


ARTICLE

Experimenting with Diffractive Analysis Practices While Walking-with River: Audiowalking and Micromapping

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(Received 10 May 2024; revised 01 July 2025; accepted 08 July 2025)

Abstract

This paper shares how a river-walking project in early childhood education created and experimented with two practices diffractively as an effort to do research differently. The year-long study, situated in Western Australia, explored river-child relations while walking with Derbarl Yerrigan/Swan River and was interested in decentring the human and attuning to more-than-human relations through situated practices. Using a feminist environmental framework this project took a non-representational approach to analysing data through two intra-related diffractive concepts: re-turning and re-membling. These concepts grounded the two practices, audiowalking and micromapping, and helped to shape the various forms of experimentation for a diffractive approach to analysis. Audiowalking is a practice that involved creating narrated audio recordings while walking with an intention of layering data from the present with pasts and futures. Micromapping is an embodied and performative practice that reimagined and unsettled place and space through mapping emotional encounters, river relations and the more-than-human. This paper shows how environmental education researchers, particularly those conducting place-based research, can approach research analysis diffractively to disrupt colonial ways of knowing, being and doing research through two practices that take a non-linear conceptualisation of time, embody data and research *with* worlds.

Keywords: Audiowalking; diffractive analysis; early childhood education; micromapping; re-membling; re-turning

Introduction

This paper shares how a river-walking project in early childhood education called *Walking-with Derbarl Yerrigan* created two practices that enacted the concepts of diffraction as an effort to disrupt research habits that are steeped in colonialism. The year-long research study was situated on and with Whadjuk Noongar boodjar, unceded Aboriginal Country near Boorloo (Noongar name)/Perth (colonial name) in Western Australia. I, Vanessa, am a White migrant settler to this place and acknowledge and pay my respects to Elders past and present for their longstanding connection to and caring for Noongar Country. First, this paper will discuss the issues and concerns with research practices that are rooted in settler-extractive colonial logics and how disrupting these logics is important to environmental education. Next, details about the study will be outlined before introducing diffraction and an agential realist approach and how these inform this research study's methodology. This paper will then show how two researcher-enacted practices, audiowalking and micromapping, were created and utilised as ways for gathering and analysing data diffractively. In particular, these practices were developed as ways of experimenting

with feminist science studies theorist and quantum physicist Karen Barad's (unmarked) (2014, 2017) diffractive concepts of re-turning and re-membering while walking with river. How this study enacted diffraction through audiowalking and micromapping and thinking-with the processes of each practice will demonstrate how diffractive research practices can disrupt the ways that environmentalism, or environmental research, usually reproduces colonialism. I offer insight into these two practices as possibilities for researchers to take up to reveal and disrupt their colonial habits of research that may be taken for granted.

The citational practices in this paper reflect my commitment to doing caring citational practices (Wintoneak, 2024) and are influenced by science and technologies studies scholar and founder of the *Civic Laboratory for Environmental Action Research (CLEAR)* lab Max Liboiron (Michif-settler) (2021b), independent feminist scholar of colour Sara Ahmed (2013, 2017), Indigenous feminisms and land education scholar Eve Tuck (Unangaŋ), decolonisation and urban education scholar K. Wayne Yang (unmarked), and education scholar Rubén Gaztambide-Fernández (Latinx) (2015). Briefly, caring citational practices are a way for doing research relationally, making worlds, being responsive and attending to anticolonialism and involve citing out of the norm (Wintoneak, 2024). Caring citational practices are about citing with intention, values, ethics and care, and as geographer Lauren Tynan (Pairebenne Trawlwoolway woman from Tebrakunna Country) and educator and researcher Michelle Bishop (Gamilaroi woman) (2023) explain, are relational — where scholarship is treated with care and reciprocity and acknowledged as an obligation. The in and end text citations in this paper make visible caring citational practices and relational reading practices by including introductions that include people's self-identified publicly available field(s)/discipline(s), social locations/relations to place and colonial systems (e.g., earlier, I introduced myself as a White migrant settler), and using their preferred pronouns. If this information was not available at the time of writing this paper, I have chosen to mark social locations/relations to place and colonial systems introductions as *unmarked* for those people. Liboiron (2021a, 2021b) explains how introductions are tied to ethics and obligation and highlight that while it is a common practice to introduce Indigenous authors with their nations/affiliations, settlers and White scholars are almost always left unmarked and therefore, in (not) doing so, settlers and Whiteness are re-centred as norms. These practices are about the transparency of what knowledge(s) my work thinks with and what privileges are afforded through who, what and how I choose to cite.

Disrupting colonialisms in research practices is important for consideration in environmental education as the stronghold and pervasiveness of colonialism is evident in how research data is collected, analysed and presented. This is particularly imperative to consider in settler-colonial states (e.g., Australia) where sovereignty has never been ceded by First Nations peoples. Liboiron (2021a) explains in their primer on colonialism, how the various types of colonialism (settler, extractive, internal, external) are similar in that they are each characterised by domination to keep Land available for settler goals — even when well intentioned. They further discuss how environmentalism rarely addresses colonialism and often reproduces it, in part because of the inherited colonial land relations by settler (Liboiron, 2021a). Identifying and disrupting settler-extractive colonial research habits are relevant and important for researchers to consider because of what these practices influence and perpetuate in education. Recognition of and addressing power structures in research that are linked with colonialisms is a way of shifting environmental narratives and doing research differently — towards anti-colonial research (Liboiron, 2021a).

Such research practices can include what feminist philosopher and environmental activist Val Plumwood (unmarked) (1993) identified as the hyperseparation of nature and culture so that land and waters are seen as sources of capital, extractive and exploitive methods of discovery to promote human exceptionalism and universalism, and the influence of a linear conceptualisation of time. Applying diffractive concepts to research practices takes up Tynan's (2020) invitation to embrace research as kin and move research practices beyond consumerist reproduction. In this paper, I will show how the application of re-turning and re-membering (diffractive concepts) to

the practices of audiowalking and micromapping positions researchers as entangled with data and of the world where being and doing research is situated, response-able and relational. In doing so, the practices disrupted colonial ways of knowing, being and doing research through taking a non-linear conceptualisation of time, embodying data and researching with worlds. However, orienting towards diffraction in environmental education contexts may prove to be challenging as it opposes the individualised and competitive neoliberal spaces of academia.

