Seeding a Repository of Methods-To-Be for Nature-Entangled Design Research

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ABSTRACT

We share an emergent repository of nature-entangled methods-to-be shared, experimented with, and discussed during a conference workshop. We present them in-use, as they are in formation. We do not seek to theorise or even fully articulate these methods-to-be. Rather, to make them approachable and actionable for others by showing them not fully polished. By doing this, we advocate for increased transparency in the difficulties of creating new methods, techniques, tools, and approaches. Our contribution is threefold: we provide 1) an annotated portfolio of methods-to-be; 2) illustrative examples of how cross-pollination of these methods can enrich their situated use; and 3) a discussion of ways to further articulate the methods and deepen reflection on their roles in nature-entangled design processes.

Authors Keywords

More-Than-Human Design; Sustainability; Design Methods; Nature-Entangled Design Research.

CSS Concepts

•Human-centered computing~Interaction design~Interaction design process and methods

INTRODUCTION

Complex, and rapidly escalating environmental crises are threatening the existence of life on the planet as we know it. It is critical that designers develop methods to reorient design from human-centred toward more-than-human-centred, nature-entangled practices that recognise humans as part of nature and that resist extractivist approaches to utilising nature [44]. While biology, ecology, geology, and other disciplines have their own cultures, traditions, and methods for engaging with nature, such orientations within design are in their infancy. As design researchers, we are concerned with expanding our capacities for practising nature-entangled design. To this end, we conducted a workshop that brought together eighteen designers and researchers interested in nature-entangled design [47] to collaboratively reflect, through practice, on methods

we were curious about. In the workshop, we shared and experimented with a rich selection of –largely nascent– methods and leveraged this hands-on experience to begin laying the foundations of a methodological landscape of emerging nature-entangled design research methods. We hope that the methods and mashups we made might be inspiring for others, as they were for ourselves. We share them, here, as an emergent repository of nature-entangled methods in development, or methods-to-be. These methods-to-be are neither static nor discrete. We propose them as inspirational starting points; illustrative examples of how cross-pollination of methods unfolds as people appropriate and combine them, and what these efforts give rise to. We envision that future work will further articulate these methods-to-be and add more examples to the repository. Our hope is that this work will support the development of designers' capacities to reorient their work towards nature-entangled processes and outcomes, and deepen reflection on the role(s) of methods in nature-entangled design processes.

BACKGROUND: Methods for nature-entagled design

Environmental crises are accelerating design research involvement in sustainability transitions [14] de-centering the human [32], conducting multispecies design [30], biodesign [32] and posthumanism [12,51]. As these perspectives become more pervasive, methods for nature-entanglement are being applied across design research [52]. To gain an overview we loosely cluster methods by their main effects on the design process: sensitising, developing relations, generating data, ideating, and evaluating, even though any methods may be relevant in more than one of these broad categories and have other effects.

① **Sensitising methods** draw from biology, ecology, multispecies ethnography [22], soma design [17] and commitments to care [39] to train perception and shift perspectives, open peoples' awareness to the natural systems of which they are a part. The sensitising process involves becoming aware of, experiencing, and understanding the world from more-than-human perspectives through "noticing", attuning, and supporting human perception of the more-than-human world [26,27,39,49]. In some cases, technologies assist people to notice what is beyond their capacity to perceive [13,19,28,39], including speculative probes that offer altered perceptions and alternative capacities to act in the world [29].

② **Methods for developing relations** between humans and other species – what Avila calls poetics of relating [3] – can be physical, e.g. smelling and tasting a mushroom [49]; emotional, e.g. feeling excited or scared about an experience or observation [20]; or speculative, e.g. having a vision of a potential experience [39]. They can be individual practices [3] or collective activities [21].

③ **Methods for generating data** can be used to deepen understanding of design contexts and guide design processes. For example, connecting seeds and sensors [16,56], gathering images through camera traps [50], using bio-acoustic sensors to listen to the forest [31], conducting chemical tests for air quality [11,37], and conducting formal observation [23]. Nature-entangled, autoethnographic data can be gathered using photo or video documentation [1,26,38], journal entries [5], through expert interviews [54] fictive interviews with an organism [8] relational maps [10], rhythm analysis [45] and more.

④ **Ideation processes** can be entangled with nature through biomimicry [43], by growing materials [32], and relations, including through multispecies designing [30]. Nature itself may be considered a co-designer [18, 34, 53], for example plants – whether in the wild or in the home, through multispecies cohabitation [4,42,48].

⑤ **Evaluation processes** that decentre the human [42] may draw from critical animal studies [55]; interacting with [2] or collaborating directly with animals [53]. We point the reader to non-anthropocentric frameworks for design [18,53] for assistance in decentring the human in design tasks, including evaluation. In sum, nature-entangled design is a new field, raising challenging questions around power and consent. Our contribution to this emerging field aims to seed reflection on methods, through an annotated portfolio of methods-to-be.

WORKSHOP METHODOLOGY

Our hybrid workshop was motivated by methodologies of co-reflection [46]. It involved eighteen design researchers from HCI, design and sustainability transitions (9 in person, 9 on-line; shared content in a Miro board). Participants were asked to bring a nature-entangled design method to share. Following introductions, the workshop participants summarised their methods on a template with four prompts ("It is", "It's meant for", "It operates at the scale of" and "It works like") to create design method cards describing easily relatable systematic procedures [41]. This resulted in 19 fairly cohesive method cards with individual adaptations. Some drew explicitly on known methods; others were more experimental. Thereafter, workshop participants added questions, comments, and responses to the methods cards produced by others in the Miro board. This dialogical exchange in the form of annotations enriched understanding of the methods. Next, we held a two-hour "methodological picnic": participants selected methods and took them out into the field, to explore their possibilities, e.g. to a nearby park, by a river, etc. Some methods required longer engagement than our picnic afforded; this impacted choice of method and the depth to which they could be engaged. Following the methodological picnic, we held an open discussion to share experiences and insights.

Describing the pictorial

This pictorial includes 16 of the annotated method cards as an emergent repository of nature-entangled methods, and methods-to-be. Some method cards were very similar, or were not filled in properly and have not been included. We begin presenting methods that support open-ended observations, and move towards more specific protocols for action and artefact design. The annotations have been copy-edited and graphically designed to be readable in a pictorial format (questions and comments in green and answers in pink). We posit that this annotated portfolio [6] strengthens designers' capacities for using nature-entangled methods. We then discuss our experiences of applying the methods in the "methodological picnic" emphasising the method combinations and mashups created by means of 5 examples complemented with personal reflections. Our insights illustrate the emergent and creative potential of the "methodological picnic" approach. As part of the collaborative pictorial creation and reflection process, the method cards and the mashups were labelled by the authors with the five categories highlighted above in the background section.

