unconventional rhythms, motions, and frames (Hickey-Moody, 2013; Hoogland, 2014; Lorimer, 2013).

In our attempts to explore the aesthetic encounters of children and environments materially and digitally we worked and thought with the storying that sprung from the workshops (Renlund et al., 2022b). Practically, this meant immersing ourselves in video recordings and transcripts from the workshops and allowing them to affect our relating with environments through embodied sensing, photographing with mobile devices, painting, and digital image creation. Some of the narrative threads in the children's storying created an uneasiness that lingered with us and inspired further and deeper inquiry through the rhizomatic patchworks. This creative probing resulted in a mingling of our digital artmaking with the aesthetic dimensions of children's storying and environments, creating the child–environment–researcher aesthetic encounters that we examine in this study. As Deleuze points out, "Something in the world forces us to think" (1968/1994: 139). The children's storying forced us to both think about and sense aesthetics differently and

from new perspectives. Thus, we moved beyond the idea of data and narration as representation (Mazzei and Jackson, 2017) and engaged with the storying events from our ethnographic fieldwork as more-than-representational openings (Lorimer, 2013). Ulmer (2017) writes that "nonrepresentation is not an end-run around method but offers a way of intertwining theory with methodological thinking to produce something different, something generative, and something wildly imaginative" (839).

Rhizomatic patchworks in motion

Next, we create and think with the rhizomatic patchworks through the storying of two children called Simon and Mauno. In our previous study, these children's storying challenged our preconceived notions of aesthetics, children, and environments (Renlund et al., 2022b). Now our focus turns to how the rhizomatic patchworks process entwined the children's storying with our, the researchers' theoretical and artistic experimenting through material and digital modes and what ethical challenges and potentials emerged. Thus, we reshape the visual-textual fabric of our previous work and continue to develop our thinking and thread new pieces through and into the rhizomatic patchworks. This pushes us to explore and tune into ourselves and the children as part of sensuously rich more-than-human encounters, catching waves of inspiration and poetic insights leading us to unplanned and unexpected paths.

We present our engagement with Simon's and Mauno's storying by zooming in on three analytic modes during our inquiry processes with the rhizomatic patchworks. First, we dig into how exploring **the concept of friction** through material sensing, photographing, and painting allowed us to recognize the diverse more-than-human agencies of aesthetic encounters. Second, we uncover how **embodying troublesome dimensions** and worries in the children's storying guided us to linger with awkward aesthetic dimensions, while we further discuss the emplaced, sensorial, and empathetic potentials of aesthetic encounters to provoke change across more-than-human worlds. Finally, we turn our attention to how **digital artmaking** played an important part in the unfolding of the patchworks, interlacing digital and material modes of engagement and amplifying our awareness of the performative and elastic potentials of arts-based methodologies. Through this stitching and piecing together, we aim to pinpoint certain practices in our rhizomatic approach that carry potency for deepening the researcher's entwinement with and attentiveness toward the aesthetic dimension within research assemblages. To produce fragments from our rhizomatic approach, we present both visual-textual manifestations of the patchworks and include descriptive captions from our processes of working with the patchworks.

Finding friction through embodied sensing, photographing, and painting

Our previous work shows how in Mauno's and Simon's storying about their local forest and outdoor environments the varying aesthetic agencies of matter and bodies, like abandoned things, snow, mud, cliffs, and special places, expressed sensations of adventure, enchantment, beauty, and fear (Renlund et al., 2022b). These narrative threads (Figure 1) persistently appealed to our curiosity and suggested aesthetic tensions that we could also sense in several of the other children's storying. However, a traditional humanist vocabulary does not provide expressive means for exploring the

complexities of this phenomenon. So, we engaged with posthuman scholars and found the concept of friction (Pacini-Ketchabaw, 2013; Springgay, 2018; Tsing, 2020), which resonated strongly with a sensuous intensity we had tried to grasp in the stories. We moved on to explore what friction could mean as part of aesthetics when understood as a relational and transformational phenomenon. This gave us an alternative to traditional notions of adverse and beautiful aesthetics, guiding us to expand beyond binaries and opposites (Renlund et al., 2022b). In this paper we extend on this previous work and turn the focus to how friction, as part of the analytic process, entered our (the researchers') material and digital relating with the children's stories and with environments.

