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Including natural beyond-human agency in Service Design process

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Abstract

Service design (SD) operates within a professional culture that has systematically excluded the living world from its stakeholder frameworks. Despite growing ecological awareness among practitioners, the discipline continues to produce methods, tools, and processes oriented almost exclusively toward human actors - a structural condition that this thesis identifies as both a research gap and an urgent practical problem. This research asks how SD can integrate natural beyond-human (BH) stakeholders into collaborative design processes, what barriers prevent that integration, how service designers currently conceptualize stakeholders, and what representational approaches and tools might make ecological inclusion possible.

The research draws on five methods: autoethnography, a survey of twenty SD students and practitioners, three expert interviews with purposively selected designers, participant observation across six more-than-human (MTH) design research encounters, and framework analysis. From which the findings suggest that the entry point to ecological inclusion matters as much as methodological depth - that framing and accessibility shape who can participate and how far the process can go. The thesis argues that incremental normalization from realistic starting positions is more likely to change the discipline than prescribing approaches that most practitioners cannot reach from where they currently stand.

The proposed solution that supports this is *Designing With: A Positioning Framework for Ecological Inclusion*, a three-stage instrument that moves practitioners from project context assessment through individual relational self-assessment to team method selection. The framework connects concept cards to specific positional conditions, making method choice accountable to the designer's actual starting position rather than to an idealized version of what MTH design should look like.

Keywords: service design, beyond-human stakeholders, more-than-human design, ecological inclusion, posthumanist design, stakeholder frameworks

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I have read many thinkers and researchers throughout this process, but I want to express particular admiration for Emīlija Veselova, whose research has been the foundational support for this thesis from the very beginning - and who has been not only an admirable researcher but also generous, open, and caring in her participation in it.

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And last but not least - thank you for reading this. I believe that becoming familiar with the topics of more-than-human design is itself a first step toward making this world a little bit better. I hope this thesis carries even small pieces you can bring along in your journey ahead.

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ANT – Actor-Network Theory
BH – Beyond human
C&PD - Collaborative and participatory design
EKA - Estonian Academy of Arts
HCD – Human-centered design
MTH – More-than-human
SD – Service design
SDSI – Service Design Innovation & Strategy

1. POSITIONING OF THE RESEARCHER

We as human beings have never experienced such heights of intellectual, economical, and technological development as we do now in the year of 2026. Therefore, I would like to start this thesis with a long, but necessary, quote from Anita Jena's research (Jena, 2024, p. 159) that I believe will strongly set the tone for what follows:

"Primitive people, in their initial struggle for existence, must have found Nature to be a formidable force to reckon with. Our ancestors eked out their means of survival from the abundant bounties of the ancient world with the meager tools at their disposal and sometimes tried to placate Nature by worshipping her. The earth was a rich Mother and the needs of the early people were few. With time the ever increasing demands of humankind were matched by their growing power to wreak destruction and havoc. They destroyed forests and dug into the earth with unrestricted abandon in the quest of greater wealth and enjoyment, slaughtered every type of life for food and even for the mere pleasure of killing. Human beings remain the only predator that kills the young adults of a species, damaging the reproductive capital of the latter. Philosophers have argued against the wanton destruction of the earth's resources. That these warnings have been largely ignored is apparent in the danger signs that have started to raise a question mark on the future of life on this planet."

This passage captures what we're living through right now. We experience firsthand the extreme increase in environmental catastrophes - and furthermore, the possible extinction of human beings per se just as the result of humankind's inability to control greed for wealth and money. This tension and pain is my, Amanda Strīģele's, main drive to dig deeper into ways how humans could cherish the world around them that is not man-made rather than destroy it.

Design - the field I am studying and the profession I am entering - has played an undeniable role in this crisis. As Wakkary argues, design today contributes directly to climate change and ongoing species extinctions, operating exploitatively in its relations to nonhuman species and materials that are extracted and reduced to purely human use (Wakkary, 2021). HCD while successful for some in shaping technologies to human needs regarding safety, health, wellbeing, and convenience, has been guided by an underlying humanism that may itself constitute part

of the problem rather than the solution. The very paradigm that promises progress may be accelerating our collective downfall (Wakkary, 2021).

1.1 The background of interest

This thesis is my way to translate the happenings in this world and what I'm really studying in the Erasmus Mundus Joint Master Degree SDSI. As a participant-researcher, it is very necessary to clarify the complex relationship I have with the baseline of this study. My position is deeply connected to my personal, socio-cultural, and academic identities. These parts of my observation point are essential to understand my views on the topic of MTH engagement in SD in the context of the Anthropocene, market-driven design, and human-centric approaches.

My decision to pursue the SDSI program emerged directly from professional encounters with the limitations of human-centered design (HCD) approaches. Being quite young (25 years old), I was leading the development of Creative and Culture Industries in Cēsis Municipality, Latvia, which included managing the co-creation center Skola6 and, more critically, spearheading the strategy for revitalizing a former industrial site of the Society of the Blind. From initial conceptual drafts to actual physical construction, I was there making decisions. Yet I quickly realized I lacked the tools and knowledge to navigate such a massive, multifaceted project with the care it deserved.

Four specific moments in this process pushed me toward SDSI, each revealing gaps in conventional design and planning approaches. First, the development area neighbored the remains of the Society of the Blind community, which made it obvious to me and others that we should not only include and cherish their heritage but make them active participants in the ongoing process as one of our most important stakeholders. Yet nobody involved in the project - including myself - was equipped to do this meaningfully. Second, Latvian public procurement law requires choosing the cheapest economical option for both design execution and construction of public property, which created massive value conflicts when trying to honor industrial heritage in a city center with deep historical significance. Third, despite my explicit written specifications in the procurement documentation that all trees and greenery must be preserved except for dead or diseased specimens, the construction company simply cut down

the remaining street trees. Fourth, even after partnering with the New European Bauhaus network for technical support, the top municipal leadership consistently prioritized bureaucratic compliance and economic value over aesthetics and sustainability.

These experiences taught me that public infrastructure functions as a direct form of service providing - yet our tools for designing it remain trapped in frameworks that privilege cost efficiency and narrow definitions of stakeholder value. My expectation for SDSI as a highly recognized triple master degree program was to gain tools that help navigate complex situations where care extends beyond user-centrism and profit maximization - where trees matter, where marginalized communities shape outcomes, where heritage and sustainability aren't sacrificed to the cheapest bid. What I didn't yet understand was that even these aspirations remained fundamentally human-centered, focused on including more human stakeholders and values while still treating the natural world as context rather than participant.

This positioning matters because the human relationship with MTH entities can be fundamentally understood as an ethical question (Jena, 2024; Veselova, 2023). Environmental ethics - a branch of Western philosophy - explores how humans ought to treat nature by considering which actions toward nature prove moral and which natural entities possess moral standing (Veselova, 2023). Yet there exists no consensus on which natural entities humans should consider when making moral decisions, with varied coexisting perspectives generating multiple frameworks for understanding human responsibilities toward the natural world. My research necessarily navigates this contested ethical terrain, and my personal values, worldviews, and lived experiences inevitably shape how I interpret and engage with these questions.

Moreover, my research is also strongly based on personal observations and reflections on this topic. This triggers different critiques of my competence and objectivity on this topic from any reader encountering this thesis. I recognize these are valid concerns within traditional scientific paradigms that privilege detached, neutral observation. However, contemporary scholarship in posthumanist design research challenges these very notions of researcher detachment.