## Sensory (auto+multi species) ethnography

Proposed by Danielle Wilde

It involves all of the senses (not only the hedonic five) in embodied attempts to engage with, and develop new understandings of the world, at once recognising and grappling through the challenge of decentring the self.

It is meant to open up new ways of understanding the world through human entanglement with more-than-human.

It operates at all scales ranging from quantum to the planetary and beyond, not only at human scales.

It works like being alive to the world within, through and around oneself and seeking sensory ways of capturing sensory impressions.

Fig 1. Abstract representation of a sensory experience
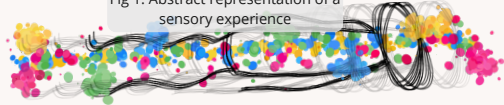
What other senses are you talking about? How might we attend better to those?

Response: For example, sense of direction, time, where we are in the world, sensing an itch (literal or metaphorical), etc. In many regards, the second question drives the methodological inquiry.

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Rhythmanalysis

Proposed by Ruut Tikkanen, Netta Iivari, Tiina Keisanen

It is a method based on the ideas of Levebvre [25] and his followers for studying natural rhythms in a holistic way in the design context. (see e.g. [45])

It is meant to assist designers in connecting to the MtH world through rhythm analysis. The goal is to use video observation to attune and adapt to natural situations, to establish a connection with more-than-human things and collaborate with them in their natural setting.

It operates at a human scale when examining the diverse rhythms and rhythm patterns of nature and their relationships (eurhythmia, polyrhythmia, arrhythmia) in a holistic way.

It works like a lens for revealing the harmony and disharmony of life's cyclical and linear rhythms. It serves as a flexible gateway to understanding the interconnectedness of human existence with the natural world, guiding us in designing digital solutions that attend to the more-than-human.

Fig 2. Analyzing the rhythm between human and mth world (flowers and a bee in autumn time)

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Is rhythm the repetition of patterns? Are there other ways to be rhythmic?

I think it would be possible to analyze rhythm beyond the human scale.

Auto-ethnographic journaling

Proposed by Daphné Hamilton-Jones

It is a practice of observing and collecting data that focuses on making observations of how you yourself relate to your environement.

It is meant for reflexive engagement with our environment; collection of small artefacts; archival of subjective realities for future reflexive practices; and noticing by inscribing things.

It operates at the scale of the human body, extended by the journal.

It works like written diary entries intermingled with artefacts, sketches, and other subjective recordings.

How do you capture non-visual, spacial and/or temporal experiences in the journals?

How could we facilitate a non-human to engage in this method?

Fig 3. Drawings made as part of auto-ethnographic journaling.

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I really liked the part where you suggest "collecting small artefacts" that reflect "subjective realities" I think it would be interesting to extend that in terms of multi-sensory stimuli. I wil be inspired by those thoughts when extending the design & use of the Snapshot Cards in the future.

(Rogerian) Encounter Group / Unconditional Relating

Proposed by Velvet Spors

It is the coming together for a set amount of time as a bounded activity (similar to a focus group, without guided activities and more open). It could be used with non-human lifeforms, too (from micro to planetary and beyond).

It's meant for opening up the space for people to heal with each other, and understand each other better, and yourself by proxy, too.

It operates at the scale of local, in-person, in-situ / in-the-world, next to each other, in close contact, maybe even touching.

It works like "witnessing" each other as you are in that moment in time, as genuinely as you can, without judgement, with unconditional empathy. You seek to radically relate and understand others, while they do the same with you.

Theoretical foundations are humanistic psychology and person-centered counselling [40]. I think this practice is complementary to Tsing's [49] "noticing".

Reason for introducing it to this workshop: We tend to approach nature from an exploitation, resource, subjugation, domination, abuse, management or steward perspective, often without understanding us as part of it, as kin. There is a lot of cultural, societal baggage, values, concepts etc. that we need to unpack, un/learn to approach (non-human) others in meaningful, non-directive and relational ways.

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How do you negotiate non-human consent for participation in the encounter?

Response: I have no idea, and I would love to figure it out, because I think even with people we struggle to create meaningful consent. Thanks for the question!!

This really resonates with me and the repertoire I have been exploring. I've been actively attempting to withhold judgement and to wait with jumping to conclusions or design opportunities in order for multiple relations to emerge. I really like the framing of encounters and unconditional relating!

Do you have a specific framing for this practise in mind? Such as self-revealing, wrangling with uncomfortableness, embracing the messiness of it.

Letter to mother earth / sit spot

Proposed by Ruut Tikkanen

It is a long term (short term) senzitizing exercise. You reflect every time you are visiting in a special secret sitspot.

It is meant to create closer connection with the MtH world and document those experiences in an form that support the design process – but in an individual level of well-being, as well having a perspective of coming product.

It operates at the scale between individual and whole surrounding environment – and in all different levels from past to present, relation to materia, emotions, experience, knowledge etc.

The exercise operates as a starting exercise. However, it is good to continue the exercise throughout the process. It is intended to awaken the senses and create a close relationship with mother earth in addition to oneself. Visiting the same sit spot alone increases the connection with the surrounding nature, where the spot is simply a favorite place in nature that you visit regularly to cultivate awareness as you expand your senses and study patterns of local plants, birds, trees, animals, etc. It teaches you to develop the most ancient parts of human awareness and gradually acquire enhanced sensitivity to nature.

Fig 4. A view from a sit-spot.

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Companion Species
Proposed by Svenja Keune

It is inspired by the Camille stories by Donna Haraway [15].

It's meant for connecting to a certain species (preferably locally and seasonally present) over a certain amount of time and to connect to the being through a variety of different methods and practices, e.g. going visiting, species interview, costume making, poem writing, embodiment.

It operates through gathering information about the physiology, behaviour, and lifecycle of the being and translates these information into imagination and creative expressions.

Fig 5. A digital species profile with information about the physiology, lifecycle, and behaviour of nettle weavils at the I.N.S.E.C.T. Summercamp 2023.

NETTLE
PHYLLOBIUS POMACEUS

> How do you consider what the non-human/s gets out of your companionship

> How do you deal with resistance or toxicity?