Figure 1. A patchwork stitching together Simon's and Mauno's storying, the concept of friction and the researchers' engagement with mud and cliffs

When thinking with the concept of friction through the patchworks, one mode of engagement that emerged as significant was the aesthetics of material phenomena, such as snow, mud, cliffs, plants, and garbage, present in the children's stories. The narrative threads from Simon's storying about mud and Mauno's storying about cliffs (Figure 1) provoked us to immerse ourselves with these material substances through embodied sensing, photographing, and painting. When asked by a researcher if he is a nature child Simon responded that he was a 'terrain child' and described how he enjoyed mud and dirt when biking in the challenging forest terrain with his friends. In Simon's response we could sense a tension between socially and culturally expected conceptions of 'beautiful nature' and the notion of finding pleasure in something like mud. This challenged our own preconceived notions of mud as unattractive and invited us to engage differently with how

the nuances of mud could feel, smell, and look like. Thus, mud became attractive and desirable, while simultaneously holding the potential for repelling tendencies. Furthermore, Mauno's descriptions of ancient cliff formations in his local forest and how these cliffs made him contemplate material change and the passing of time raised questions of the temporality and transformation of aesthetic agencies through friction, which we wanted to explore by engaging with cliffs. Thus, aesthetic friction became an active and discomposing force in our inquiry that prompted experimental contemplation. These captions show how our own material and digital engagement with substances and environments interlaced with the mutual becomings of children, mud, and cliffs as aesthetic and relational:

> *The day was humid, and the grounds were very wet because of the morning rain. While biking to do grocery shopping, I was thinking about Simon's storying about mud. On my way, I saw some wet brown substance ahead on the biking path near a small stream. The soil had mixed with the morning rain, creating a slippery, thick goo that covered some yellow-red maple leaves and traced the patterned footprints of many walking by. I approached the mud and could sense the slippery sticky substance squish and slurp under my weight when I crouched to take some photos with my mobile phone, expecting the mud to smudge my shoes like it did with the leaves.*

> *I wet my paintbrush until it was soaked and moved it to the palette of watercolors. I let the brush dip into the red, blue, and yellow, mixing all the colors together until they became brown and murky, letting the paint drip onto the paper. I played around with different hues of murk, sloshing the brush into growing puddles. The puddles looked and felt a lot like mud, shifting in lustrous nuances of darkness and earthiness.*

> *Inspired by Mauno's storying about cliff formations, I started to wander around in the nearby woods and hills at my cottage to photograph and document cliffs. The cottage is situated in the Finnish archipelago and is surrounded by smooth cliffs with little vegetation. I became aware that millions of years of ice, sand, rocks, and water, shaping each other and making forms and patterns emerge on the surface of the cliffs. Letting myself become sensuously moved by the cliff formations and letting them lead the walk provoked me to zoom in and explore the placement, shapes, textures, light, and colors of the gritty surface with immersed and careful attention.*

Deleuze (1970/1988), suggests that "one never commences; one never has a tabula rasa; one slips in, enters in the middle; one takes up or lays down rhythms" (as cited by St. Pierre, 2019: 12). "Slipping in" and becoming muddy and gritty helped us immerse ourselves with the children's stories of becoming attracted to and playing with mud and cliffs. By physically engaging with materials and places, as well as photographing and painting them, we burrowed into the humid, slippery, earthy, smelly, sticky, dripping substance of mud and the textured, gritty, cool, weighty, smooth, hard substance of cliffs. As Malone puts it, "sensual knowing emerges as the means for making sense of things in the act of sensing" (2019: 4). Thus, friction not only became a concept to think with, but a concept to sense and experiment with through our artmaking processes (Springgay, 2018). As we later describe, this sensing and experimenting continued in our digital image creation, when the children's stories, our theoretical musings, photographs, and paintings visually entwined.