1.2 Geopolitical context

I was born in Latvia, a post-Soviet country in Western Europe whose recent history swing back and forth between Soviet occupation, independence struggles, and contemporary integration into Western European structures. My family and formative education emerge from this context, profoundly shaping the worldviews, values, and sensibilities that inform this research. To ensure transparency regarding the reasoning behind observations and arguments throughout this thesis, I briefly introduce the societal beliefs and cultural practices of this region - not as universal truths, but as the situated knowledge (Haraway, 1988) that grounds my perspective.

Latvian culture occupies a liminal space between Eastern and Western European orientations, shaped by layers of occupation, resistance, and cultural preservation. The social fabric weaves together communal values inherited from both pre-Soviet rural traditions and Soviet collectivism, strong nationalism forged through repeated struggles for cultural survival, and deep connections to seasonal cycles and land-based practices. These are not nostalgic remains but living traditions that structure contemporary life, particularly outside urban centers.

I come from a pagan family whose roots extend into farm life and the previously mentioned cyclicity of nature. The social dynamics I observed growing up supported correctness and obedience toward formal systems in public settings, yet emphasized hard work, self-sufficiency, and fierce independence in private life - legacies perhaps of navigating Soviet bureaucracy while maintaining cultural identity. But always present was a care and relationalism toward the environments we inhabited, the animals we kept, and the plants we cultivated. My family woke with sunrise and slept with sunset. I spent hours handpicking bugs from tomato leaves - not because organic sprays were unavailable, but because this was the practice. I held rabbits close to comfort them, sat beside a solitary birch tree in the forest because it stood alone.

This culture emerges not only from rural presence to land but also from storytelling encountered early in childhood. One of my core memories and deepest value-shapers is Kārlis Skalbe's Dvēseļu Mežs (Forest of Souls), where a child's mother is transformed into a tree, leading to the idea that every tree once was a human. This narrative accomplishes something

Haraway (2003) would recognize as companion species thinking - it does not anthropomorphize nature through projection, but rather creates kinship by suggesting humans and trees share fundamental capacities for love, loss, and transformation. It offers not a metaphor but an ontological possibility: that the boundary between human and tree is permeable, that care and grief connect us across species.

Such stories are not entertainment but pedagogy - they teach relational ontologies where more-than-human beings are as close as our dearest humans. This perspective resonates with what Wakkary (2021) describes as thinking-with things rather than about them, and what Puig de la Bellacasa (2017) explores through her concept of care for soil - the recognition that beyond-human (BH) entities deserve not just consideration but genuine relationship.

Latvian culture is deeply nature-celebratory, though not in the environmentalist sense common to Western European discourse. We practice sauna rituals that bring birch branches, aromatics, and smoke into purification ceremonies. We mark every solstice with transformative rituals that acknowledge seasonal shifts and our embeddedness within them. We cherish deities responsible for harvest, sun, and wind - not as distant abstractions but as active presences whose attention must be maintained through offerings and respect. We heal with herbs gathered ourselves, learn to forage wild foods early in childhood, and understand that human wellbeing depends fundamentally on right relations with land and weather.

This closeness with nature's cycles has deeply shaped how I perceive the capitalistic, progress-driven paradigms that dominate contemporary design discourse. Where I learned to attune to seasonal rhythms and acknowledge dependencies on ecological processes, much of design education emphasizes human autonomy, technological mastery, and growth imperatives. Where my upbringing cultivated relationalism toward BH entities, dominant design frameworks position nature as resource, context, or constraint to be managed for human benefit.

1.3 Embracing situated knowledge

Haraway's concept of situated knowledge demonstrates that objectivity emerges not from impossible neutrality but from making the knower visible within the knowing process (Haraway, 1988). This turns objectivity into a matter of accountability - the visible knower

becomes present in the process of knowing, and this presence demands responsibility for the partial, incomplete nature of any single perspective. As Wakkary elaborates, understanding design from the perspective of situated knowledge opens design itself to being understood through multiplicity, where "the issue is not which claims are truer toward an ideal notion of design but rather that all claims about design that hold an embodied objectivity are accountable claims" (Wakkary, 2021, p. 50).

In this framework, feminist objectivity embraces knowing in its multiplicity. The knowing self remains partial in all its manifestations - never finished, whole, or simply present - always constructed and imperfectly stitched together, and therefore able to join with others to see collectively without claiming to become another (Haraway, 1988). This represents what Haraway terms "positioned rationality" - a joining of partial views and incomplete voices into a collective subjective position that acknowledges its limitations while claiming accountability for its perspectives (Haraway, 1988, p. 590).

Therefore, rather than pretending to false neutrality, I embrace my position as a service designer with strong commitments to beyond-human engagements for sustainability, combined with my background in creative strategy focused on creating deep narratives for transformative organizations. Everything for me needs to sound authentic, bold, but also very human - this is not a weakness in my research but rather a strength that demands I remain accountable for how my perspective shapes my interpretations, findings, and conclusions.

This critical self-reflection aligns with emerging methodological frameworks in design research that recognize the researcher as participant rather than distant observer - methodologies including autoethnography, practice-based research, and participant observation. Such approaches acknowledge that investigating emerging practices requires both analytical distance and embodied participation, particularly when exploring phenomena as ontologically complex as human relationships with the MTH world.

2. INTRODUCTION

This thesis emerges at a moment when the relationship between human activity and the living world can no longer be treated as a peripheral concern in design practice. The following chapter establishes the research problem, defines the scope of the inquiry, and introduces the conceptual foundations on which the research rests. It begins with the planetary conditions that give this work its urgency, moves through the disciplinary gap it seeks to address, and concludes with the research questions and methodology that orient the investigation.

2.1 Background of the research problem

The research problem this thesis addresses sits at the intersection of two conditions that rarely appear together in service design discourse: an accelerating ecological crisis and a discipline structurally unprepared to respond to it. The following sections trace both conditions in turn - first the planetary context, then the professional one - before identifying the specific gap that this research attempts to fill.

2.1.1 The planetary emergency

In 2024, the world exceeded the critical 1.5°C global warming threshold (UNEP, 2024), arriving at this tipping point years earlier than the 2030-2050 timeframe projected by the Intergovernmental Panel on Climate Change in 2018 (IPCC, 2018). This acceleration signals that Earth systems are destabilizing faster than scientific models predicted. The consequences of crossing this threshold include intensified impacts on warm water corals, fisheries, terrestrial ecosystems, and coastal flooding, with cascading effects across interconnected ecological and human systems (Brand, 2018).

Humanity has now crossed seven out of nine planetary boundaries (see Figure 1) - the safe operating space within which civilization can develop and thrive (Stockholm Resilience Centre, 2025). These transgressed boundaries include climate change, biosphere integrity, land-system change, freshwater use, biogeochemical flows, novel entities, and ocean acidification. Each boundary crossed represents a threshold beyond which Earth systems may enter unstable states with potentially irreversible consequences. Operating outside the safe planetary space means

humanity is fundamentally undermining the environmental systems upon which all life depends.