Micro-phenomenological interview
Proposed by Anton Poikolainen Rosén [7]

It is an interview method [35, 36] that functions as a "psychological microscope"

It's meant for understanding details in how we come to experience (the more-than-human world), with a focus on sensory perception and feelings.

It operates at the scale of human perception.

It works like: a trained interviewer helps the interviewee evoke a memory in greater and greater detail by asking quesitons related to the senses, repeting the interviewees accounts, and asking content free questions such as "how do you know that? and "how did that feel". Unpacking an experience of 5-30 seconds takes at least one hour.

> Unpacking experiences sounds similar to psychoanalysis-oriented therapies. I wonder how structured the interviews should be and how much it is open for free-associations in experiences?

Fig 6. Representation of the poetic layer of experience.

> How might this be adapted for non-human participation or phenomenology?

> **Response.** There is typically a goal "I want to know more about this aspect of the experience?" – but other than that there is no structure. It is the interviewees account that guides the interview. (the Interviewer should however be mindful about synchronous and asynchronous accounts of the experience)

> **Response:** We can't interview non-humans in human language - BUT the method often reveals how non-humans in our environment are deeply affecting our experiences (and actions) in ways where they have more agency that we might initially think.

> The benefit of micro phenomenological interviews is, I feel, that it is deeply reflective on the part of the researcher, tying strongly with autoethnography for that reason.

> Only a trained interviewer can achieve this method or is there a possibility to train ourselves to do this?

> **Response:** The method is not rocket science – you can train yourself to do it – but it requires some practice to conduct skillfully. Especially if you are not aiming to use the method to "prove scientific findings" but rather "inspire design" I believe it can be used in a more casual way. However, it's good to have experienced how it is like to be interviewd in this way, to understand what the method aims to acheve.

The snapshot cards
Proposed by Ferran Altarriba Bertran

The Snapshot cards are small analog postcards that can be used to store vivid, artistic, and reflexive accounts of experiences lived within nature.

They are meant for increased & empathic noticing of –and meaning-making around– human-nature interactions through documentation of anecdotes, memories, reflections, and design ideas that emerge during nature-related activity. The cards allow us to produce partial translations of vivid, situated, and highly material nature-related events and processes so they can later be embraced in design, in their full depth albeit interpretively.

The cards operate at the scale of the human body, as they enable humans to store introspective accounts of their lived experiences, observations, reflections, and ideas. They also allow documentation of events and observations that transcend the scale of a human.

They work as you note memos and unpack them using the limited space offered by the cards through a simple drawing and/or a short piece of text. The cards have four categories: anecdote, reflection, memory, or design idea. Each card corresponds to a different experience.
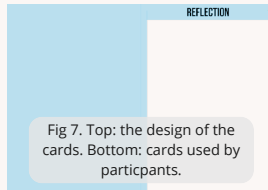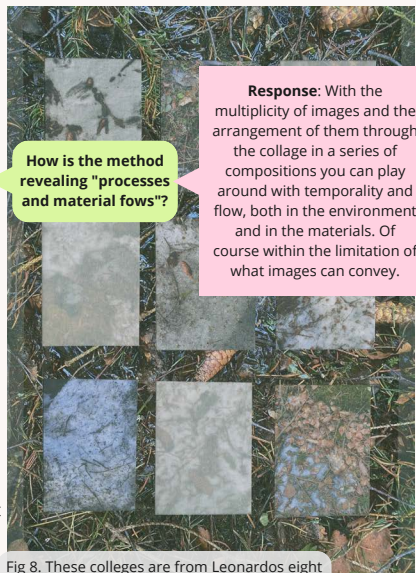
REFLECTION

Fig 7. Top: the design of the cards. Bottom: cards used by particpants.

> How do you capture non-visual, spatial and temporal experiences in the collage and cards?

> **Response**: This has been done through vivid introspective reflexive accounts by people involved. It would be interesting to find ways for de-centering the human from the process and let multi-sensory events/properties feed into the cards in a way that bypasses the "human filter".

> **Response:** By playing with other media like sound recording – but images can also evoke other senses. By using pictures taken at different times you can explore temporal notions through the composition.

> I like the use of pictures as a quic way of annotating a memory/insight – and how they are used later in creative work. Can you take pictures in different ways? Different techniques? Perspectives?

> **Response**: Yes, the way of taking pictures can be explored in multiple ways, and can go along with note taking in a journal as well. As you say, they work as quick annotations, but involve the use of the body (for example getting close to a leaf, going to the ground, looking at the sky, touching, etc.). The idea is to have multiple pictures and later arrange them together in a way to go back to the experience, then make the collage, like a moodboard of the walk in a way.

> Are they to be used in groups, to spur conversation perhaps?

> **Response**: The co-experiencing part is often done in a group. The content that go into the cards is thus often the result of a shared process but when you then write on the cards, I've framed it as an individual process where you sit, think, and document on your own. In many situations, a group of people have been producing their cards physically next to one another, silently absorbed into their process. Once the cards have been produced, they can feed back into group conversations again. Since they embody rich, vivid experiences/thoughts/ideas, they can spur conversation among those who were not present in the activity portrayed in the cards. Using these components as a starting point, I allow people to appropriate the cards in any way they want, which leads to unexpected uses.

Collaging a walking experience
Proposed by Leonardo Hidalgo

Collaging a walking experience is a way of documenting and conveying walking experiences in a particular type of environment (e.g. a forest). It focuses on actions and sensory experiences by paying attention to the body affecting and being affected by the environment.

It's meant for documenting and analysing embodied experiences and interactions with the environment. It also includes processes and material flows. It works as a tool that allows to notice materials and organisms and to reflect on being-in and possibly making-with an environment.

It operates at the scale of the human body in craft practices and other activities that entail an interaction with an environment and organisms or things that are part of it. It can be extended to hybrid environments where both human and non-human beings play different forces in the ecosystem.

It involves taking pictures that register different types of activities and encounters during the walk. For example finding a particular organism or material, the light of the day, the feeling of the ground, etc. Then the pictures are printed or sorted digitally in order to start making compositions with them. The idea is to be able to convey what it was experienced and to understand the constellations of sensory experiences by juxtaposing them in a playful and intuitive fashion.

> How do you negotiate non-human consent for participation in the collage?

> What is a picture capturing? What is it not capturing?

> **Response**: Yes, that is a good question and there is the limitation of what is seen and not, what is noticed and not.

> How is the method revealing "processes and material fows"?

> **Response**: With the multiplicity of images and the arrangement of them through the collage in a series of compositions you can play around with temporality and flow, both in the environment and in the materials. Of course within the limitation of what images can convey.