Through our material and digital engagement with friction, we became aware of the conditions that bring about mud and cliff formations, including how these materials work together through

transforming assemblages and varying temporalities. The aesthetic potency of mud and cliffs did not reside within the materials or within us; rather, it emerged through the frictional and productive coming together of several agencies; involving centuries of material substances creatively mingling, ours and the children's particular spatio-temporal engagement, the dynamic possibilities of digital devices, as well as lingering stories and experiences (Springgay, 2018). These materials and ideas did not merge smoothly or effortlessly; rather, encountered in abrading and provoking ways, and they stimulated our curiosity and attentiveness, opening opportunities for change. In this way, our patchwork in figure 1 explores how the artistic processes of the rhizomatic patchworks made us aware of the aesthetic potentials of mud and cliffs to leave residues and provoke varying kinds of engagement and movement. This challenged us to recognize the potential of child–mud–researcher aesthetic encounters to arouse experimental joy and perform a blurring of material boundaries. While the child–rock–researcher aesthetic encounters invited engagement in slow transformations that span centuries and challenged both the children and us to recognize movement and change in seemingly stable and constant formations.

Thus, with a posthuman perspective to friction and aesthetics, we can gain a sense of aesthetic dimensions as multi-agentic, performative, and dynamic, recognizing friction as essential to how aesthetic dimensions form, move, and change within the comingling of matter, digital technology, and stories in educational and research assemblages. This further prompts social and political questions of how diverse aesthetic agencies are performed and how their hues and vibrations affect environmental education and research with children. With post-qualitative artistic approaches, we can attempt to recognize the embodied and sensuous situatedness of children and their life-worlds, and the constant social, political, digital, and material flux of this situatedness (Neimanis, 2017). This however inevitably means messy inter-weavings with our own (be it researchers or educators) embodied and sensuous situatedness.

Embodying the trouble

While friction emerged as a way for us to tune into and explore the productive entwinement of attracting and repelling dimensions in aesthetic encounters, some of the children's stories also raised questions about ethical concerns and troubles related to aesthetics. Such stories about discordant and troublesome dimensions of the local forest seemed to flourish during the storying workshops, often emerging from bewildering combinations of becoming enchanted with the environment, while worrying about the well-being of animals or plants or about the effects of garbage and pollution (Renlund et al., 2022b). The following patchwork (Figure 2) shows how our digital artmaking entwined with the narrative threads from Simon's and Mauno's storying, which provoked us to linger with awkward and troubling aesthetics.
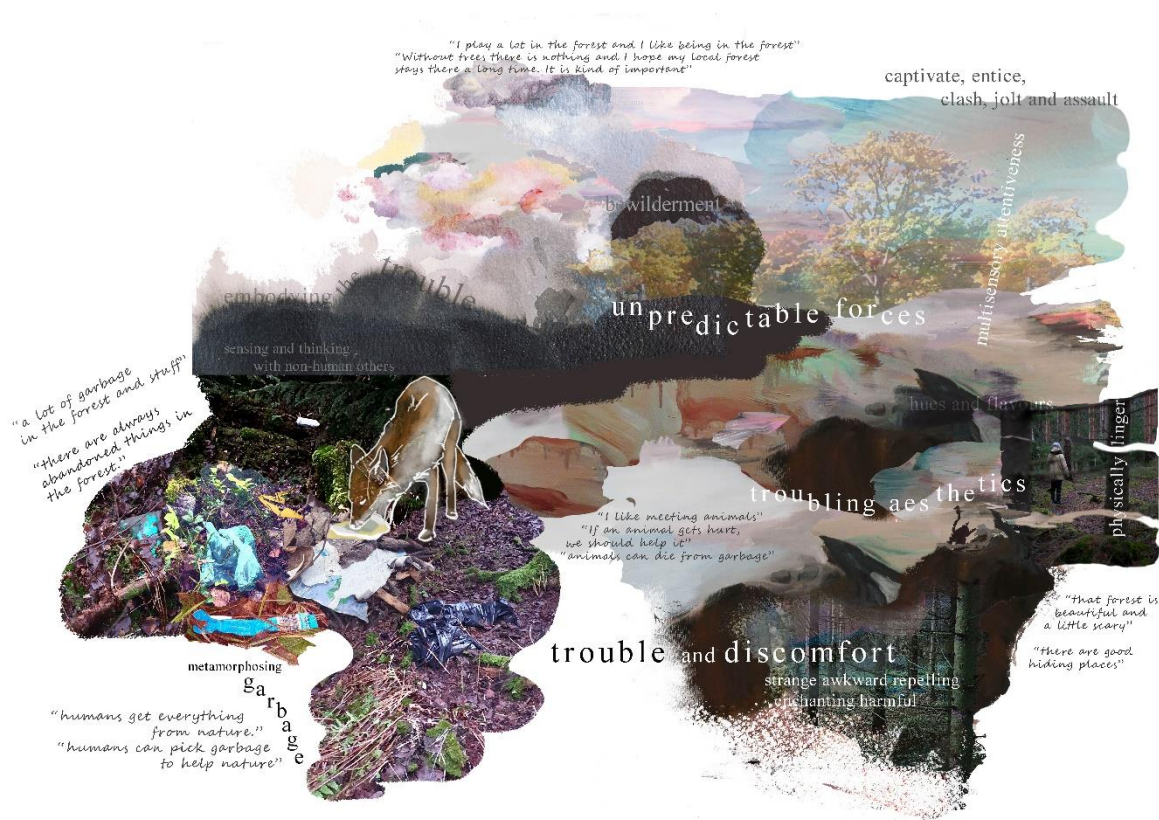
Figure 2. A patchwork piecing together Simon's and Mauno's storying about and the researchers' engagement with awkward and troubling aesthetics.