Transformational education scholar Shae L. Brown (unmarked), environmental educator and researcher Lisa Siegel (unmarked), and leader, educator, and researcher Simone Blom (unmarked) (2020) have written together about their interest and experience in exploring how Barad's agential realist approach and diffraction can inform environmental educators and researchers. They argue that with Barad's theories, environmental education practices and research can shift towards a focus on living and being within the responsibilities to place and all other entities. This paper expands on Brown *et al.*'s (2020) explorations of Barad's work by providing examples of practices that apply diffractive concepts to the *how* of research. The practices of audiowalking and micromapping that were created and utilised in this study are examples of gathering and analysing data as an inseparable and ongoing related process. How these practices are enacted reveal the connection and inseparability, or entanglements, of *everything*. Brown, Siegel, and Blom (2020) discusses how they use diffraction as a way of paying attention to the "overlapping ripple patterns of knowing we create together" (p. 220). Both audiowalking and micromapping are different to Brown *et al.*'s (2020) style of discussion (similar to Barad [2014, 2017] and Malone [2020]) as a way of enacting diffraction. These practices, and this paper, show how to live, be, and think as connectivity in research — as material-discursive entanglements, which Brown *et al.* (2020) ask for environmental researchers to seriously consider amongst the global issues and challenges facing Earth and its inhabitants.

The project discussed in this paper was part of a large-scale international study *Climate Action Network* (Climate Action Childhood Network 2023) led by feminist childhood scholar Veronica Pacini-Ketchabaw (unmarked) and explored ways of doing research and pedagogy that was situated with place for recuperative futures. Briefly, this feminist research was motivated by the need for ways of responding affirmatively and collectively with the climate crisis, ongoing colonialism and human exceptionalism. *Walking-with Derbarl Yerrigan* was one of sixteen research sites and was designed as a walking and water collaboratory that was informed by feminist environmental frameworks. A collaboratory is a hybrid concept of collaboration and laboratory and includes the participation and interactions children, educators, researchers and their worlds (Pacini-Ketchabaw, feminist childhood scholar Mindy Blaise (settler), & children's geographies scholar Peter Kraftl (unmarked), *in press*). Our collaboratory included Derbarl Yerrigan (Noongar name)/Swan River (colonial name), approximately 80 children aged two to five years, four educators and two researchers and involved weekly walking at a 500 m stretch of river near the childcare centre. The four educators involved in this project formed a specialised outdoor and environmental education team at the centre and regularly walked at the river with children prior to the study commencing. Children's participation in this project was made possible through both informed consent provided by their parent(s) and research attunement to children's assent during the collaboratory walks.

Derbarl Yerrigan/Swan River runs just over 200 km as a river before becoming a brackish water estuary and winding for roughly 70 km towards the Indian Ocean at Walyalup (Noongar name)/Fremantle (colonial name). Elder and Indigenous Studies scholar Len Collard (Whadjuk Noongar) (Cook, 2015) explains how Derbarl Yerrigan/Swan River is significant for Noongar people as it is central to the Waugal, or the Noongar rainbow serpent, which formed the mountain ranges, plains and waterways that make up Noongar Country, as well as the creation of moort (family relations) and kartijin (knowledge). This river is also significant to those who call Boorloo/Perth home, as it is a place of recreation, fishing, social gathering and transportation. River relations were a focus in this study and include, but are not limited to, relations with djenark (Noongar name)/silver gull (common name), wind, algal blooms, child, sewage drains, rubbish,

blowfish, shells, jellyfish and river wall. During this project, we walked with between four and ten children once a week and two to four educators. The four educators involved in this project formed a specialised outdoor and environmental education team at the centre, where they worked with children from across age groups throughout the day and week. The project was interrupted by COVID-19 restrictions and resulted in a phase of the study where I walked with Derbarl Yerrigan/Swan River by myself, which is when the two practices discussed in this paper, audiowalking and micromapping, were conceptualised and practised.

Engaging with diffraction, re-turning and re-memembering as ways for disrupting colonial research habits

In the project *Walking-with Derbarl Yerrigan*, I turned to Barad's (2007) agential realism, an epistemological-ontological-ethical framework, to inform the methodology. Importantly, agential realism is concerned with performativity over representationalism, where making knowledge is about "making specific worldly configurations" (Barad, 2007, p. 91) rather than making facts. Choosing to work with agential realism in this paper acknowledges my interest in learning how to intra-act responsibly as part of the world — that I, as researcher, am not the only active being and that that my objectivity accounts for the ongoing reconfigurations of material-discursive practices. This research study took up Barad's (2007, 2014) agential realist concept of diffraction as a way of thinking about its non-representational methodological approach. Diffraction is a lively affair that troubles dichotomies and is informed by a feminist and physics theorising about difference (Barad, 2014).

First proposed by feminist question-driven scholar Donna Haraway (White) (Haraway, 1992, 2004; Wolmark, 1999, 2011) as an alternative methodology to counter the commonly used metaphor of reflection, Barad (2007) uses quantum physics to further develop and elaborate Haraway's ideas. In this research study, diffraction was utilised as a way of disrupting the longstanding and commonplace use of reflection within research analysis in order to engage analysis practices that situated and embedded the researcher as part of the world. This is different to reflective analysis practises that often separate researchers from data, where researchers know from afar and use representation to share their findings. Barad's view of reflection is described as a practice that "look[s] for homologies and analogies between separate entities" (Barad, 2007, p. 88). Reflection is problematic for environmental education research and practice that is interested in forgoing binaries, including the nature/culture divide. So, rather than relying on reflective practices in research, particularly during data analysis, diffraction opens up other possibilities. For example, research practices that apply diffractive concepts (like audiowalking and micromapping will show in this paper) are about exploring what Barad (2007) explains as material-discursive entanglements from an ethico-onto-epistem-ological view. Therefore, practices enacted diffractively can position knowing as a material practice of engaging as part of the world and its differential becomings. To be clear, discursive practices and material phenomena are not in opposition, rather they are in mutual relation, where neither has privileged status determining the other or is reducible to the other — matter and meaning are mutually articulated (Barad, 2007). Barad's ethico-onto-epistem-ology is about appreciating the connection of ethics, knowing and being and firmly situates knowledge as being *of* the world, not *outside of* the world.