Fig 8. These colleges are from Leonardos eight month long autoethnographic exploration of collecting plants for dying in local Finish nature.

Olfactory eros & instruction painting

Proposed by Tarsh Bates

It is the creation of instructions/recipes/protocols for humans to explore and experience non-human "smells".

It is meant to shift your perspective to your sense of smell to consider the sensation of smell chemicals, what / who created them and how non-humans might experience them.

It operates at the scale of the individual or group of humans or, if you create instructions for non-humans to follow, it operates at many different spacetime scales.

How to do it:
1. perform an olfactory eros activity
2. consider the steps, surfaces, caresses, tools and agents involved in that activity
3. consider who you are writing the instruction for
4. write instructions to tell someone or something else how to do that activity
5. test your instructions by getting your target agent to perform them
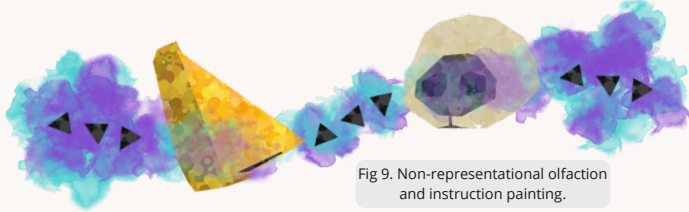6. revise instructions as needed

Fig 9. Non-representational olfaction and instruction painting.

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> I get a vivid image of coffee beans at the department store to "reset" your nose before smelling new perfume. This also makes me think of being "saturated", e.g., you can smell things only so much before the stimulus does not get stronger – Is there something in there? **What about blocking smells out?** I am thinking of creams/tinctures to put near your nose for cleaning up messy organic happenings that would make people vomit otherwise (e.g. crime scenes).

> **How can you create instructions "for non-humans to follow"?**

Playful ritual design

Proposed by Daniel Fernández Galeote

It is an ancestral way of making sense of ourselves and our environment. The way I understand it in this context (in a bit of an improvised way) is as a form of enacted metaphor/symbol with a clear purpose. I conceptualize it as playful – to participate in a ritual is to take part in a game, no matter how serious.

Its purpose can be to, e.g., express gratitude, honor painful emotions and experiences, change our perspective towards reality (e.g., interconnectedness), or transform ourselves (e.g., by expressing a commitment).

It operates at the scale of the relationship between the individual and a particular non-human agent, but also more broadly between community and place, or the individual and cosmic forces, or any other combination of small-to-large human and non-human dimension.

It works like:
1. We set a purpose for the ritual: what is it signaling, what is it meant for?
2. Who are the human and non-human agents that will be involved or referenced in the act?
3. We envision the ritualistic process as a metaphorical enactment serving such purpose. The ritual can be as complex and rich as we wish--we can involve objects, music, costumes, production, consumption, gifting, other people, stories and personified natural phenomena, multi-sensory contact, different stages...
4. If non-humans are directly involved, conscious acknowledgment of their role and material presence would be important. For example, what are the implications of taking a leaf as the culmination of the ritual?

Fig 10. A sketch inspired by the four steps involved in creating and enacting a playful ritual.

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> **Do you also draw on "interaction ritual chains" [57] in this concept?**

> **How do you negotiate non-human consent for participation in the ritual?**

> **Response.** With most non-human actors, I truly struggle to conceptualize consent (and kind of dislike when the concept is applied carelessly). My provisional, limited solution is to attempt to minimize harm/maximize well-being based on what we know of them. For example, it is very different if my ritual involves hugging a tree vs. burning a tree, based on what I think I know of plant life – but it is radically not about consent, and especially consent as a feel-good delusion.

> **What constitutes a ritual - what makes it different from any other activity?**

> **Response.** I would say it is an enacted metaphor with the intention to signal, honor, represent and satisfy a larger purpose. It is intentional and bounded. My definition of game and ritual are very generous and flexible, so many mundane things can be rituals for us.

MtH play with game design fictions

Proposed by Oğuz 'Oz' Buruk

It is positioning more-than-human actors as players and imagine/design games that can be played with them.

It's meant for discovering uncommon ways of relating to more-than-human actors and also imagining unaccustomed roles for them.

It operates at the scale of individual human and non-human actors. It is more about shifting and disrupting our perspective regarding MtH actors.

It works like that you choose one or more MtH actors as players and start designing a game that can be played with them. Might be good to start with static actors (e.g. plants, rocks) since it would be easier. When you get good with it you can try to include other actors. Later you start playing the game. After playing until you are bored and tired you reflect on the experience with e.g., a diary entry, voice recording, photo.

Disclaimer This method has not been tested properly. Use it at own your risk! Get prepared to find yourself in awkward and silly situations!
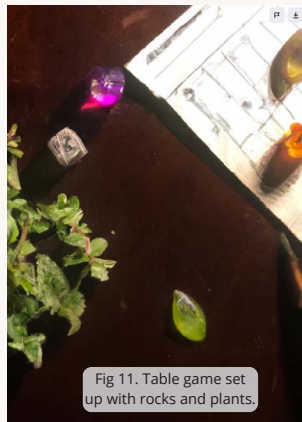

Fig 11. Table game set up with rocks and plants.

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> **How do you consider what the material you are using gets out of your intervention?**

> **How do you negotiate non-human consent for participation in the game?**

> **Response.** The fiction part comes in here, it's more of imagining a participation in a fictional world, rather than real participation. This hopefully will also help human fictional game designer to reflect on issues such as consent, or toxicity.

Participatory food workshops

Proposed by Leena Naqvi

It is a workshop which allows people to learn by doing and focusing on haptics.

It's meant for the participants to learn by doing (as opposed to just by watching) and negotiate tasks. It is a collaborative activity which allows the participants to focus and be in the moment and engage with the materials (i.e. the ingredients in this case).

It operates at the scale of a group of people. Ideally a group between 6-20 persons.

It works like gathering participants to prepare food. However, the workshop must be led by an individual who demonstrates the processes involved. *The recipe is withheld.* All participants have to partake in the activities of producing that particular meal. Not every step can be done individually and thus participants must collectively distribute certain 'steps'.

② ③

Fig 12. A recipe is being prepared during a participatory food design workshop.

> This makes me think about how, when it comes to cooking, recipes are only used at the two extremes of the "knowledge" continuum: by complete inexperts (who do need a precise recipe to not mess up) and by super high end chefs (who produce intricate dishes that require precision). Anyone in between those poles, i.e. those who know how and/or love to cook, often privilege intuition and sensorial stimuli over a recipe, as they often turn out to be more useful.