In Simon's and Mauno's storying, the forest became a multi-species site for animals, trees, cliffs, hiding places, old war bunkers, abandoned things, garbage, and humans, which came together with simultaneously enchanting and harmful potentials (Renlund et al., 2022b). For instance, Simon described abandoned things in the forest as exciting and enjoyable to play with, while also expressing a worry that animals might choke on garbage. We strived to engage with these narrative threads through a multisensory attentiveness, creating an embodied resonance toward the children's stories and the nonhuman agencies that evoked them (Springgay, 2018). In Simon's and Mauno's storying, we recognized crossings toward sensing and imagining the world from nonhuman perspectives; these ventures were not innocent or harmonious but instead involved alluring and disturbing intensities that became tangled in messy assemblages, diffusing the boundaries between the beautiful and adverse (Renlund et al., 2022b). We were inspired to follow these stories by going into forests and parks and sensing and thinking with nonhuman others, as described in the following caption:

> *As I was walking in the forest on a dank and gray winter day, the familiar place became different through fragments from the children's narrations and the written words of the scholars I was reading. The air was filled with a cold drizzle and a compound scent of dirt and pine trees. I moved to touch and photograph cliffs, moss, and trees, trying to relate to the hues and flavors in the stories that accompanied my walk. My*

> *musings were abruptly jarred by the sight of a plastic bottle partly covered by moss. When I looked around, I could see more garbage that, over time, seemed to have merged with the forest floor. There were plastic bags peeking out from the underbrush, a tin can disguised in a rusted green shade, and a cracked piece of cement with metal rods pretending to be part of the bushes covering it. My first inclination was to leave the place, but the children's narrations prompted me to move closer and engage with the garbage. Resolved to explore the friction of both attracting and repelling aesthetics, I lingered, sensed the intermingling of materials, the play of light and shadows, and imagined the stories of this place. With my mobile phone I took pictures of the metamorphosing garbage, which made me think of Bennett's (2010) description of how her encounter with a constellation of garbage and a dead rat covered in pollen had started to shimmer.*

Haraway's (2016) call for "staying with the trouble" combined with Springgay's (2018) suggestion for felt and corporeal research inspired us to embody this trouble. Embodying trouble during our analytic engagement with the children's stories meant becoming sensuously attuned to aesthetic qualities that felt awkward or ethically challenging. By letting ourselves physically linger with, photograph, and artistically engage with troubling aesthetics, we could explore our local environments anew, hence striving to grasp the challenges of unruly aesthetic dimensions. Guttorm et al. (2016) write about the potentials of compassionate research and pedagogies, where affects and embodied knowing take center stage. This kind of embodied engagement prompted us to relate empathetically with matter in unfamiliar ways (Lorimer, 2014), recognizing the entwined repelling and attracting potency of disagreeable others, such as garbage and pollution, to simultaneously captivate, entice, clash, jolt, and assault.