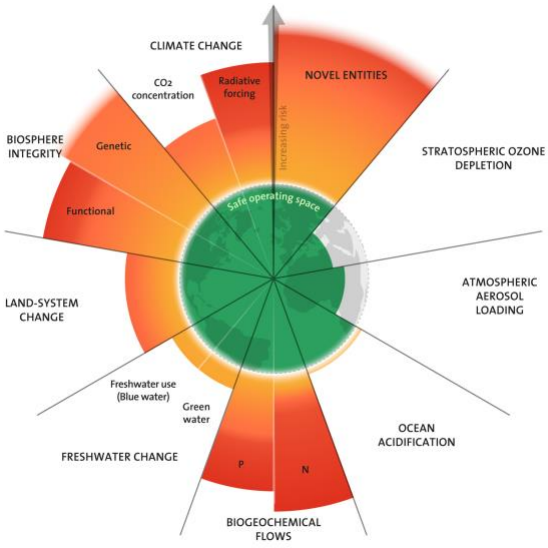


Figure 1. The 2025 update to the Planetary boundaries (Stockholm Resilience Centre, 2025)

The scale of ecological devastation manifests in stark statistics. Although humans account for merely 0.01% of all biomass on Earth, our footprint stands completely disproportionate to this tiny percentage (Bar-On et al., 2018). Wilderness - land largely untouched by humans - has shrunk from 85% of Earth's landmass at the turn of the twentieth century to only 23% today, continuing to contract under expanding human technological, economic, and domestic pressures (Watson et al., 2016). Vertebrate populations tell an equally devastating story: within forty-six years (1970-2016), populations of mammals, birds, fish, reptiles, and amphibians declined by an average of 68% (WWF, 2020). Scientists confirm we have entered the sixth major mass extinction event in planetary history, with species disappearing at rates up to 1,000 times higher than background extinction rates (Ceballos et al., 2017).

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2019) warns that approximately one million species face extinction in the coming decades. Ecosystem collapse is already visible: coral reefs, which occupy less than 1% of ocean area but provide habitat for 25% of all marine species, face widespread degradation from ocean warming, acidification, and pollution (Hughes et al., 2017). Recovery timescales for severely

degraded reef ecosystems extend across centuries to millennia even under optimistic climate scenarios (Hughes et al., 2018). In protected areas across Germany, flying insect biomass declined by more than 75% over twenty-seven years (Hallmann et al., 2017), while bee populations continue declining globally, threatening both wild plant reproduction and agricultural food security (Potts et al., 2010; IPBES, 2016).

2.1.2 The design problem: Anthropocentrism in service design practice

The EU Circular Economy Action Plan of March 2020 pointed out that up to 80% of products' environmental impacts are determined at the design phase and that, because most products are not designed with circularity in mind, many break down too quickly and cannot be easily reused, repaired or recycled (European Parliament, 2025). While this data itself should back up all the validation for the design problem of current processes, the problem itself goes much deeper, especially when the design object is not merely product.

Since its formalization as a profession in the early twentieth century, design has primarily focused on creating solutions that satisfy human needs, first through technology-focused approaches, and later explicitly centering processes around humans using user-centric, human-centric, and participatory approaches (Ceschin & Gaziulusoy, 2020). SD, as an area of design theory and practice, involves stakeholders in design projects to jointly explore problems, negotiate values, and co-create solutions (Steen, 2013). SD has historically defined "stakeholders" in exclusively human terms - as individuals, groups, or organizations who can inform, be involved in, or be affected by the design process. Veselova and Gaziulusoy (2022) note this anthropocentric limitation and propose expanding the definition to include natural nonhuman entities that are connected to, affected by, or possess interdependencies with design projects and their outcomes.

Wakkary (2021) argues that HCD, while successful in shaping technologies to human needs regarding safety, health, and wellbeing, has been guided by an underlying humanism that may itself constitute part of the problem rather than the solution. Design today contributes directly to climate change and ongoing species extinctions, operating exploitatively in its relations to nonhuman species and materials that are extracted and reduced to purely human use (Wakkary,

2021). The question Wakkary poses strikes at the heart of design's identity: what if human-centered thinking is not the answer to planetary crisis but rather, in its dominant role, may be part of the problem?

This anthropocentric framing reflects what sustainability science identifies as root causes of the environmental crisis: the perceived separation from nature and the perceived human right to dominate nature (Abson et al., 2017; Ives et al., 2017). The human-nature divide - the worldview that the human realm and nature are two separate realms - is ingrained in beliefs, language, structures, and behavior, as well as in research disciplines and professional practices (Abson et al., 2017; Muhar et al., 2018; Raymond et al., 2017).

Collaborative and Participatory Design (C&PD) - the broader framework within which SD operates - has focused predominantly on developing solutions that satisfy human wants and needs while treating nature as resource, context, or constraint rather than as stakeholder with agency and needs (Veselova, 2023).

Even when service designers aim explicitly for sustainability outcomes, current methodologies lack frameworks for identifying which BH entities constitute relevant stakeholders or how to represent their needs and perspectives in design processes. The field requires what Latour (2004) calls bringing the sciences into democracy - creating new assemblies of humans and nonhumans in which all have rights to speak and participate. This connects to Fuad-Luke's (2009) vision of design activism creating counter-narratives that challenge existing power structures and generate institutional and environmental change.

2.1.3 The research gap

While design research increasingly acknowledges the need to move beyond anthropocentrism, SD specifically lacks practical methodologies for beyond-human stakeholder integration. Many researchers working with natural nonhuman stakeholders in design contexts do not describe how they identify relevant stakeholders or determine their needs when aiming to contribute to sustainability (Veselova, 2023). The proposal that considering nature and natural nonhuman entities can contribute to addressing the sustainability crisis warrants careful

investigation, yet it remains unclear how exactly stakeholder inclusion assists in addressing root causes and building sustainable solutions.

Existing MTH design approaches have emerged primarily in product design, interaction design, and architecture. Poikolainen Rosén et al. (2022) explore learning from gardening as a pathway toward MTH-centered design, demonstrating how practices of care and attentiveness to ecological processes can inform design approaches. Tsing (2015) offers insights through her concept of polyphonic assemblages, noticing the happenings and interplay between nonhumans and humans. Despret (2016) provides generous undoing of scientific language and theories too frugal to see animal agencies. However, service design's distinctive focus on systems, experiences, and stakeholder relationships creates both unique opportunities and specific challenges for BH engagement that these existing approaches do not fully address. Three critical gaps exist in current SD practice:

Methodological gap: Service designers lack systematic approaches for identifying which BH are relevant to specific projects.

Representational gap: SD methods - workshops, stakeholder mapping, journey mapping, service blueprinting, co-creation sessions - were developed for human participants who can speak, attend meetings, and provide feedback. Nature cannot participate in these ways.

Ethical gap: BH stakeholder engagement raises profound ethical questions that current SD practice is ill-equipped to navigate.

Service designers need practical guidance that acknowledges this complexity while enabling action. Haraway (2016) rejects both pure innocence and pure guilt, arguing instead for response-ability - the ability to respond ethically within messy, compromised situations where there is "no way to eat and not to kill, no way to eat and not to become with other mortal beings to whom we are accountable."

2.2 Motivation for the study

Already some parts of the motivation of this study have been stated in Chapter 1 where initial problems are represented. Furthermore, this research addresses research gaps by developing practical frameworks for integrating BH stakeholders in SD practice. Three interconnected motivations drive this work:

Motivation 1: Raise Critical Awareness

SD practitioners and educators need to understand that anthropocentric approaches perpetuate the worldviews driving ecological collapse. The perceived separation from nature and the perceived right to dominate nature form root causes of the environmental crisis (Abson et al., 2017; Ives et al., 2018). Haraway (2016) argues that the Anthropocene demands we "stay with the trouble" - refusing to look away from difficult realities or delegate ethical questions to pre-decided rules. This research documents the evidence, examines design's complicity, and makes the case that business-as-usual is ethically indefensible.