> **Response.** I have really enjoyed this comment and it's making me think if written recipes are only limited to "complete beginners" and "high end chefs" - or if there is also other groups using written recipes.

> I love this method. It is anti-thetical to mine [Olfactory Eros]. We should do something together as a dialectical method.

> **What are you learning beyond the concrete skill of preparing food?**

> **Response.** To avoid reducing an entire process to a product is exactly why the learning-by-doing is essential. One learns by understanding the material properties, and its limitations. Reliance on haptics. And in a broader sense, negotiations and interactions that spur from being part of a group with the particular process are unprovoked so the process required some mediation.

> **I wonder how would it be possible to capture participants' individual experiences from the workshop?**

> **Response.** I have used both short interviews with participants to record the participants experiences as well as autoethnographic observations to record the comments and conversations that stood out for me from the interactions between the participants.

> **Does taste play a role in this workshop?** Feels like it would be a great way to explore the sensorial side of these processes (with food) apart from haptics.

Repertoire for inviting participation

Proposed by Doenja Oogjes [9, 33]

It is an open and generous approach of creating things that change, and exposing them in open contexts .

It is meant for orienting, taking stock and accounting for the agencies of different more-than-humans.

It operates at the scale of the personal context (e.g. a garden or balcony) but the aim is for the scale to continuously expand, to understand indirect relations to broader ecologies.

It works like stepping back, taking time and pause, and observing - frequent diary entries intermingling local data such as the weather with observations.

Fig 13. A shape-changing textile that was initiated as a collaboration with rainy weather: two small snails appeared after a couple of days.

1 3 5

How do you negotiate non-human consent for participation in the encounter?

Response. Very interesting question - I don't know if the concept of consent - as a human construct - maps to this in easily resolvable ways. Do we consider consent as in participating in a study and getting signatures? If so, how do we "inform"? I think for now, the initiation of the participation is not in my hands so I consider that more-than-humans simply consent by participating.

Response. I've chosen all natural materials like paper and linen - but I think the attention to potential harm is very important!

How do you deal with resistance or toxicity?

How do you decide what constitutes harm and to whom?

Response. I am framing the materials here as tools and so upon reflection, I suppose I am lessening their agency and desires to make space for those of the broader ecology

How do you consider what the material you are using gets out of your intervention?

Mapping relational dynamics

Proposed by Svenja Keune

It's meant for collecting knowledge about species and relating them to each other in a web of relationships.

This can be done digitally and collectively e.g. via Miro or by creating physical profiles, putting them up on a wall and connecting them with differently coloured threads that express the type of relationship, e.g. sharing the same habitat or being predator/pray.

It works by using species profiles and creating a map of relationships between species. This information can be used to better understand a local ecosystem at a certain point in time, the type of relationships that can be found between the actors, and can motivate a deeper investigation into a specific relationship.

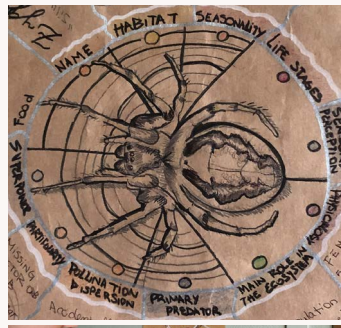**Do we aim at a particular degree of detail in our mappings?**

Fig 14. The top image shows a species profile of a spider that is set into relationship with other species of the same ecosystem through a relational map shown in the bottom image.

2 5

Have you explored also symbiotic relationships?

Response. Yes, in this example we explored the ecosystem of an elder tree and discovered many symbiosis with the nettle plant underneith and the insects and spiders living there, e.g. the nettle weavil or the tortoiseshell caterpillar.

What kinds of relations are maped out? (e.g economic or emotional)

Response. Predator/pray, co-habitation, habitat were the ones we focused on, but could also be other similar relationships.

## Cohabitation labs

Proposed by Oscar Tomico [48]

Cohabitation labs are hybrid spaces (socio-ecological) in the intersection of socio-technical systems and ecosystems. It can be a flat in the center, an office space, a farm or a road. It is a way to look differently at where you live, work, walk, drive in your everyday for a long period of time.

They are meant for exploring alternatives to our current naturecultures through Multispecies Design. Making sense of the place's infrastructure, ecological conditions, biodiversity, geo-political histories, and so on.

They operate at the scale of the ecosystem and focus on renegotiating human and more-than-human inter- and intra- actions. They foreground co-adaptation and co-dependency in order to support biodiversity and life affirmation in general.

They work by designing with and living with other-than-humans. It could be plants, animals, microbes etc. One can apply 1st person design research ranging from embodied ideation to authoethnography or autobiographical design. The goal is to develop ecologies of practice that have the potential to maintain caring and develop new more-than-human sensitivities and relations.

I document frictions, surprises, ideas and activities that are relevant to me by means of photos and short texts. It helps me to track changes over days and years.
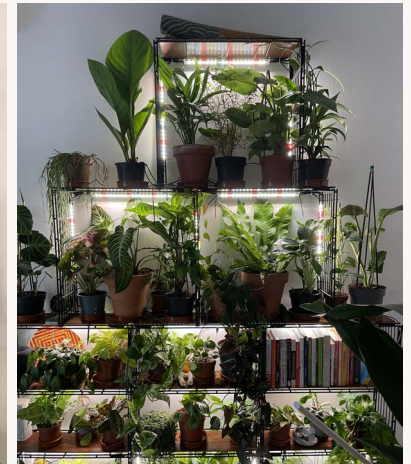
1 2 3 5

How do you deal with resistance or toxicity?

Response. Sharing space and resources supports exploring what is mutually beneficial. E.g. using the same (filtered) water for drinking and watering improved my health and made me aware of how important it is for the plants too.

How are control/containment & surveillance part of the cohabitation method?

Response. Really relevant question. I try to avoid anthropomorphising human and non-human relations. Instead I'm looking for alternative points of view to critically look at existing relations and explore new ones. I'm comparing my behaviour with other living and non-living entities on earth.

How do you negotiate non-human consent for participation in the co-habitation?

Fig 15. Photos documenting the changes in my working studio. The sequence reflects the transition to full-spectrum grow lights used as complementary lighting.

Since we ourselves are a habitat for a range of living things... How might we engage our own bodies as a cohabitation lab? How could we leverage that as an opportunity for strengthening the more-than-human orientation of our work? What might be the potential/benefits of doing so?