Furthermore, Barad (2007) expresses how from their agential realist approach, knowing is "not a bounded or closed practice but an ongoing performance of the world" (p. 149) that goes beyond humanist and anti-humanist conceptualisations of knowing by being about intra-activity rather than seeing from above or outside or from the human. Their framing of knowledge is appealing as a way for experimenting with analysis practices that attend to the performativity of the world's intra-activity (Barad, 2007) rather than external relationships. And, as Haraway *et al.*, (1992, 2004) suggests, diffracting composes "interference patterns" (p. 69) rather than replicating, reflecting, or

reproducing, which I am arguing for here in this paper — that diffractive analysis practices can interfere with colonial habits and colonial ways of knowing, thinking and doing research.

The research study discussed in this paper took up diffractive practices as an alternative to reflective forms of analysis, similarly to early years educator and lecturer Karen Nociti (unmarked) (2022). Through her blogging-with Place practice, Nociti (2022) enacted a diffraction, as an alternative to reflective journaling, which she explains is a common and highly encouraged educational practice. Nociti (2022) notes that Place is capitalised as an acknowledgement of Place as agentic in the making of worlds and realities. She draws on Place-Thought work of sociologist Vanessa Watts (Haudenosaunee and Anishinaabe) (2013), which accounts for land being alive and thinking and “that humans and non-humans derive agency through the extensions of these thoughts” (p. 21). Nociti (2022) explains how diffractive practices help make differences matter in place-based research, though a deliberate unlearning of reflective processes is required. She demonstrates how this is neither simple nor easy work to do through her examples of hesitating, (de)composing and unlearning time and naming practices (Nociti, 2022). This paper also acknowledges that diffractive practices are messy and effortful in their making and doing, however, are worth the effort and confronting feelings of being uncomfortable or unsure. Part of this work is to eschew White fragility from limiting what researchers can do to disrupt colonialisms entrenched in their practices. White fragility is described by critical discourse analysis and Whiteness studies academic Robin DiAngelo (White) (2018) as a process where White people respond with emotions such as anger, fear and guilt and behaviours such as argumentation, silence and withdrawal when faced with racial stress. Researchers, particularly those who identify as White (like myself), may find that a diffractive approach to research data collection and analysis is an opportunity to *practise* research in ways that are less and less accommodating of colonial ways of thinking, knowing and doing.

In the project *Walking-with Derbarl Yerrigan*, experimenting with diffractive analysis practices was centred around disrupting research habits that are linked with settler and extractive colonialisms as a way for making *different* (anticolonial) relations through analysis. This study was interested in shifting away from practices rooted in colonialisms such as relying on binaries (e.g., object/subject, nature/culture, human/nonhuman), separating practices that promote human exceptionalism, and Western conceptions of time (e.g., linear time). Diffraction, as Barad (2007) explains, “attends to specific material entanglements (p. 88) and “configurations of the world’s becoming” (p. 91), which supports this study’s effort in shifting analysis practices from reflecting *on* the world from the outside towards analysis as *within and as a part of worlds*. Anchoring analysis methods as diffractive meant that data in this project was viewed as performative — where subject and object are not separate and do not pre-exist each other, but instead emerge through intra-actions. Intra-action is explained by Barad (2007) as recognising that distinct agencies do not precede, but rather emerge through their intra-action, also phrased as cutting together-apart (Barad, 2014). The temporality of intra-actions recognises that time has a history, that what comes to matter is re(con)figured in the making and/or marking of time (Barad, 2007). Diffractive analysis practices also require engaging *as part of* the world and making visible the liveliness of the world through attention to fine details. Relying on these diffractive cornerstones from Barad (2007), I, the researcher, was able to *think, do, and be* data and analysis practices otherwise by experimenting with two of Barad’s (2014, 2017) diffractive concepts: re-turning and re-memembering.

Re-turning is not reflection or returning by “going back to a past that was” (Barad, 2014, p. 168), but rather a way for turning an encounter over and over again without closure or being finished. The hyphen is used by Barad (2014) to signify this difference and situate re-turning as a multiplicity of process and a mode of intra-acting with diffraction. Re-turning in this study was about bringing data together over and over again as a means of continual reconfiguring or iteratively creating new diffractive patterns (Barad, 2014). As a notion for analysis, re-turning is quite different from normative analysis practices which demand closure through findings and

results that can then be used as evidence for progress and development (tied to capitalism and colonial efforts). Posthuman child studies scholar Karin Murris (unmarked) and curriculum studies scholar Weili Zhao (unmarked) (2022) concisely provide three things that Barad's re-turning pays attention to: illuminating differences; showing how insights came about; and showing what was excluded, how this matters, and to whom. Taking these things into an analysis practice provides a dynamic multiplicity for working with data as lively entanglements of more-than-human worlds. They also help to make analysis practices transparent, which is related to accountability and Barad's (2007) ethico-onto-epistemology.

Re-membering is an embodied practice of re-turning, where one materially reconfigures encounters to account for history, memory and politics (Barad, 2017). Again, the hyphen is used by Barad (2017) to differentiate between remembering as a practice of going back to a past that was and re-membering as an embodied practice that is a material reconfiguring of spacetime-mattering. Spacetime-mattering is a neologism of Barad's (2012a) that entangles space, time and matter together — where matter is not an individual entity in a separate place and moment in time, but instead phenomena are entanglements (material-discursive intra-actions) of spacetime-mattering *and* that entanglements are enfoldings of spacetime-matterings. Barad (2017) suggests that re-membering can be used to trace entanglements of the legacies of colonialism and produce openings and new possible histories and is an integral part of re-turning — therefore not a stand-alone concept. Essentially, these two concepts are re-membering what one re-returns, and the hyphens in both re-turning and re-membering signify that these concepts are response-able to the tangles of spacetime-matterings and are accountable to colonial erasures and avoidances (Barad, 2014, 2017). The diffractive concepts of re-turning and re-membering were applied to two research practices developed in the study while walking with Derbarl Yerrigan/Swan River, which this paper will now introduce.