Motivation 2: Translate Existing Knowledge

BH approaches exist in other design disciplines, sustainability science, environmental ethics, and Indigenous knowledge systems. This research examines what could work in SD contexts, what requires adaptation, and where entirely new approaches are needed. As Wolfe (2010) notes, posthumanism forces us to rethink taken-for-granted modes of human experience by recontextualizing them within the broader sensorium of other living beings and their ways of bringing forth worlds.

Motivation 3: Provide Practical Tools

Awareness without methodology leads to frustration. Service designers need accessible methods for identifying relevant BH stakeholders, representing their perspectives in design processes, and navigating ethical complexities - methods that work within real project constraints of time, budget, and client expectations. This requires translating theoretical

insights into actionable frameworks, adapting existing methods, and developing new tools specifically for SD contexts.

2.3 Research goals and questions

This thesis aims to develop practical methodologies for integrating BH stakeholders in SD practice, enabling transformation from anthropocentric toward sustainable (Gaia) futures.

The research is guided by a core hypothesis derived from Brand's (2018) co-emerging futures framework: The Gaia future - characterized by post-anthropocentric worldviews that value biodiverse ecosystems and recognize humans as part of nature - can be reached if design processes meaningfully include BH stakeholders.

Primary research question:

RQ1: How can service design integrate beyond-human stakeholders into collaborative design processes, moving toward Gaia futures?

Current SD approaches maintain anthropocentric orientations even when pursuing sustainability, operating within what Brand (2018) terms Habitania - managing resources efficiently for human benefit. Moving toward Gaia futures - post-anthropocentric worldviews valuing biodiverse ecosystems and recognizing humans as part of nature - requires transforming how designers conceptualize stakeholders, whose needs matter in decisions, and how participation structures create space for BH voices.

As Wakkary (2021) argues, human-centered thinking may not solve planetary crisis but perpetuate it. This question explores whether integrating BH stakeholders can catalyze the "change of heart" Brand (2018) identifies as necessary for Gaia futures - transformation at the personal sphere where worldviews shift, enabling new possibilities in political structures and practical solutions.

Secondary Research Questions:

RQ2: What barriers currently prevent service designers from integrating beyond-human stakeholders, and what values, practices, and conditions would enable this transformation?

Understanding why BH inclusion remains rare proves essential for viable pathways forward. Barriers might operate across multiple levels: practically (time, budget constraints), epistemologically (lack of ecological literacy), methodologically (anthropocentric tools), and structurally (disciplinary norms, economic systems, client expectations). This question investigates these material, cultural, and institutional obstacles while exploring what conditions would enable transformation despite real constraints.

RQ3: How do service designers currently conceptualize stakeholders, and what frameworks can guide identification of relevant beyond-human stakeholders for specific project contexts?

SD defines stakeholders as individuals, groups, or organizations who inform or are affected by design processes. This question examines how designers determine stakeholder relevance - what criteria they apply, which entities receive consideration, how boundaries are drawn. Moving beyond current practice requires frameworks helping determine which BH stakeholders matter for specific contexts. Veselova and Gaziulusoy's (2021) systemic typology - identifying seven types including individual organisms, populations, ecosystems, processes, and cycles - provides foundation, yet designers need practical assessment criteria determining relevance based on project type, impact scale, and degree of human-nature entanglement.

RQ4: What representational approaches and tools might enable service designers to include beyond-human perspectives in design processes?

SD's participatory methods - workshops, stakeholder mapping, journey mapping, co-creation - were developed for humans who speak, attend meetings, and provide feedback. Nature cannot participate this way, creating fundamental methodological challenges. This question investigates how BH interests might be represented within existing workflows, examining Veselova's (2023) three approaches (direct participation, expert proxies, representative

profiles) alongside methods observed in BH design practice. It explores what practitioners find viable, what techniques might adapt to SD constraints, and how to navigate inherent limitations of representation while maintaining accountability.

2.4 Definition of key terms and limitations of the research

2.4.1 Key terms

Service design (SD)

SD is an area of design theory and practice focusing on creating and improving services by involving stakeholders in design processes. Designers and stakeholders jointly explore problem areas, learn about each other's needs, negotiate values, and collectively envision, conceptualize, and create future scenarios or solutions (Steen, 2013). SD encompasses approaches including participatory design, co-design, and co-creation, emphasizing stakeholder involvement at varying levels throughout the design process.

Beyond-human (BH) / more-than-human (MTH) stakeholders

Following Veselova (2023), BH stakeholders are natural entities - individual organisms, species collectives, ecosystems, and ecological processes - whose existence, needs, and flourishing intersect with design projects and warrant consideration alongside human stakeholders. This definition acknowledges that design interventions operate within interconnected human-nature systems where non-human entities are active participants whose wellbeing affects systemic sustainability.

I use BH and MTH somewhat interchangeably with slight distinctions. BH emphasizes moving past human-only concerns. MTH (following Haraway, 2003, and Wakkary, 2021) emphasizes relational, interconnected nature of human and nonhuman existence. Both reject anthropocentric framing positioning humans as separate from or superior to nature. The distinction is one of emphasis rather than opposition, and the two are treated as complementary rather than competing framings.

Sustainability and sustainable futures

I adopt systemic sustainability framing from Veselova (2023), viewing sustainability as a systemic property emerging from interconnected dynamics of human-nature systems. This recognizes that humans and social, technical, and economic systems depend fundamentally on nature and ecological systems - they cannot be viewed as independent (Neumayer, 2003; Rupprecht et al., 2020). Human-made systems extensively and inseparably interconnect with natural elements and systems through flows and exchanges of materials, nutrients, and energy (Ives et al., 2017).

Sustainable futures are futures in which human activities operate within planetary boundaries while ensuring wellbeing of both human and BH entities. This aligns with Brand's (2018) Gaia future scenario - a post-anthropocentric worldview valuing biodiverse ecosystems and recognizing humans as part of nature.

Posthumanism

Following Wakkary (2021), posthumanism in this thesis refers to critical posthumanism - a relational ontology that abandons the autonomy of human subjectivity central to humanism for a relational subjectivity where beings are defined by relations they form rather than existing as independent entities (Haraway, 2003). This is distinct from transhumanist afterhuman ideas that extend humanist ideals into technological transcendence (Hayles, 1999).

Posthumanism is the sharing of the center between humans and nonhumans - what was solely occupied by humans at the center now includes other beingness, materiality, vitality, and technology moving from background to foreground alongside humans (Wakkary, 2021). Braidotti (2013) describes this as critical posthumanism - thinking that is not about technology as neutral extension of humans but about becoming or being human, entangled thoroughly with the world in ways that can only be relational and expansive.

This allows rethinking design in ways that displace the human at the center with humans and nonhumans bound together materially, ethically, and existentially (Wakkary, 2021).

2.4.2 Scope and limitations

This research focuses specifically on SD practice rather than all design disciplines. While insights from product design, interaction design, and architecture inform this work, methods and frameworks target service designers working on systems, services, and experiences.

The research emphasizes natural nonhuman stakeholders - organisms, ecosystems, processes, cycles - rather than artificial nonhuman entities (AI, algorithms, robots). While both fall under MTH, the focus on natural entities reflects urgency of ecological crisis and need to address human-nature relationships.