Response. The change of scale is really interesting. The body is an ecosystem and looking at it as a cohabitation lab will bring to the forefront the symbiotic relations existing with bacteria and other micro-organisms.

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Focusing on a smaller scale

Novel opportunities, outcomes, and insight emerged by the combination of several methods that Anton had not previously used in this specific form. Here we add his reflections on the process:

"During the workshop, I combined two methods suggested by my peer researchers. The first method was "Snapshot cards". The second method was "Collaging a walking experience". I stayed with and observed the same decaying tree trunk for about 15 minutes. The snapshot cards allowed me to make structured notes without disturbing my experience too much. The cards also prompted me to notice different aspects/dimensions of the experience, for example through their four categories (anecdote, reflection, memory, or design idea). I complemented this notetaking by taking pictures of anything that interested me – knowing that I could later use the pictures in the collaging method I intended to use. The utilization of these methods helped me to (1) slow down to be more attentive and (2) focus on a smaller scale. For example, I noticed small holes where insects presumably live and I noticed how the tree provided substrate for plants to grow. It felt like entering a micro-cosmos – an own little world."

This experience points to the creative potential of combining two methods. It also shows how a lack of familiarity with these methods afforded engaging with them in new ways. The cards prompted in-situ reflection; remembering these reflections through the photographing and collaging provided a straightforward, yet creative way of expressing these insights. The images further make the more-than-human (e.g. plant seedlings, mushrooms and presumed hole-inhabitants) concretely represented in the analysis. Here, the juxtaposition, scaling and cropping of images allows for centring the feeling of a mysterious micro-cosmos that occurred in the situated moment of noticing.

Methods

Snapshot cards ① ② ③ ④   **Collaging a walking experience** ① ②

Example of application – from Miro-board

The spaces held by a decaying stub – a microcosmos

Who lives here?

Fig 16.

Effects

① **Sensitising** by slowing down and focusing on a smaller scale (zooming in).

② **Developing relations** by noticing and imagining the microcosmos as its own little world.

③ **Generating data** by taking pictures of the elements that spark imagination and curiosity.

Creating connection

This example illustrates the benefit of methods that enable stronger connections with the more-than-human world. Velvet reflects on the process shown to the right.

"I combined 'sensory ethnography' and 'olfactory eros & instruction painting' to explore blue spaces of water. I live in the city that the workshop happened in, so I was already familiar with the park used for our exercise. Here, I was keen to investigate the lake in the middle of it more closely, and more intimately than I normally do when I walk past it. Being close to the water meant doing activities that may look unusual, perhaps even taboo, from the outside: For example, I hung myself over the lake's pier to look at lake's surface up closely. This transgression in public resulted in myself considering how other people might see me. This assumed gaze made me consider my conscious breathing to smell the water. It also required physical effort to not fall into the lake. I experienced this as a somaesthetic, intimate activity. What I ended up designing has a sensual undertone – inviting the participant to open up, be vulnerable and physical with their blue space of choice. Here, I realise the stark contrast of infusing human characteristics into "water", while trying to position it as an active actor in human life."

Velvet first observed their environment using sensory ethnography. They then created an evocative instruction based on these experiences. The contribution of this instruction is twofold: It both acts as an expression of Velvet's experiences and conflicting feelings (for example towards anthropomorphizing water) and as a prompt or inspiration for others to explore a particular aspect of the more-than-human world. In this way, the instructions become a "shortcut" to a particular way through which to view the world. The idea is not to replicate the experience exactly, but to offer a creative provocation through which vantage points – identified as spurring creativity – might be shared.

Methods

Sensory ethnography 1 2   **Olfactory eros & instruction painting** 1 2 4

Example of application – from Miro-board

Find a body of water. Let it find you, maybe.

Try to get as close as possible to it, getting close to the lakeshore, lower yourself close, even to the ground.

Take off all items, clothes or accessories that may fall into the water, or keep them on for extra risk. Check your pockets and bags.

Move your face close to the water surface, so your nose almost touches it, as if you are trying to kiss your reflection.

Inhale and exhale deeply, through the nose, through your open mouth, with eyes open and closed. How does it feel to hold onto the ground, is it strenuous, does the blood rush to your head? Or can your rest your chin in soft soil, holding your face like a patient lover's palm?

Does your breath cause ripples in the water, or is it unruly, vibrant, moving by itself? Are you moved by it, or does it move you?

This close to the water, think about what you are inhaling. Does it fill you with fresh awe, neutral observation or stale rot and disgust?

How does it feel to transgress in public? Do their glances fill you with hot shame, or cold sweat? Or maybe you are somewhere remote and without other people, bordering on deviant alone-ness?

Circle your body of water. Repeat the ritual in different spots, during different season. Leave without a word and return with tears, with shivers, with fever.

Think about this water the next time you are in a meeting that could be an email, how its weight and gravitas hold your gaze easily.
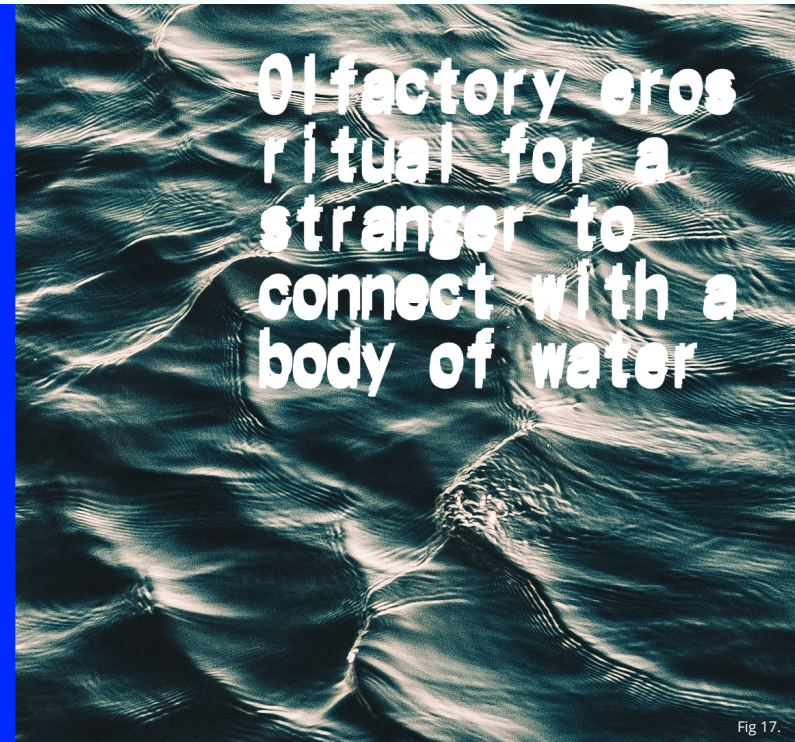
Fig 17.