Enacting diffraction in research practices: audiowalking and micromapping

This section discusses the two research practices I developed in this study where I applied and experimented with Barad's (2014, 2017) concepts of re-turning and re-membering. Thinking with Barad's ideas in an environmental education research context provided opportunities to rethink analysis as a reflective process of what happened/what can be known by looking as separate from an "other" towards analysis as within and a part of worlds in pastspresentsfutures and inseparable from data "collection." Both audiowalking and micromapping offer environmental education researchers, particularly those researching with place, insight into how taking a diffractive approach to practice can disrupt colonial habits, such as separation. The ways in which I created and practised audiowalking and micromapping diffractively afforded me the opportunity to co-generate knowledge with river through taking a non-linear conceptualisation of time, embodying data and researching *with* worlds.

Audiowalking

Audiowalking is a practice that involved the creation of walking-narrating-listening-thinking audio recordings while walking with Derbarl Yerrigan/Swan River with an intention of enfolding data through re-turning and re-membering the present walk with collaborative walks. I gave this creative research practice the name audiowalking without a significant reason to begin with, but a firm intention of experimenting with Barad's ideas on diffraction. My interest in incorporating audio recordings with walking originated from listening to podcasts and learning theory and philosophy while walking by myself with Derbarl Yerrigan/Swan River throughout this project. For example, I listened to plant ecologist and writer Robin Wall Kimmerer (enrolled member of the Citizen Potawatomi Nation) discuss ancient technologies and relations with corn (Kimmerer, 2018), and

Donna Haraway and Anna Tsing's conversation on the limits and the possibilities of the Anthropocene (Mitman, 2019), and all eight of the WalkingLab (n.d.) podcast episodes that share about walking research-creation. Walking-listening-thinking was a regular part of my walking practices, which transformed to include narrating and making recordings myself following COVID-19 disruptions to the research project where I could no longer walk with young children as a collaboratory. I approached the walks by myself at Katamburdup/Pelican Point as experimentation with walking and research practices for working with "data" otherwise.

In this study, I deliberately chose to interrupt a traditional approach to research where there are separate research phases and data is conceptualised as being something other and outside of myself, the researcher. Audiowalking therefore, is about creating, collecting and analysing data simultaneously. The way that I use audiowalking as a diffractive practice turns data over and over again by employing Barad's (2014, 2017) concepts of re-turning and re-memembering through various components of audiowalking: recording, listening and responding, transcribing and writing and presenting. As previously mentioned, audiowalking enfolds data. Enfolding is the past and future iteratively reconfigured, where an encounter cannot be located in space and time and is instead materially entangled across different spaces and times (Barad, 2007). The method of making audio recordings while walking included river and place sounds and narration of my thinking, speculations, wonderings and memories which created openings for re-turning and re-memembering river-child encounters. These concepts are what ensured audiowalking was a diffractive analysis of research data rather than a reflective account and analysis of river-child encounters with the purpose of seeking findings, closure and being "finished."

My first experimentation with the practice of audiowalking, *Audiowalking With Derbarl Yerrigan: Memories*, took place as I walked with the familiar 500 m stretch of river we walked with as a collaboratory post COVID-19 disruptions. The particular river-child encounters that this paper focuses on from this audiowalk are about re-turning and re-memembering relations with jellyfish. The re-turning and re-memembering takes place with transcript excerpts from this audiowalk, photographs from collaboratory walks, field notes and writing from the project's research blog. The audiowalking excerpts have been lightly edited in their transcription for length to exclude speaker hesitations and disfluencies (e.g., um, ah, mmm), unless they contribute meaningfully to the audiowalk. The text in square brackets indicates sounds of Derbarl Yerrigan/Swan River that accompany the subsequent text as an effort to de-centre the human in acknowledgement of more-than-human aspects to audiowalking. The full audiowalk recording can be listened to at <https://castbox.fm/vi/616409269>.

Audiowalking with Derbarl Yerrigan: memories

Taking inspiration from Barad (2014), I will begin the re-turning and re-memembering experimentation in this paper by returning (to) the past, to the spacetime coordinate 19 August 2019 through a photograph and an audio recording 19 August 2019 (Figure 1 and QR code) from a collaboratory walk with Derbarl Yerrigan/Swan River that is dispersed and diffracted throughout this paper through multiple ways of re-turning and re-memembering. Please note that this section is indented and differently spaced to help show the experimentation.

Photograph with audio 19 August 2019

Research Blog 21 August 2019

Children were moving, holding, covering and bathing jellyfish. They were imagining and finding a home for jellyfish, a rock decorated in algae with nooks for jelly to fit in, and digging a bath for jelly to be cleaned after being sprinkled with or dropped in the sand. Though, her actual home is Derbarl Yerrigan. How might children and jellyfish be in good relation? How does this kind of play make room for good relations? (Blaise & Wintoneak, 2019).



Figure 1. Rock-child-jellyfish encounters.

Liboiron (2021b) positions being in good relation about being tied up in obligation and ways of being in the world. Thinking about children and jellyfish being in good relation with each other brings attention to dismantling human/nonhuman and nature/culture binaries in how I, the researcher, might analyse river-child encounters. Paying attention to children caressing, caring for, and playing with jellyfish is only part of this story. What if I pay attention to jellyfish?

Audiowalk 8 June 2020

[Footsteps, small rushing waves, djenark/silver gull calls]

Thick, high clouds cover the sky and a cool, light breeze is coming off Derbarl Yerrigan. Arriving today in my car to Katamburdup, also known as Pelican Point, creates an unfamiliar river greeting compared to how we arrived here as a collaboratory.

Well, today is a jellyfish day it seems! Moon jellies and Brown jellies are beached, some in water, some in-between. All of these jellyfish are inviting me to walk in the water and towards the long beach. You know, today might be about following memories.