This thesis adopts a practice-oriented rather than purely theoretical approach. While engaging posthumanist philosophy (Wakkary, 2021; Haraway, 2003, 2016; Latour, 1993-2017; Bennett, 2010; Barad, 2007), environmental ethics (Brennan & Lo, 2016; Boylan, 2013; Sandler, 2018), and sustainability science (Veselova, 2023), the primary goal is developing practical methodology for working practitioners. Theoretical depth balances against accessibility and applicability.

The research is limited by its geographic and cultural context. As a researcher educated in Western European institutions (Latvia, Estonia and Finland), my perspectives are shaped by Western design paradigms and philosophical traditions. While acknowledging Indigenous knowledge systems and non-Western approaches to human-nature relationships, I do not claim expertise in these areas. As Haraway (1988) argues through her concept of situated knowledges, all knowing is positioned and partial - objectivity emerges not from impossible neutrality but from making the knower visible within the knowing process, demanding accountability for partial perspectives. Future research should center Indigenous and non-Western perspectives more fully.

Temporal limitations constrain this thesis to a snapshot of rapidly evolving fields. SD, MTH design, and sustainability science develop quickly. Methods and frameworks proposed represent current best understanding but require ongoing refinement.

Finally, this research acknowledges the fundamental limitation of human perspective. Even experts deeply familiar with natural entities can only represent partial, biased knowledge - we cannot fully know or represent the worlds of other beings. As Despret (2016) demonstrates, even generous readings of animal agency remain mediated through human categories and language. No matter how sophisticated our methods, we remain humans attempting to understand and represent BH needs and perspectives.

2.5 Summary of the methodology

To answer the research questions outlined above - and in alignment with my positionality as a service designer committed to ecological justice and BH flourishing - this study adopts a critical realist philosophy informed by posthumanist, feminist, and new materialist perspectives. This orientation assumes that reality is neither singular nor entirely socially constructed, but emerges through material-semiotic entanglements of humans, nonhumans, discourses, and practices (Haraway, 2016; Barad, 2007; Latour, 2005). Knowledge, therefore, is never neutral or disembodied; it is relational, situated, and enacted through specific practices and assemblages (Haraway, 1988).

Following these philosophical commitments and drawing on similar empirical studies in sustainable design (Poikolainen Rosén et al., 2022; Veselova, 2023), this study adopts a multimethod qualitative approach combining four complementary methods to triangulate understanding and develop robust, practice-grounded frameworks. This methodological combination is considered best suited for capturing the complex, nuanced, contextual, and emotional dimensions of BH stakeholder integration among SD practitioners. The methods are:

- **Method 1: Survey Research.** A comprehensive survey distributed to SD practitioners and students (primarily SDSI program participants) maps the current landscape of awareness, attitudes, and practices regarding BH stakeholder integration. The survey explores current stakeholder concepts and practices, sustainability commitments, awareness of BH approaches, perceived barriers and enablers, and preferences for tools and methods.

- **Method 2: Semi-Structured Interviews.** In-depth interviews with practitioners who have attempted BH stakeholder integration explore practical experiences, methods used, challenges encountered, unintended consequences, lessons learned, and recommendations.
- **Method 3: Literature Review.** Systematic review of existing literature for BH stakeholder identification and integration draws from:
    - posthumanist design theory (Wakkary, 2021; Haraway, 2003, 2016; Latour, 1993-2017),
    - more-than-human design practice (Poikolainen Rosén et al., 2022;),
    - natural stakeholder integration (Veselova, 2023; Veselova & Gaziulusoy, 2021, 2022),
    - co-emerging futures theory (Lovelock, 1972; Lovelock & Margulis, 1974; Brand 2018),
    - design critique (Papanek, 1971; Fry, 2008; Fuad-Luke, 2009),
    - foundational posthumanist philosophy (Bennett, 2010; Barad, 2007)
- **Method 4: Participatory Observation.** Attendance at BH design workshops and lectures as participant-researcher documents methods, participant responses, and embodied experiences of perspective-shifting practices. Data collection includes field notes documenting activities and responses, reflexive journaling capturing subjective experiences and learning processes, and artifact collection (handouts, workshop outputs, facilitator materials).
- **Method 5: Autoethnography.** Given the dual role as practicing service designer and researcher, autoethnography enables systematic reflection on tensions between current anthropocentric design methodologies and aspirations toward BH stakeholder integration. It includes reflexive documentation of design work, workshop facilitation experiences, and encounters with barriers to ecological inclusion.

Together, they inform development of practical framework or tool grounded in both theory and practice, responsive to real barriers and constraints, and validated through multiple perspectives.

Regarding generalizability and transferability, this research does not seek statistical generalization. Instead, it aims to: (1) identify patterns and themes that can be compared with existing literature to support transferability of research findings across SD contexts, (2) develop framework adaptable to different project types and constraints, and (3) enable particularized, context-sensitive, and ecologically grounded change within SD practice. The goal is not universal applicability but rather what Haraway (2016) calls response-ability - providing resources that enable practitioners to respond thoughtfully to the specific situated realities and BH stakeholders they encounter.

2.6 Structure of the thesis

Chapter 1 (Positioning): Establishes the personal, professional, and geopolitical context from which this research emerges. This chapter makes the researcher's positionality explicit as an epistemological starting point rather than a source of bias to be neutralised.

Chapter 2 (Introduction): Presents the research problem, objectives, and research questions. It defines the scope of the study, introduces the key concepts of BH stakeholders and MTH design, and outlines the structure of the thesis.

Chapter 3 (Literature Review): Examines four theoretical domains foundational to this research: posthumanist design theory and the critique of human-centred design; natural stakeholder integration and the typology of BH entities; co-emerging futures and the Gaia framework as a normative horizon; and SD as a discipline, including its core tools, methods, and structural limits regarding ecological inclusion.

Chapter 4 (Methodology): Describes the research design and philosophical foundations, including critical realism and posthumanist constructionism as the ontological and epistemological stances. It presents the five methods employed - autoethnography, survey research, semi-structured expert interviews, participant observation across six encounters, and framework analysis - and explains the rationale for each. It addresses ethical considerations and acknowledges the limitations of the study.

Chapter 5 (Results): Presents findings across five data sources. The autoethnographic reflection documents the absence of ecological thinking in a mainstream SD curriculum. The survey analysis maps current practitioner awareness, stakeholder conceptualisation, barriers, and tool preferences across twenty respondents. The expert interview synthesis draws on three practitioner positions to reveal the structural, commercial, and emotional dimensions of BH inclusion. The participant observation chapter documents nine workshop concept cards derived from six research encounters, each grounded in a published source and mapped to the double diamond and Veselova and Gaziulusoy's inclusion modes. The chapter concludes with the framework *Designing With: A Positioning Framework for Ecological Inclusion*, the original contribution of this thesis, which operates across three sequential stages - project context assessment, individual relational self-assessment, and team method selector - connecting the nine concept cards to specific positional conditions.

Chapter 6 (Discussion): Interprets the findings through four analytical themes - the positioning problem, the framing paradox, the representation limit, and the structural education gap - relating them to the research questions and to the theoretical literature. It addresses the implications of the research for posthumanist design theory and for SD practice and acknowledges the ethical considerations and limitations of the study.