Thus, aesthetics materialized as an unpredictable force, with the potential for provoking bewilderment and anxiety, as well as for eliciting curiosity and empathy for human and nonhuman others (Kumpulainen et al., 2021; Renlund et al., 2022b). Through an aching twist this also made us aware of the ethical contradictions in our analytic processes; how the agencies of digital technologies that offer creative and dynamic modes of engagement in our research, on a global scale cause serious environmental and social damage through production and as future waste. Things that shimmer can simultaneously feel uncomfortable and ooze of trouble and adversity (Bennett, 2010; Rose, 2017). While we might not have any easy solutions, embodying this trouble through sensuous and artistic engagement can be one path for becoming more responsive to the shifting and problematic aesthetic agencies of different technologies and matter within environmental education and research (Lemieux and Thériault, 2021). Like Neimanis (2017) writes "posthuman ethics may depend upon pushing against the borders of comfort" (17). Furthermore, we suggest that this kind of pushing toward the uncomfortable, enables empathetic ways of taking the worries, fears, and contradictions in children's stories seriously, making it possible to recognize children's varying and unequal possibilities to affect and become affected in our ecologically challenged times.

Exploring material and temporal elasticity through digital artmaking

A material and temporal elasticity traveled into our analytic thinking with the children's storying because we let them provoke us to engage with the aesthetics of matter and environments through digital artmaking. We brought our engagement with the children's stories into virtual spaces by

digitally piecing together images and words in the patchworks (see Figure 3). Our theoretical, material, and digital engagement with the children's storying developed through recursive shifts between these different modes throughout the inquiry. Renlund's experience as a visual artist and Wong's experience as a designer made working with a range of artistic means and image editing software easily accessible. Nonetheless, the collaborative processes of the rhizomatic patchworks offered all of us ways to combine our creativity and to find new ways of combining digital and material modes, challenging us to go beyond our habitual ways of analysis. Furthermore, because of the global pandemic, virtual and digital co-stitching events across countries and continents became vital for our team's shared thinking. In this way the rhizomatic patchworks is an example of how posthuman and post-qualitative approaches allow researchers to take on unruly collaborations across diverse materials, expertise and knowledge, giving them room to enter rich configurations of creative practices (Lemieux and Thériault, 2021).

Figure 3. A patchwork engaging with our digital image creation

Compelling functions of digital image creation that became important agencies in piecing together the patchworks were working with adaptable layers, applying filters, and transforming the sizes and positioning of shapes. These functions provided the opportunity to revisit and rearrange previous constellations of the visual design, creating a temporal dynamic and elasticity that allowed for open-ended playfulness and experimentation across our past and present visual thinking

(Peppler et al, 2020; Sintonen, 2020). The next caption gives a glimpse into how digital dimensions could become intertwined with our analytical processes:

> *Pieces of images and text are moving across the screen, changing form, color, and placement as we work with multiple layers in an image editing application. Our shared thinking and the digital manifestation of the patchwork are simultaneously transforming. While we look at our screens and growing patchwork, we can also see the computer cameras' transmissions of ourselves floating at the corner of the screen. Our faces are like breathing, talking, and mimicking patches in the patchwork. We laugh, argue, provoke each other, become frustrated and inspired. We zoom in, and the whole screen becomes a colored texture; we zoom out, and we can see the visual constellation from afar. There is a dynamic playfulness in our visual experimentations. At times, someone's computer does not want to cooperate, and we need to change who shares the screen. Other times, the internet connection is poor, creating cracked and frozen moments in the conversation followed by a sped-up version of what was said.*

When working with Simon's and Mauno's storying via visual, verbal, and textual dialoguing through digital means, the combination of material attunement and digital artmaking practices made it possible to move beyond representational reasoning with data to approach thinking and analyzing as temporally and materially malleable processes that perform knowledge, stories, and worlds through complex assemblages (Hickey-Moody, 2013; Lascik et al., 2022; Sinquefield-Kangas et al., 2022). Like Dixon et al. (2012), we follow Deleuze and Guattari's (1987) notion of art as more-than-human expressions of rhythms and motions that create territories and qualities. Additionally, Hoogland (2014) interprets Deleuze's idea of art as an encounter where things, people, ideas, and matter come together and produce something that is both outside and in between, both strange and familiar, to those who take part in its creation. Thus, the rhizomatic patchworks became an expressive domain that continued and transformed the children's stories by knotting them together with our thinking and experimenting and with the multiple human and nonhuman agencies that entwined with our digital and material explorations (Deleuze and Guattari, 1987; Hoogland, 2014). This coming together of sensuous material engagement and digital artmaking allowed for digging into the fibers of theories and to experiment playfully with the multisensory and multitemporal ways in which matter can aesthetically move and affect across moments and centuries within child–environment–researcher assemblages (Bennett, 2010; Malone, 2019; Renlund et al., 2022b; Rose, 2017).