Effects

1 **Sensitising** oneself and passing it onto others.

2 **Developing relations** by smelling and being close to the lakes surface.

4 **Ideating** a practice for others to experience a lakes surface.

From observations to ideas for play

Observing more-than-human entities may support ideating games where they are involved as players, playgrounds or play materials. Oz reflects on the process as follows:

"While observing the park, I noticed a tree leaning towards the water, slowly releasing the grasp of its leaves, getting teased by birds... Considering its location (half on the ground, half in the water), interactions (with birds, with water, with leaves) and elements (branches, bark, leaves, cavities), I decided to design games with it. I've spent an hour ideating different games where this tree is an actor. Sometimes, it was a player, sometimes its body was a platform for play, sometimes it was the game master. One of the games was called 'Falling Leaves'. If the leaves fall under the tree, the tree gets a point, if they fall to the path nearby, I got a score. The tree won! Here, the tree was a player, but also a game master since it was spreading the leaves. In another game, I realized that the tree has some seeds I can gather, and invented a simple shooting game where I was aiming to the cavities in the bark. There were also some mushrooms growing on the tree that made for a different type of target. In this one, the tree was more of a playground with its intricacies. One other one was about tickling the tree, and I start thinking of how a tree can be tickled and would feel when giggled because of it. I searched the tree through Google Maps, and I found it, because I recognized it from the pictures spending quite much 'quality time' with it. This might be the first time I could recognize a tree and separate it from other trees. Although it did not have a transformational effect on me, it started a different kind of bond with that tree. I reflected on how many of our mainstream talks about trees position them as resources. I realized some games can reinforce that."

Being attentive to nature entanglements can inspire design. Designing games can support thinking about possible relationships between ecosystem actors and inner workings of another being such as a tree. This can in turn lead to reflections on the preconceptions about nature and possible harms of these preconceptions.

Methods

Sensory ethnography ①② **MtH play with game design fictions** ①③④ **Collaging** ①②

Example of application– from Miro-board

Ideas for games based on observing nature: Falling Leaves – Bird calling – Burn and climb –Climbing fake branches– Fighting game– Water splash game– Tree giggling.

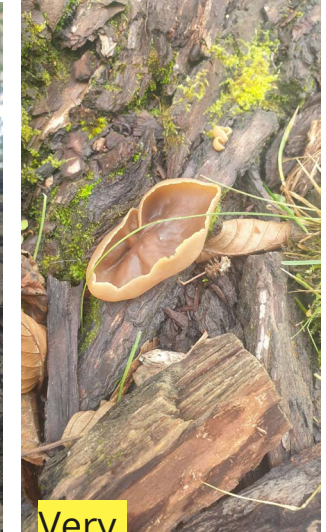## Chain Saw - *Shooting the bark with seeds*

Trees are rich

They have balls

They have targets

Very interesting targets

Fig 18.

Effects

① **Sensitising** by training perception & changing perspective.

② **Developing relations** by supporting direct engagement with the ecosystem of a tree.

④ **Ideating** inspired by experiences with the tree.

Tracking and training bodily awareness and sensory perception

Auto-ethnographic methods can be beneficial to generate a stronger connection with both the more-than-human world and the own body. Prompted to conduct sensory ethnography by making notes on the snapshot cards, Svenja reflects on the simple process of opening and closing a window as shown to the right:

"Exploring the simple act of closing and opening the window in front of my desk had a surprisingly strong effect on my senses and nervous system. When opening it, I noticed the expansion of my senses, a deeper breath, a wider hearing, a hightened sense of smell, and more aliveness/energy in the body. It felt like I was expanding and becoming part of the outside world. When closing the window, I noticed a quality of silence and my sensory awareness concentrated to the room I was in. I became more aware of the sound of my breathing and that it became much more shallow. The change of sound-scape brought an energetic shift from which a slight tension built up in my body and in my sense of hearing."

This experience pictures the interplay of built environment, sensory awareness, and bodily response. Here, the single act of opening a window can create a felt experience of belonging, expanding to the world outdoors, and deepening the breath. In turn, its closing can lead to a feeling of turning inwards and lead to a breathing that is more shallow; and a sense of isolation – you can see the outside world but are not fully connected to it with all of your senses. In this way, the window becomes a mediator between indoors and outdoors not just for how the space is perceived but also how you feel yourself.

In the example, "indoors" was associated with a *concentration* of sensory awareness, and "outdoors" was associated with an *expansion* of sensory awareness. This points to the importance of developing methods and sensibilities for the various states of awareness (of nature-entanglement) humans can have.

Methods

Sensory ethnography ① ② → **The snapshot cards** ① ② ③ ④ →

Example of application – from Miro-board

Anecdote / Memory / Reflection / Idea : **Opening and Closing**

Fig 19.

Effects

① **Sensitising** by training sensory perception and somatic body-mind experiences.

② **Developing relations** by experiencing shifts in the soma.

③ **Generating data** by documenting how the soma reacts.

Mapping relationships

Observational methods are able to reach deep when relationships between different actors of an ecosystem are considered. Organised journal notes taken while applying the methods are shown to the right. Daniel reflects on his experience:

"I intended to draw a relational map between species in the park using auto-ethnographic journaling to record the process of making the first annotations required. I selected these methods because I enjoy having an analytical, systems-based relationship to the world. However, soon I realized that I lacked time and knowledge to create a proper network, so the most interesting part of the experience ended up being the process rather than the result, as you can see in my notes from the attempt. I would highlight how using this combination of methods helped me become much more aware of my surroundings, how wanting to chart an ecosystem forced me to pay attention to its elements and relationships. At the same time, paying attention made me realize how much I ignore of a place that is rather known to me. My attempts to be a detective soon revealed that I would need skills and tools, mine and others', to untangle the web—but it also uncovered multiple connections between different elements, as shown through my annotations across categories on the right."

We can learn from applying methods and facing their, and our own, limitations. This case makes it clear that methods-to-be, applied in ways that are experimental and constrained, can generate moments of awareness and sensitivity to the world around us and our place in it, and generate data on reality and the way that we get to know – or fail to know, or wonder – about it.