Chapter 7 (Conclusions): Answers the four research questions directly and summarises the main findings. It states the three contributions of the thesis - empirical, methodological, and the framework itself - and proposes four directions for future research, including framework validation in live project contexts, pedagogical integration, commercial translation, and decolonial approaches to BH design practice.

3. LITERATURE REVIEW

This literature review positions my research within five interconnected bodies of scholarship that together establish the theoretical foundation and identify critical gaps that this thesis addresses. The review examines: (1) HCD paradigms and their critiques, (2) posthumanist and MTH design theory, (3) environmental ethics and stakeholder frameworks, (4) approaches to non-human representation in design, (5) sustainability science and systemic thinking, and (6) the Gaia hypothesis and co-emerging futures framework.

Each section of this review critically examines its domain, identifying not only what scholarship reveals but also where significant gaps, tensions, and contradictions exist. Rather than merely cataloging existing knowledge, the review maintains critical engagement with how different theoretical traditions complement or conflict with one another, and how abstract philosophical frameworks do or do not translate into practical methodologies. This critical stance proves essential because my research seeks not merely to understand more-than-human design theoretically but to develop actionable frameworks that service designers can implement within real project constraints.

3.1 Human-centered design: foundations and critiques

HCD emerged as design's dominant paradigm through evolutionary phases that progressively foregrounded human needs, experiences, and participation. Early twentieth-century design focused primarily on technological feasibility and aesthetic form, positioning designers as expert arbiters of solutions (Cross, 2011). The shift toward human-centeredness began with ergonomics and human factors approaches that studied human capabilities and limitations to inform design specifications (Norman, 2013). This evolved into user-centered design, which emphasized understanding user needs, contexts, and behaviors through research methods borrowed from psychology and anthropology (Norman, 2013).

Participatory design marked a significant expansion by repositioning users not merely as research subjects but as active collaborators in design processes (Schuler & Namioka, 1993). Emerging from Scandinavian workplace democracy movements in the 1970s, participatory

design insisted that those affected by design decisions should participate in shaping those decisions (Ehn, 1988). This political commitment to democratizing design evolved into contemporary co-design approaches, which structure collaborative creation processes involving diverse stakeholders (Sanders & Stappers, 2008). SD inherited and amplified these participatory commitments, emphasizing stakeholder involvement in jointly exploring problems, negotiating values, and co-creating solutions (Steen, 2013).

SD scholarship defines stakeholders as a person, group or organization that is somehow connected to or has an interest in the specific project scope (Stickdorn et al., 2018). This stakeholder framework recognizes two primary participant categories: trained design professionals who guide methodology, and "others" - variously termed users, citizens, informants, design partners, or co-designers - who contribute lived experience and contextual knowledge (Lee, 2008). Participation approaches vary across a spectrum from passive observation through consultative feedback to active co-creation, with different methods positioning stakeholders with different degrees of agency and influence (Harder et al., 2013).

However, participation does not automatically equate to power redistribution. Critical scholarship reveals that co-design processes often maintain asymmetric power relations despite rhetoric of collaboration (DiSalvo et al., 2012). Designers retain control over process framing, which issues become discussable, which solutions receive consideration, and how "success" gets defined (Björgvinsson et al., 2012). Bratteteig and Wagner (2012) identify multiple levels where power operates in participatory design: conceptualizing power (who frames problems), structuring dominance (whose knowledge counts as legitimate), transformative capacity (who can implement decisions), and materialization (which artifacts carry forward certain values while obscuring others). These power dynamics mean that expanding participation does not necessarily transform underlying assumptions about whose interests matter - it can simply extend human-centered frameworks to include more humans.

Crucially for this research, all participatory design and SD frameworks maintain fundamentally anthropocentric orientations. Regardless of how participation gets structured, stakeholder categories remain exclusively human. Nature appears, if at all, as context, constraint, or resource rather than as participant or stakeholder with legitimate interests (Veselova &

Gaziulusoy, 2022). This anthropocentric framing operates invisibly within SD methodology - stakeholder mapping templates assume human actors, journey maps trace human experiences, service blueprints orchestrate human interactions. The tools themselves encode assumptions that design serves human interests.

Recognition that HCD contributes to rather than resolves ecological crisis has deep roots in design critique. Papanek's (1971) indictment that "there are professions more harmful than industrial design, but only a very few" (preface) challenged designers to develop social and ecological responsibility, distinguishing between human wants artificially created through marketing and genuine needs. Yet Papanek's critique, while prescient about environmental degradation, remained fundamentally anthropocentric - calling for design to serve human needs responsibly rather than questioning whether humans should occupy design's exclusive center.

Fry (2008) extended this critique through his concept of defuturing, arguing that design practices actively destroy futures by depleting resources and degrading ecosystems upon which future possibilities depend. Design does not simply create products and services; it structures material and social conditions that determine what becomes possible or impossible for future generations and species. Fry calls for redirective practice - turning design away from futuring (creating conditions that enable certain futures) toward sustaining futures through elimination design that removes unsustainable products, practices, and systems. His work recognizes that sustainability requires not designing better things but challenging the imperative to design more things for expanding human consumption.

Fuad-Luke (2009) develops these concerns through design activism, defined as involving "design thinking, imagination and practice" applied "to create a counter-narrative aimed at generating and balancing positive social, institutional, environmental and/or economic change" (p. 27). Design activism positions designers as agents who can challenge dominant paradigms, revealing how current practices serve particular interests while marginalizing others. Fuad-Luke recognizes that mainstream design operates within and reinforces capitalist growth imperatives that fundamentally conflict with ecological sustainability. However, design activism still largely addresses how designers can create better outcomes for human

communities and environments, rather than questioning whether design should serve exclusively human interests.

Wakkary (2021) makes this question explicit: what if human-centered thinking is not the answer to planetary crisis but rather, in its dominant role, may be part of the problem? Design today contributes directly to climate change and ongoing species extinctions, operating exploitatively in its relations to nonhuman species and materials that are extracted and reduced to purely human use. The very paradigm that promises progress - solving human problems through better design - may be accelerating collective ecological collapse. Wakkary argues that design has been guided by underlying humanism that positions humans as autonomous reasoning subjects separate from and superior to the material world. This humanist foundation enables treating nature as resource rather than recognizing humans as fundamentally entangled with and dependent upon ecological systems.

This critical trajectory reveals an evolution from calls for more responsible HCD (Papanek) through recognition that design structures possible futures (Fry) and can contest dominant paradigms (Fuad-Luke) to fundamental questioning of whether human-centeredness itself must be challenged (Wakkary). Each iteration pushes toward more systemic critique, recognizing that incremental improvements within anthropocentric frameworks cannot address crises generated by anthropocentrism itself.

3.2 Posthumanist and more-than-human design theory

Posthumanist theory provides philosophical grounding for challenging HCD by proposing alternative ontologies where humans are not autonomous subjects separate from the world but relationally constituted through entanglements with human and nonhuman others. This scholarship does not reject humanism to transcend the human toward technological enhancement (transhumanism) but rather refigures what being human means by recognizing fundamental dependencies, co-constitution, and shared agencies across human and nonhuman entities.

Haraway's work proves foundational for posthumanist design thinking. Her concept of naturecultures directly challenges the nature/culture binary that underlies modernist thought,

arguing that "nature and culture are not opposites but co-constitute one another" and that beings "do not exist before relations; rather, they are constituted through the relations they form within the world" (Haraway, 2003, p. 7). This relational ontology means understanding humans not as independent agents who then enter into relationships, but as fundamentally relational beings whose very existence emerges through entanglements with others. Her companion species thinking extends this, proposing that humans and other species "co-constitute one another, not through mastery or use but through living and dying together in significant otherness" (Haraway, 2003, p. 12).