Hoogland (2014) writes about the significance in troubled times to create something in our encounters with the world, rather than to box in or diminish phenomena, and how the adventurousness of art "may offer us such 'screens' as enable the freedom to feel differently, to experience anew" (180). Similarly, Swanstrom (2016) suggests that facts are not enough to evoke environmental action and that aesthetic encounters are needed. When research is combined with the experimental and expressive functions of art a performative, affective and open-ended attitude enters knowledge production. We hope that the visual manifestations of the rhizomatic patchworks would carry expressive and provocative functions that are similar to digital art (Swanstrom, 2016). That might nudge readers into aesthetic encounters with the children's stories, with our analytic processes and with environments, which then hopefully would continue to flourish in other assemblages (Lemieux and Thériault, 2021). Our effort with the patchworks is "to re-orient thought to experiment and create new forms of thought" (St. Pierre, 2021: 163).

However, this raises questions about the tensions between the elasticity and uncontrollability of creative work (Hoogland, 2014; Haraway, 2016); what agency do our patchworks carry? what do they bring into or perform in the world? and how far do our social, material, and technological response-abilities as researchers, educators and artists extend?

Future directions for rhizomatic patchworks

In the current paper, we have sought to examine how posthuman and post-qualitative approaches, such as rhizomatic patchworks, can offer new material and digital avenues for inquiring about the aesthetics of children's storying and environments by becoming experimentally and creatively entwined with them. Because aesthetics is a vital part of relating and responding to environments, it becomes crucial to give more attention to aesthetic dimensions in ecologically concerned environmental research and education (Iared et al., 2016). Aesthetic relating through sensory and embodied attentiveness can promote a sense of kinship across human and nonhuman worlding (Bennett, 2010; Haraway, 2016; Malone, 2019; Rose, 2017). Additionally, acknowledging the complexities and frictions of aesthetic dimensions becomes significant when inquiring into twenty-first century children's lifeworlds, which are increasingly defined by environmental transformations and challenges (Renlund et al., 2022b; Rousell and Williams, 2020). We hold that the dominant anthropocentric approaches in research and education cannot sufficiently address the aesthetic qualities of social, material, and technological worlds (Rousell and Williams, 2020; Hickey-Moody, 2013). As a response, we suggest that the rhizomatic patchworks approach offers a valuable means to explore the nuances of more-than-human phenomena, such as aesthetic encounters in environmental education and research, by creating child–environment–researcher aesthetic encounters.

First, we wish to acknowledge the impossible task of grasping the methodological practices of inquiry to write about them. There is a vibratory richness to inquiry that weaves together myriad threads of matter and life with the fabric of researching some named phenomenon (Higgins et al., 2017; Holbrook and Pourchier, 2014). These threads carry with them stories from other assemblages, moving through and with the inquiry, shifting form, multiplying, and vibrating toward yet other assemblages. We cannot make these processes static to retrace them, and we should not reduce or distort them to make methodological models of them (St. Pierre, 2021). Nevertheless, we have sought to follow fragments of our processes of inquiry through rhizomatic patchworks so that we might examine some productive and creative modes to engage with the social, material, and digital configurations of aesthetics, children, and environments.

When thinking with and about the rhizomatic patchworks, the materialization of the concept of friction—as well as aesthetically relating with and embodying narrative threads from the children's storying through our own experimenting, imagining, and expressing across materials and digital technologies—emerged as significant for us as researchers. Inquiry through the patchworks meant that we intentionally became part of the unfolding fibers of the children's storying and through digital art making continued the stories with a focus on aesthetic encounters. Our paper shows how the rhizomatic patchworks approach disrupts linear notions of time and matter and sets unexpected connections in motion that complicate the roles and agencies of both human and

nonhuman research participants. Here, aesthetics emerges across events and modes of children's storying and the researchers' experimenting and digital artmaking practices, allowing us to engage in tension-laden and complex intersections of children, researchers, and environments. The children's stories set forth sensuously rich and aesthetically frictional and troubling encounters with matter, plants, devices, animals, places, pollution, garbage, and other humans. Engaging with these encounters through the rhizomatic patchworks made us attentive to the various ways aesthetic dimensions affected the children's and our own relating with local environments.