[Light wind, people sounds, footsteps in water]

Okay, I notice that I am walking quite quickly so I might just start to slow here. Near where I am walking now reminds me of an encounter we had as a collaboratory where we were, we too were walking quickly amongst a mass of jellyfish. During that walk, as a pedagogical interruption, I slowed down my walking and I started paying attention to an individual Moon Jellyfish by taking a video and following jelly.

Photograph with audio

Jellyfish-Child Movements (Figure 2 and QR code) is a way of re-turning and re-memembering a photograph with audio I Found A Jellyfish! of how jellyfish move(d) humans in the *Walking-with Derbarl Yerrigan* project. Time and time again, jellyfish pulse(d) with river inviting children and adults to swish through water to follow and avoid and find and play.



Figure 2. Jellyfish-child movements.

Audiowalk 8 June 2020

This invited children and educators to join me and I can remember children asking why I was taking a video of Moon Jelly and what Moon Jelly was doing. It felt as though children were expecting or waiting for something significant to happen to make it worthwhile to stick with this one Moon Jelly. It was challenging to not respond to children's expectations with something grand or insightful or exciting! But, I just kept following the Moon Jelly and while seemingly nothing "happened," for the remainder of our walk, jellyfish had our attention.

[Children playing, water swishing, wind]

Derbarl Yerrigan and wind are rocking Moon Jelly towards shore near the far beach. Their rhythm brings jellyfish and seagrass together at the shore and they begin to travel together against the sand. Moon Jelly is tossed over, upside down, and back, and back again. I think slowing down our walk, our walking that day was helpful for encountering jellyfish differently and today, this slowing down has invited me to think through this encounter. I don't know, maybe . . . I'm not sure if it is about thinking *through*. Maybe it is more about thinking about it again, like rethinking it?

Research Blog 21 August 2019

Derbarl Yerrigan invited a few of the girls to examine Moon Jelly jellyfish.

With the end of a feather, one child poked jellyfish, turned jellyfish, and carried jellyfish.

I asked if they thought jellyfish was dead or alive? I wasn't trying to find out their knowledge about the jellyfish, but was curious to know if they would have been handling jellyfish like this if he was alive.

I asked, "How do you know if jellyfish are alive, dead, or hurt?"

I wondered, How do children know? Why might this matter? Should it matter? (Blaise & Wintoneak, 2019).



Figure 3. Playful jellyfish-child-rock encounters.

Audiowalk 8 June 2020

[*Water lightly splashing, wind gusting*]

I suppose there was more of an openness to being near jellyfish from educators and children as our project went on. The conversation shifted from being stung by jellyfish (them being dangerous) to our affect on jellies (that perhaps we could hurt them too) and what kind of life these jellyfish live/lived with Derbarl Yerrigan. I think of how fear and danger began to lessen as we *regularly* walked with Derbarl Yerrigan. The weekly walking at a familiar place and frequent closeness to jellyfish really encouraged more playful encounters, like that time at the algae-rock. The frequency, the recurring nature of our walking practice certainly mattered to relations, or how to cultivate good relations with Derbarl Yerrigan.

Photographs

A series of photographs are shown in Figure 3 of jellyfish-child-rock play that took place during collaboratory walks. I returned to these photos to help with re-turning and re-memembering this audiowalk in the writing of this paper. Children carried and exchanged and slid jellyfish across algae-rock and tucked them into “bed” — a seemingly perfect sized hole for jellyfish blanketed with soft green algae. Jellyfish wiggled and slipped and brought children and adults together and hid still with rock and algae.

This has been an example of putting the concept of re-turning to work. While there were instances where this audiowalk could have stayed as a mere reflection of the past collaboratory walks through returning to Derbarl Yerrigan/Swan River to walk, physically walking with jellyfish again, slowing my walking pace again, thinking-with jellyfish-child and jellyfish-Vanessa encounters, and talking these out loud shifted the practice to re-turning jellyfish encounters.

The way that I practise audiowalking does what Barad (2017) explains as “understanding how the ‘new’ and the ‘old’... are diffractively threaded through and are inseparable from one another” (p. 69) by entangling spacetime coordinates (Barad, 2014). As I presently walked with Derbarl Yerrigan/Swan River by myself I was walking with deep river time and anticipated river futures. Audiowalking can also cut-together-apart (Barad, 2014) entanglements and their differentiatings, or what Barad (2017) refers to as travel hopping, through re-memembering. Practising audiowalking afforded me opportunities to re-memember with place, with more-than-humans, with memories, and with imaginings. Cutting-together-apart is about *tracing* the entanglements of spacetimemattering, which is made possible through an embodied practice of re-memembering (Barad, 2017). Audiowalking does this tracing — it is an embodied practice through

its walking-narrating-listening-thinking format. Thinking with and practising diffraction in this project invoked a discerning curiosity in myself, as researcher, and cultivated a practice of iterative questioning — which I was able to explore and express through the practice of audiowalking.

These dispositions are helpful to disrupt the entrenched and often made invisible colonial-influenced practices in research methodology and early childhood pedagogy. As Burman (2017) writes, colonial invasion and occupation initiated the rise of and enmeshment of “progress” as related to individual child development, social development and national development. Audiowalking, when approached as a diffractive practice, shifts away from notions of progress, child-centredness and objective knowledge production by thinking-with diffraction. Diffraction is about relations and entanglements and investing in a diffractive approach quickly reveals deep rooted separating practices in doing research and pedagogy.

Micromapping

Micromapping is another researcher-created practice that I experimented with in this study. It was a slow-to-emerge practice, meaning that normative cartographic ways of mapping were slowly moved away from throughout the project as I learned more about and engaged with relationality, worlding, anticolonialism and non-representationalism. It is a performative mapping practice that involves gestural mark making while walking with Derbarl Yerrigan/Swan River. This practice was inspired by young children’s drawings from the collaboratory walks and small sets of blank cards that I began carrying with me in my backpack while walking by myself with river. I considered the few times that young children drew while walking as a collaboratory and was motivated to experiment myself with how they responded to river relations with non-representational mark making.