Haraway (2016) develops these ideas through her call to "stay with the trouble" - refusing easy solutions or innocent positions outside the complex, compromised realities we inhabit. This demands what she terms response-ability - not universal ethical rules applied from outside but the capacity to respond to specific situated encounters with other beings, acknowledging accountability for the partial perspectives we inevitably hold. Her thinking-with proposes that knowing always occurs in relation to other humans, technologies, things, and animals rather than through detached observation of separate objects (Puig de la Bellacasa, 2012). For design, this suggests shifting from designing for users toward designing-with humans and nonhumans in fundamentally relational ways.

Latour's Actor-Network Theory (ANT) provides complementary insights by examining how realities are produced through heterogeneous networks of human and nonhuman actants (Latour, 2005). ANT refuses distinctions between nature and culture, subject and object, arguing instead that entities - whether humans, technologies, organizations, or natural phenomena - are defined through their relations in networks rather than possessing inherent essences. Latour's (1993) argument that "we have never been modern" challenges the purification work that maintains strict separations between nature and culture, revealing that scientific facts and technological artifacts emerge through hybrid networks of humans and nonhumans.

For design, Latour's concept of spokespersons proves particularly significant. He argues that nonhumans cannot speak for themselves in human forums, requiring humans to represent their interests - but this representation is inherently uncertain, running "the entire gamut from

complete doubt (speaking in one's own name rather than representing those claimed) to total confidence (when those represented truly speak through the spokesperson's mouth)" (Latour, 2004, p. 64). This uncertainty is not a problem to solve but a condition to acknowledge - representation will always be partial, contestable, and requiring accountability. Latour's shift from matters of fact to matters of concern reframes design challenges from seeking objective truths to navigating contested political questions about how to live together with human and nonhuman others (Latour, 2004).

Bennett's (2010) vital materialism extends these insights by arguing that matter itself possesses vitality - agentic capacities to create effects and combinations that exceed human intention or control. Her analysis of the 2003 Northeast power failure demonstrates that the electrical grid functions as an assemblage of humans and nonhumans - "a volatile mix of coal, sweat, electromagnetic fields, computer programs, electron streams, profit motives, heat, lifestyles, nuclear fuel, plastic, fantasies of mastery, static, legislation, water, economic theory, wire, and wood" (Bennett, 2010, p. 25). No individual human can be held responsible for the grid's failure because agency is distributed across this assemblage. If things share in making the grid function and fail, they share in politics and deserve consideration alongside humans.

Bennett argues that recognizing material vitality moves us past "the belief that humans are special... outside the order of material nature" (Bennett, 2010, pp. 36-37), toward understanding that "we are also nonhuman and that things, too, are vital players in the world" (p. 4). This does not mean attributing human-like consciousness to things but recognizing that humans share affinities with nonhumans - that agency and intentionality, traditionally viewed as exclusively human, are actually distributed across assemblages of humans and things.

Barad's (2007) agential realism pushes these arguments further by proposing that agency is not an attribute entities possess but an ongoing reconfiguring of the world through intra-actions. Rather than pre-existing entities interacting, Barad argues that entities and their boundaries are produced through specific material-discursive practices. We cannot separate observation from the observed, subject from object, human from apparatus - all are co-constituted through practices. This challenges design's traditional subject-object framing where designers (subjects) shape materials and create products (objects) for users (subjects who become objects

of study then subjects of designed experiences). Instead, designing appears as a practice where designers, materials, tools, users, and contexts mutually constitute one another through ongoing intra-actions.

Wakkary's (2021) *Things We Could Design* provides the most comprehensive framework for translating posthumanist philosophy into SD practice. Wakkary proposes posthumanist design as fundamentally relational and expansive, refiguring design as multiple intersecting nomadic practices rather than a singular discipline with fixed boundaries. Nomadic practices are fluid, constantly moving and changing form to match the terrain they traverse - they refuse stable foundations or definitive boundaries. This allows design to be understood pluralistically, with different design practices valid within their contexts rather than one true design method.

Central to Wakkary's framework is understanding things as relational and multistable - without fixed meanings, interconnected with humans and assemblages, possessing their own intentionality toward the world. Supporting other scolars - things are not passive objects receiving human intentions but active participants with agentic capacities. This shifts design from making objects that serve human purposes toward designing-with things, acknowledging their agencies and the hybrid assemblages of humans and nonhumans that actually do designing. Wakkary argues that designers should be understood as assemblies of humans and nonhumans rather than autonomous human subjects - what he terms designer as biography, where humans and nonhumans together inscribe themselves into shared lifeworlds.

This demands what Wakkary calls humility in the designer - recognizing the emergent, fallible nature of posthuman subjectivity rather than claiming universalizing objectivity or mastery. Designers must acknowledge that things will always partly withdraw from human understanding and that design interventions will generate unintended consequences because agencies are distributed across assemblages. Wakkary's framework demonstrates how posthumanist philosophy can inform concrete design practices, though his examples focus primarily on product and interaction design rather than SD.

While posthumanist design scholarship provides rich theoretical foundations and demonstrates feasibility through examples, significant gaps remain in how these approaches translate to SD

specifically. Most examples come from product design (Wakkary's Tilting Bowl, Morse Things), interaction design (animal-computer interaction projects), or architectural installations rather than SD contexts. The philosophically sophisticated frameworks developed by Haraway, Latour, Bennett, and Barad remain largely abstract for practitioners seeking actionable methodologies.

The gap between philosophical richness and practical application proves particularly acute for SD. Service designers working on real projects with actual budgets, timelines, and clients need frameworks showing: when BH stakeholders are relevant to their specific project, how to identify which natural entities matter, what methods can represent BH interests within SD workflows, and where in processes BH perspectives can meaningfully enter. Current posthumanist design literature provides compelling reasons why design should move beyond human-centeredness but limited guidance on how service designers can operationalize this shift within professional practice contexts.

3.3 Environmental ethics and stakeholder frameworks

Environmental ethics, as a branch of Western philosophy, explores how humans ought to treat nature by considering which actions toward nature are moral and which natural entities possess moral standing (Brennan & Lo, 2016). This field emerged in the 1970s alongside growing environmental movements, challenging anthropocentric assumptions that only humans have intrinsic value while nature possesses merely instrumental value based on usefulness to humans (Sandler, 2018). However, environmental ethics scholarship has generated multiple competing frameworks without consensus on which natural entities deserve moral consideration or how to balance human and nonhuman interests when they conflict.

Anthropocentric frameworks maintain that nothing in nature has intrinsic value or moral standing - nature matters only insofar as it serves human needs and purposes (Boylan, 2013; Sandler, 2018). Strong anthropocentrism holds this position absolutely, while weak anthropocentrism acknowledges potential intrinsic value in nature but considers human interests overwhelmingly more important. Enlightened or prudential anthropocentrism argues humans have moral duties toward nature because those duties ultimately serve human

wellbeing - protecting ecosystems ensures resources for future human generations. These frameworks dominate mainstream environmental policy and economic thinking, treating ecological degradation as problem because it threatens human interests rather than because nature has inherent worth.