The act of trying and documenting an incomplete map is in itself the main value of this experience. If this method was to be implemented as an educational tool, for example, it may be important to place as much weight on the discoveries along the way (about ecology, people, ourselves) as on the end product.

Methods

Auto-ethnographic journaling ①②⑤   **Relational Mapping** ②⑤

Example of application – from Miro-board

Journal on mapping out ecological relationships (the process is the artifact)

DISCLAIMERS

I am mapping a place that is known and dear to me. It is a significant space.

This is a work in progress that has more in common with a list than with a system or a map.

NON-HUMAN LIFE

Land plants, water plants. Fruit and surviving flowers on different trees, many of which I don't know. The starting list already requires external help.

HUMANS

I see the gardeners' intentional work. I wonder what criteria they follow to select plants and their arrangements.

Wild crows, domesticated dogs.

Moss on stone, mushroom on tree.

I would like to speak to the city gardeners to learn more, to see better.

Two tree trunks together. One tree, or two? Same species, different bark texture.

Some branches have been cut.

The ducks are gone. They give the park its name. I was here yesterday and did not even pay attention to this.

Certain leaves look heavily eaten but I see no perpetrator.

The grass contains more than grass when seen from up close.

Why doesn't it grow around and under the trees? Lack of nutrient, lack of sunlight, intentional cutting...

Roots, fish, bacteria.

I need tools and/or the knowledge of those who used them before.

The gravel path dictates what can exist. A map says which paths are maintained in the winter.

ABSENCES AND INVISIBILITIES

Testimonials: piles of leaves, a rake, a wheelbarrow. Compost and little wood chips at the foot of the growing trees, wooden rods and the wire sustaining them.

Streetlights, garbage bins, benches, statues, wooden pieces containing the island in the middle of the pond.

The Earth's translation and the Sun's incidence on its surface are significant actors—they determine the ducks' absence.

NON-LIVING ELEMENTS

I conclude: seasonal absences, presences, states of the climate... change the configuration.

Dead leaves, puddles: I see them as process and matter.

Fig 20.

Effects

① ② **Sensitising** and **Developing relations** by observing the site and sorting impressions, thoughts, and impulses.

③ **Generating data** by collecting, listing, and organising impressions.

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DISCUSSION

Making methods accessible.

Delving into ontologies and methods that de-centre the human in design is not straightforward. We recognise the complexity of more-than-human design research [12] and hope to contribute to the work of developing new methods in this space. To this end, our approach sidesteps theoretical abstraction and provides simple practical guidance – while recognising the need for theory. The method cards serve as an accessible way to support adoption, adaptation, and the creation of mashups, proposing these methods as flexible, movable, recombinable components that could be strategically used at different stages of the design process and adapted to various settings, including research, commercial, and studio practice.

The importance of process.

More-than-human design acknowledges the dynamic and emergent nature of processes; it does not aim to discover fixed truths but rather sensitise people to observe phenomena as they unfold as unique and situated [51]. This suggests a significance in designers letting go of control, and prioritising processes rather than outcomes. Our pictorial visually exemplifies this standpoint by showcasing "methods-to-be" and highlighting the dialogical exchange that arose during reflections on these proposals. The annotations illustrate questions that arose before engaging with the methods-to-be, as well as experiences and reflections after their use. The methods are unfinished, leaving room for development, critical engagement, and clarification. Some annotations highlight critical questions such as how to negotiate non-human consent; many of these remain unanswered, and point to the provisional nature of the methods, the potential for further developing the method cards, the challenges of communicating methods effectively, and the need for further work.

The challenge of categorisation

Our attempts at categorising can be characterised by frustration. We first thought to use affinity mapping, to identify groupings; then turned to thematic analysis,

using our five categories: sensitising, developing relations, generating data, ideating, and evaluating. These categories emerged from our discussions, and are grounded in a belief that designers often choose methods based on where they are in the design process. We recognise that any other grouping may have served us just as well. Indeed, we found that almost all methods could have fitted into any category (as noted above), and sensitising was a part of every mashup, even if the method was used with another primary intention. This outcome suggests to us that sensitising is a foundational aspect of nature-entangled design. Such sensitising is intended to counteract the tendency among anglo-european designers to recognise a self-imposed otherness from the rest of nature – and calls for efforts to undertake nature-entangled design in cultures that operate as if humans are separate from nature. A separation that we recognise as being untrue in line with recent design philosophy that recognised plurality and critiques the dominating tendencies of modernity [9, 35].

A collaborative development of design methods.

Methods for nature-entanglement in design research are not only about understanding our interdependence with ecologies, they are also about finding ways to feed insights into design processes as social practices [4]. This requires an understanding from the perspective of how methods are appropriated by others. In our workshop, sharing and using the methods has improved and expanded the discussions around them. We learned about the applicability of the methods through others. The intentionally limited nature of the methods cards allowed people to fill in the gaps of what the methods "were" and how they should be used. Thus, generating new and diverging practices. Additionally, collectively applying the methods in groups (e.g. in a public park) highlighted the feeling of being supported by a community of practice [24], offering a unique perspective not encountered when using similar methods individually. The overall approach was thus not only about personal nature entanglement but also about sharing a collective positioning as part of nature.

CONCLUSION

This study contributes to nature-entangled design research with an annotated portfolio of methods-to-be that were explored and discussed in the context of a conference workshop. It has shared the value of cross-pollination by showcasing the process of appropriating the methods through mashups, and the insights they have generated. Lastly, we discussed ways to further articulate the methods and deepen reflection by highlighting how to make methods accessible, the importance of focusing on processes, the challenge of categorization, and the need to strengthen collaborative activities between design researchers in the field.

Several of the methods, such as micro-phenomenological interviews, relational mapping, and design work require more extensive time, infrastructure, or initial training before you can use them. These methods were thus not engaged further in the workshop. Additionally, explicit methods for design critique and ideation were not suggested in the workshop. Further work is thus needed to encompass a more diverse set of methods for nature-entangled design research. There is also an opportunity to conduct a similar workshop over several days (for example during summer schools or residency programs) to fully engage with the methods-to-be – and to survey if and how the methods have been appropriated after the workshop.

Nevertheless, it is crucial to showcase work in progress and initial attempts at developing methods. Revealing the challenges and reflections on imperfect work can be valuable for those interested in applying similar techniques. We encourage others to embrace nature-entangled design research and refine their methodologies by combining existing methods, even if not fully polished. We advocate for increased transparency in the difficulties of creating new methods, techniques, tools, and approaches, since sharing reflections on both successful and unsuccessful attempts can aid others in adopting and enhancing their approaches.

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