Micromapping resists representative intentions of map making by instead being an embodied way of interpreting and (re)encountering place and river relations. It has been conceptualised alongside the scholarship of artist and academic Linda Knight’s (unmarked) (2016, 2021) inefficient mapping, which she describes as a methodological protocol for researchers to thoughtfully encounter place. Knight’s (2021) mapping practice differs from conventional map making as she employs drawing methods that counter hegemonic cartographic practices. For Knight (2016), inefficient maps are about making partial recordings of “the less mappable things of a playground” (p. 23) (e.g., leaf movements, periods of sun, rocks and stationary adults) through gestural, responsive drawings that are attentive of place. Her creative, pedagogical and political approach to mapping sparked my interest for this research project as normative mapping practices had already been established in my project, which focused primarily on human movements. Therefore, I was motivated to experiment with mapping otherwise as a way of re-encountering Derbarl Yerrigan/Swan River when walking by myself.

Margo Neale Ngawagurrawa (Aboriginal and Irish descent, from Kulin nation with Gumbaynggirr clan connections) and science writer and educator Lynne Kelly (non-Indigenous) (2020), further guided ideas around micromapping through their examples of how Aboriginal Country had long been mapped and archived before settlers arrived and began taking land through acts of colonialism. I was cognisant that through micromapping I had a choice and opportunity to challenge colonial cartographic practices and feel that I experimented with my practice of micromapping so that it centred around being a method *with* river relations rather than *about* river. I see micromapping as mapping *with* river relations, which challenges colonialisms such as separating myself from river, as a human superior to nature. This is a way of troubling the nature/culture divide in how environmental education research is done. Furthermore, micromapping is multiscalar and multitemporal. Perhaps because of its name and the small sized cards used, it could be misunderstood as being a mapping practice that attends to the microscale. However, while micromapping creates in the present, the creator experiences another scale of time through personal memories, place histories, traces and imagination as



Figure 4. Collection of micromapping practice.

micromapping takes place. The micro sized cards (2.5 cm × 8 cm), influenced the name of this practice and importantly, their size committed my attention, speed and detail to *process*, rather than an end result — as a way of encouraging mapping rather than creating a map (Figure 4).

The process of micromapping primarily involved gestural mark making using a PITT artist pen, with India ink, to express (re)encounters with Derbarl Yerrigan/Swan River. The marks are co-created between myself and card and pen and movements and water and wind and waves and bodies and shells and seagrass and djenark/silver gull and sewage drains and rain and rocks and sand and so on. Creating each micromapping was responsive to the happenings of the present, while also connecting to personal memories, collaboratory walks and imaginings for futures. Micromapping encouraged me to walk *with* Derbarl Yerrigan/Swan River rather than walk *at* or *to* the river by embodying (through mark making) movements, emotions, weathers, birds, fish, jellyfish, shells, wind, water, seagrass, etc.. Some micromapping processes include (from left to right, top to bottom Figure 5): holding pen against card as my body moved while walking with Derbarl Yerrigan/Swan River; attaching pen to string and holding other end of string to allow wind to make marks on card; pressing and rolling river shells into card; dipping card into river; rubbing sea lettuce and card together; marking movements of djenark/silver gull, blowfish, jellyfish, feathers, rubbish, waves, sea snail/*Batillaria australis*; marking imagined movements of returned blowfish and jellyfish; and remembering child-river encounters.

Furthermore, influenced by Knight's (2021) inefficient mapping, I experimented with layering micromappings with photographs, children's drawings and sound. Layering in this project is a part of mapping (rather than creating a map) by making visible the entangled and lively relations of walking-with Derbarl Yerrigan/Swan River. Layering, as Knight (2021) explains, is a way of negating mappings schematically representing place by including different modes of visualisation to show how each "piece of data" is only partial and records different phenomena. I suggest that layering micromappings with other "pieces of data" is a way of diffracting data, a practice for troubling linear time; a practice of re-turning and re-memembering with data; a practice that undoes progress as inevitable and a suggestion that the past is left behind. Layering illuminates differences productively and shakes time to its core (Barad, 2017). I liken the possibilities created through layering to Barad's (2017) discussion on the origins of the Anthropocene, where they express the absurdity of the idea that there is a single determinate origin. Instead, Barad (2017) suggests that the differing opinions on what marks the origin of the Anthropocene offers evidence that the "unilinear nature of time itself (the fact that only one moment exists at a time) is waning" (p. 57).

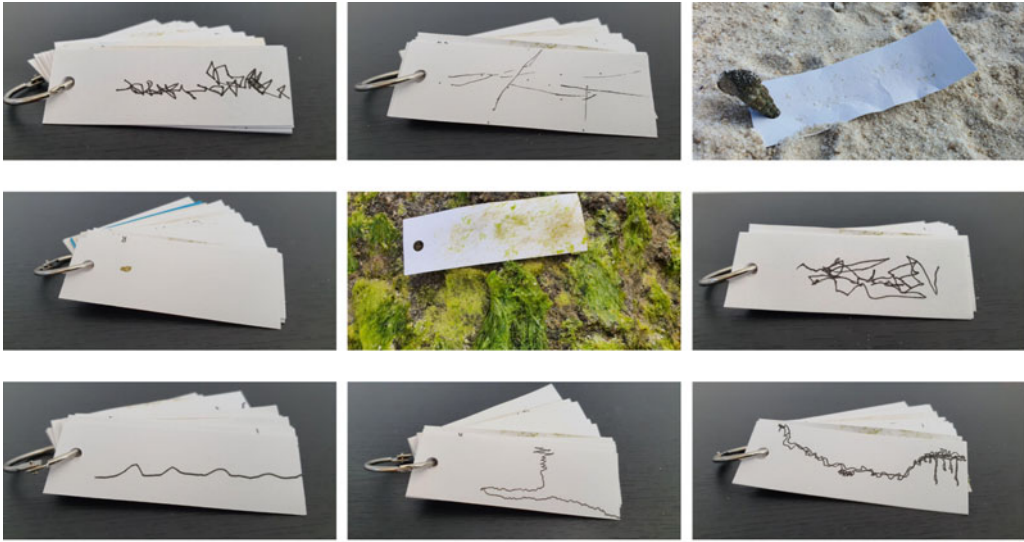


Figure 5. Micromappings of walking-with Derbarl Yerrigan/Swan River.