Approaching children's storying as something that moves us corporeally and theoretically and acknowledging more-than-human aesthetic agencies as performative within the creation of the rhizomatic patchworks, irks ethical discussions related to agency within storying and arts-based methodologies, raising questions of whose stories are being created and what these stories can and will become (Mazzei and Jackson, 2017; Springgay, 2018). What happens to research practices and participants when we acknowledge the agentic multiplicities of data and the complex, troubling and contradictory aesthetic potentials of these agencies? The shift from seeing narrations as representing the ideas and thoughts of individual humans to understanding them as multi-agentic forces that move and transform requires new ethical considerations and response-abilities (Lemieux and Thériault, 2021; Mazzei and Jackson, 2017). It challenges us to recognize that as researchers, we always write ourselves into the research and that the research becomes part of rewriting us and of creating new more-than-human assemblages. We cannot say where the inquiry or our methodological approaches start or end; they travel and transform through and with our and others' ceaseless attempts to sense and learn.

Consequently, rhizomatic patchworks do not necessarily form coherent, well-structured stories or follow specific methods and designs. However, the rhizomatic unruliness of patchworks provides opportunities to engage with and create something beyond the expected (Deleuze and Guattari, 1987). The creative dispositions and multiplicities of engagement through the rhizomatic patchworks set in motion what Guttorm et al. (2016) call 'pluralities of knowing,' grounded in material and digital exploration that entwine with theoretical augmentation. By artistically threading together seemingly disparate elements and modalities of thought and experience (Springgay, 2018), the rhizomatic patchworks generated creative reverberations that became essential to approaching aesthetics differently. This corresponds well with the need for ecologically engaged research and practices to not only "re-present what is already there" (Hoogland 2014: 69), but also to respond to their focus of investigation in considerate ways that create further response and invite readers and students into creative dialogue (Lemieux and Thériault, 2021; Rousell, 2021). According to Rousell (2021), this kind of creative inquiry can be evoked through ethical and aesthetic commitments to do experimental work that combines "alternative forms of social life and inquiry" (581). Because of the experimentative nature of post-qualitative and artistic approaches, each scholar and project will invent their own figurations, modes, and techniques to engage with within research assemblages. For us, the rhizomatic patchworks will also take on new forms and qualities in our ongoing inquiries. One future direction for rhizomatic patchworks would be to make the process more inclusive of children's creative agencies throughout the analytic and digital artmaking practices.

Nevertheless, the rhizomatic patchworks approach suggests some productive modes of engagement for posthuman and post-qualitative inquiry that can help disrupt and reconsider the patterns and ways of experimenting and learning within educational research (Hickey-Moody, 2013; Peppler et al., 2020). Hence, we offer a list of playful provocations for researchers who wish to follow rhizomatic and patchy experiments of inquiry:

- Engage with concepts sensuously through entwined material and digital modes.
- Embody trouble and awkwardness, pushing toward the uncomfortable.
- Find temporally, materially, and digitally dynamic processes that potentiate playfulness and experimentation.
- Let your experiments manifest into artistic expressions to provoke readers' further engagement.

Following these modes of inquiry can offer researchers and educators creative and sensuous ways to engage with the hues, tonalities, and vibrations of phenomena such as aesthetic encounters, opening vistas to perform resonances that hopefully provoke further attentiveness and curiosity toward the complex more-than-human becoming of ecological worlds.

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Conflicts of interest

The authors declare that this research was conducted in the absence of any commercial or financial relationships that could be construed as potential conflicts of interest.

Ethics approval statement

This study follows the ethical standards of the Finnish Advisory Board on Research on Integrity (https://www.tenk.fi) and was reviewed and approved by the Education Division of the City of Helsinki (HEL 2019-008574 T 13 02 01). Informed consent was obtained from all participants and the children's guardians. Pseudonyms were used for all participants.

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