Figure 6. Re-turning and re-memembering with micromapping algae-jellyfish-rock.

The act of layering portrays that data is neither in the past, nor only the present, or the future. Instead, data is all of these times at once and always. The below example shows my experimentation with layering and includes brief narrations about the production, re-turning and re-memembering of this layering.

There are multiple meetings of data in the experimentation of layering with micromapping as seen in Figure 6. One layer is a photograph taken during a collaboratory walk, of an algae covered rock that invited children to play and create a home for jellyfish; another layer is a photograph of the same rock taken months later when I was walking by myself; another layer is a micromapping

created through embodying memories of the play and movements between child and jellyfish and rock during the collaborative walk; and another layer is a QR code that links to sounds of walking-with Derbarl Yerrigan entitled 20210118_jellyfishwardungDerbarlYerrigan. The process of layering each of these encounters transforms photographs, micromappings and audio recordings from being a representation of a moment (i.e., a piece of data) to moments that “come alive with each meeting” (Barad, 2007, p. 396) and helps to read these moments together rather than against (Barad, 2017) — this is diffraction in action. The photographs layered with a micromapping, layered with audio brings multiple spacetime coordinates together and leaks out of linear time (Barad, 2017). Reader interaction with the layering, specifically by using the QR code, again leaks time — shifting readers outside of the structure of this academic paper and into relation with jellyfish and river and screen and sound and multiple spacetimes.

Re-turning and re-membling through layering this example of micromapping also reveals responsibilities and accountabilities while walking-with Derbarl Yerrigan/Swan River as a group of settlers. I connect layering with feminist science and technologies scholar María Puig de la Bellacasa’s (unmarked) (2017) nonnormative approach to care. Puig de la Bellacasa (2017) explains that looking at problems and research as a matter of care is a way of shifting research from questions of “how to care more” to paying attention to moments where “the question of ‘how to care?’ is insistent but not easily answerable” (p. 7). Experimentation with layering for the practice of micromapping required me to engage in non-innocent webs of thinking-with care to help show the traces of human exceptionalism and colonial logic as river, child, jellyfish become-together through play. So, layering as a part of micromapping in this example, brings to the forefront how to care when our walking practises in this research project were *with* river rather than *at* or *to* the river. For example, it raises questions of how to care when our walking: perpetuated ongoing human disruption to estuary habitats; sometimes involved hasty bodily interference with living/dead/dying jellyfish (easily done when othering jellyfish); were reliant on engineered rock walls (and their crumbling remains) which have been constructed for reinforcing walking paths and to “protect” the foreshore from erosion (however, these hard walls have significantly contributed to the loss of beaches and vegetation resulting in loss of habitat and diverse species from Katamburdup/Pelican Point). Raising questions of how to care in an imperfect and complicated world is not to say that children should not play with jellyfish or walk with Derbarl Yerrigan/Swan River, but instead, what might we pay attention to, and how, in these playful encounters? Micromapping pays attention to lively relationalities and is a way of responding responsibly, with accountability to the specificity of histories, contexts and place. This practice is a way for environmental educators and researchers to raise, think-with and propose other ways of being in a more-than-human world.

Conclusion

This paper has brought attention to diffractive analysis and its potential possibilities for disrupting colonial research habits through two practices: audiowalking and micromapping. Environmental education researchers may find these two practices useful if interested in shifting away from reflective analysis practices, which can entrench the nature/culture binary through reflecting on the world from the outside and by relying on linear time. By taking a diffractive approach to analysis practices, researchers can disrupt colonial ways of knowing, being and doing research through taking a non-linear conceptualisation of time, embodying data and researching *with* worlds as was shown through audiowalking and micromapping.

Audiowalking is an analysis practice that involved creating narrated audio recordings while walking with place, with an intention of layering data from the present with pasts and futures. The example of audiowalking shown in this paper focused on re-turning jellyfish encounters from a year-long river-walking project situated in early childhood education. The audiowalk created new

temporalities by turning jellyfish encounters over again and again through embodied walking with place, returning to and walking with the research site and making the recording, re-encountering jellyfish, memories of jellyfish-child encounters which were re-turned with research blog excerpts, photographs and the creation of this paper. The practice of micromapping showed how performative mapping is a way of doing embodied diffractive analysis practice. Micromapping, when approached diffractively, is a form of analysis in the river-child walking project that unsettled place and space through mapping emotional encounters, river relations, and more-than-humans.

These two practices co-generated iterative ways of thinking-with data by bringing together multiple “pieces of data” so that they came together again and again reconfiguring thought. Both audiowalking and micromapping offer educational researcher’s non-representational ways of working with data that forgoes answers, closure and notions of progress or creating new knowledge. In particular, as an implication for environmental education/place-based researchers, audiowalking and micromapping give practical insight into how diffractive analysis seeks to identify differences productively and account for multiple spaces and times revealing entanglement and the multiplicity of worlds. This paper also provided detailed insight into how two practices came to exist and their manner of experimentation, which revealed what it means to *do* research within and as a part of worlds situated with/in pasts/presents/futures. Audiowalking and micromapping, when practised with concepts of diffraction are effective at disrupting settler-extractive colonial habits in research and as such, open towards futures of doing research with greater accountability, response-ability and relations to place.

Acknowledgements. This research is supported by an Australian Government Research Training Program Scholarship.

Financial support. This research study draws on research supported by the Social Sciences and Humanities Research Council (SSHRC) of Canada.

Ethical standard. The research project shared in this publication obtained multi-centre ethics approval from Edith Cowan University: Project approval number 109337.

References

- Ahmed, S. (2013). Making feminist points. *feministkilljoys*. <https://feministkilljoys.com/2013/09/11/making-feminist-points/>.
- Ahmed, S. (2017). *Living a feminist life*. Duke University Press. DOI: 10.2307/j.ctv11g9836.
- Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Duke University Press.
- Barad, K. (2012). Nature’s queer performativity*. *Kvinder, Køn & Forskning*, 1-2, 25–53. DOI: 10.7146/kkf.v0i1-2.28067.
- Barad, K. (2014). Diffracting diffraction: Cutting together-apart. *Parallax*, 20(3), 168–187. DOI: 10.1080/13534645.2014.927623.
- Barad, K. (2017). Troubling time/s and ecologies of nothingness: Re-turning, re-membling, and facing the incalculable. *New Formations*, 92(1), 56–86. DOI: 10.3898/NEWF.92.05.2017.
- Blaise, M., & Wintoneak, V. (2019). 002 Being invited by Derbarl Yerrigan: Why imagination is vital. *Walking-with derbarl yerrigan*. <https://waterways.climateactionchildhood.net/index.php/2019/08/21/19-august-2019/>.
- Brown, S.L., Siegel, L., & Blom, S.M. (2020). Entanglements of matter and meaning: The importance of the philosophy of Karen Barad for environmental education. *Australian Journal of Environmental Education*, 36(3), 219–233. DOI: 10.1017/aee.2019.29.
- Burman, E. (2017). *Deconstructing Developmental Psychology*. Routledge. <https://doi.org/10.4324/9781315727127>.
- Climate Action Childhood Network (2023). Homepage. <https://climateactionchildhood.net/>.
- Conroy, R. (n.d.). WalkingLab Podcast [audio podcast]. *WalkingLab*. <https://walkinglab.org/series/walkinglab-podcasts/>.
- Cook, D. (2015). Noongar of Beelari - Swan River [Video]. YouTube. <https://www.youtube.com/watch?v=ONwcf6ORGZU&t=185s>.
- DiAngelo, R. (2019). *White fragility: Why it’s so hard for white people to talk about racism*. Penguin Random House UK.
- Haraway, D. (1992). The promises of monsters: A regenerative politics for inappropriate/d others. In L. Grossberg, C. Nelson & P. Treichler (Eds.), *Cultural studies* (pp. 295–337). Routledge.
- Haraway, D.J. (2004). *The Haraway reader*. Routledge.

- Kimmerer, R.W. (Host)** (2018). Corn tastes better on the honour system [Audio podcast episode]. *Emergence Magazine Podcast*. <https://emergencemagazine.org/feature/corn-tastes-better/>.
- Knight, L.** (2016). Playgrounds as sites of radical encounters: Mapping material, affective, spatial, and pedagogical collisions. In N. Snaza, D. Sonu & S.E. Truman (Eds.), *Pedagogical matters: New materialisms and curriculum studies* (pp. 13–28). Peter Lang. <http://www.jstor.org/stable/45157526>.
- Knight, L.** (2021). *Inefficient mapping: A protocol for attuning to phenomena*. Punctum Books.
- Liboiron, M.** (2021a). *A wee primer on colonialism*. CLEAR Lab Book. <https://civiclaboratory.nl/clear-lab-book/>.
- Liboiron, M.** (2021b). *Pollution is colonialism*. Duke University Press.
- Malone, K.** (2020). Re-turning childhoodnature: A diffractive account of the past tracings of childhoodnature as a series of theoretical turns. In A. Cutter-Mackenzie-Knowles, K. Malone & E.B. Hacking (Eds.), *Hacking research handbook on childhoodnature: Assemblages of childhood and nature research* (pp. 57–86). DOI: [10.1007/978-3-319-67286-1](https://doi.org/10.1007/978-3-319-67286-1).
- Mitman, G. (Host)** (2019). Reflections on the Plantationocene: A conversation with Donna Haraway and Anna Tsing [audio podcast episode]. In *Edge effects*. <https://edgeeffects.net/haraway-tsing-plantationocene/>.
- Murris, K., & Zhao, W.** (2021). Re-turning. In K. Murris (Ed.), *A glossary for doing postqualitative, new materialist and critical posthumanist research across disciplines* (pp. 112–113). Routledge. DOI: [10.4324/9781003041153](https://doi.org/10.4324/9781003041153).
- Neale, M., & Kelly, L.** (2020). *Songlines: The power and promise*. Thames & Hudson.
- Nociti, K.** (2022). Beyond reflective practice: Blogging-with Place as a diffractive practice for (re)imagining place-based education. *Contemporary Issues in Early Childhood*, 25(1), 7–20. DOI: [10.1177/14639491221129190](https://doi.org/10.1177/14639491221129190).
- Pacini-Ketchabaw, V., Blaise, M., & Kraftl, P.** (in press). Thinking & doing with(in) collaboratories. *Children's Geographies*.
- Plumwood, V.** (1993). *Feminism and the mastery of nature*. Routledge.
- Puig de la Bellacasa, M.** (2017). *Matters of care: Speculative ethics in more than human worlds*. University of Minnesota Press.
- Tuck, E., Yang, K.W., & Gaztambide-Fernández, R.** (2015). *Citation practices*. *Critical ethnic studies journal*. University of Minnesota Press. <http://www.criticalethnicstudiesjournal.org/citation-practices/>.
- Tynan, L.** (2020). Thesis as kin: Living relationality with research. *AlterNative: An International Journal of Indigenous Peoples*, 16(3), 163–170. DOI: [10.1177/1177180120948270](https://doi.org/10.1177/1177180120948270).
- Tynan, L., & Bishop, M.** (2023). Decolonizing the literature review: A relational approach. *Qualitative Inquiry*, 29(3–4), 498–508. DOI: [10.1177/10778004221101594](https://doi.org/10.1177/10778004221101594).
- Watts, V.** (2013). Indigenous Place-Thought and agency amongst humans and non humans (First Woman and Sky Woman go on a European world tour!). *Decolonization: Indigeneity, Education & Society*, 2(1), 20–34. <https://jps.library.utoronto.ca/index.php/des/article/view/19145/16234>.
- Wintoneak, V.** (2024). *Walking-with Derbarl Yerrigan/Swan River: Experimentations with methodological and pedagogical practices in early childhood education*. Edith Cowan University. DOI: [10.25958/jqv9-jd62](https://doi.org/10.25958/jqv9-jd62).
- Wolmark, J.** (1999, 2011). *Cybersexualities: A reader on feminist theory, cyborgs and cyberspace*. Edinburgh University Press.

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