Non-anthropocentric frameworks challenge this human-only focus by assigning intrinsic value and moral standing to various natural entities. Individualistic non-anthropocentric frameworks focus on certain organisms as morally considerable. Ratiocentrism extends moral standing to rational individuals, primarily humans but potentially including other highly rational species and advanced AI. Singer's sentientism assigns moral standing to sentient beings - organisms with psychological capacity to feel emotions and experience suffering - including humans, mammals, and birds (Singer, 2011). Biocentrism extends consideration to all living organisms, arguing that anything alive possesses inherent worth deserving moral consideration (Taylor, 1986).

Holistic non-anthropocentric frameworks assign moral standing to collectives and systems rather than just individuals. Ecocentrism values ecosystems themselves, arguing that ecological wholes deserve consideration regardless of impacts on individual organisms (Naess, 1973). Leopold's land ethic proposes expanding moral community boundaries to include "soils, waters, plants, and animals, or collectively: the land" (Leopold, 1949, p. 204), calling for humans to see themselves as "plain members and citizens" of biotic communities rather than conquerors. Naess's deep ecology emphasizes intrinsic value of all life, advocating for minimal human interference and recognition that nonhuman entities have rights to flourish according to their own nature (Naess, 1973).

Some holistic frameworks explicitly challenge the human-nature divide. Deep ecology, ecofeminism, social ecology, and new animism argue that humans and nature are fundamentally interconnected and interdependent rather than separate realms (Boylan, 2013). These frameworks critique not only how humans treat nature but the conceptual separation that enables exploitation - arguing that recognizing human-nature entanglement is prerequisite for ethical relationships.

For designers seeking guidance, environmental ethics scholarship proves simultaneously essential and frustrating. It establishes that moral consideration might extend beyond humans, providing philosophical justification for including natural entities as stakeholders. However, each framework argues for its position while critiquing others, offering no clear consensus. Should designers adopt Singer's sentientism and primarily consider sentient animals? Follow Leopold's land ethic and focus on ecosystems and bioregions? Embrace deep ecology's biocentric egalitarianism? These frameworks can generate contradictory guidance - sentientism might prioritize eliminating animal suffering in food systems while ecocentrism might accept predation as natural ecosystem function.

Designers need practical ethical frameworks that acknowledge this complexity while enabling action rather than paralysis. The proliferation of environmental ethics theories demonstrates that moral questions about human-nature relationships cannot be resolved through pure philosophical reasoning - they require situated judgments accounting for specific contexts, stakeholders, and consequences. This suggests designers need not adopt one "correct" environmental ethics but rather develop literacy across frameworks, understanding their assumptions and implications for design decisions.

Traditional stakeholder theory, emerging from management and business ethics, defines stakeholders as "any group or individual who can affect or is affected by the achievement of the organization's objectives" (Freeman, 1984, p. 46). This framework expanded corporate responsibility beyond shareholders to include employees, customers, suppliers, communities, and other human groups with legitimate interests in business decisions. However, traditional stakeholder theory maintains anthropocentric boundaries - stakeholders are human individuals, groups, or organizations.

Veselova and Gaziulusoy (2021) develop a systemic typology that extends stakeholder concepts to natural nonhuman entities, drawing on multispecies ethnography methods (Kirksey & Helmreich, 2010). Their empirical work involved five weeks of intensive observation in a Latvian family garden, collecting rich qualitative data through participant observation, interviews, photographs, and audio/video documentation of garden elements and inhabitants. Through iterative collaborative analysis using distinctions-systems-relationships-patterns

model of systems thinking, they developed a typology recognizing seven key types of natural nonhuman stakeholders that is represented in Table 1.

Table 1. A systemic typology of natural nonhuman stakeholders when designing for sustainability (Veselova & Gaziulosoy, 2021)

The types of natural nonhuman stakeholder	Examples
Single organisms Organisms that are typically seen as independent living entities	Plants; animals (incl. humans, mammals, birds, reptiles, insects, amphibians, crustaceans, mollusks)
Single species collectives Collectives of organisms of a single species that jointly partake in life processes	Social insect colonies; bryophytes (incl. mosses and hornworts); algae; fungi
Multispecies collectives Collectives of living organisms (such as microorganisms, insects, and worms) that jointly partake in life processes	Bacterial collectives; lichens; soil: compost; animal manure
Living systems The location-tied systems of living organisms, collectives, and the organic and inorganic matter and gasses that jointly partake in life processes	Gardens; lawns; greenhouses; forests; rivers
Life processes Flows of elements between living and nonliving parts of the biosphere	Photosynthesis; the decomposition of organic matter; respiration; nitrogen fixation
Biogeochemical cycles The cyclical flows of elements between the living and nonliving parts of the biosphere	The carbon cycle; the nitrogen cycle; the phosphorus cycle; the water cycle

Processes of the atmosphere A short-, mid-, or long-term process in the atmosphere that determines the presence of elements and energetic resources for life processes	Weather; the season; climate

This typology proves significant because it reveals that any single observable natural entity represents multiple stakeholder types simultaneously. An apple tree is an individual organism, a member of a population, a representative of a species, part of multispecies collectives (the orchard ecosystem including soil microbes, pollinators, pest species), a participant in processes (photosynthesis, transpiration, fruit production), and a participant in cycles (carbon, water, nutrients). There is no simple way to map an observed entity onto a single stakeholder type - the nested, interconnected nature of ecological systems means one physical entity embodies multiple stakeholder identities simultaneously (Veselova, 2023).

This complexity has profound implications for design practice. Designers cannot treat "nature" as singular stakeholder but must understand the complexity of interlinked interdependencies, needs, causes, and effects to practice MTH design at any level of sophistication that complex systems demand (Veselova, 2023). No stakeholder in a MTH world is an isolated entity - it participates in nested living systems, forming entangled parts of collections of several systemic stakeholders. This aligns with Latour's (2005) ANT insight that entities are defined through relations in heterogeneous networks rather than possessing independent essences.

However, this typology raises practical challenges for SD. If designers must consider individual organisms, populations, species, collectives, habitats, processes, and cycles, how do they determine which stakeholder types are relevant for specific projects? An outdoor light pole installation affects organisms through habitat disruption, ecosystems through light pollution, cycles through energy consumption and material extraction, processes through interrupting nocturnal species behaviors. Designers cannot meaningfully account for every natural stakeholder across all typology categories - they need frameworks for making transparent, accountable decisions about which stakeholders matter most for their specific context.

3.4 Approaches to non-human representation in design

Veselova (2023) identifies three primary approaches for including natural nonhuman stakeholders in design processes, each with distinct methodologies, applications, and limitations. Examining these approaches critically reveals both possibilities and challenges for SD contexts.

(1) Direct participation involves natural nonhuman stakeholders as active participants in design processes, with designers attempting to facilitate genuine involvement rather than merely representing interests secondhand. This approach finds primary application in Animal-Computer Interaction, where researchers design technologies for and with animals as users (Mancini, 2011).

Examples include designing wearable devices for working dogs where researchers observe how dogs interact with prototypes, iterating designs based on animal responses and preferences (Zeagler et al., 2016). Robinson et al. (2014) explored touchscreen interfaces for orangutans in zoos, studying how orangutans engaged with different interaction paradigms to inform design decisions. Mancini et al. (2012) worked with therapy dogs, developing methods for including canine perspectives in designing assistive technologies. These projects demonstrate that certain animals can participate meaningfully in design processes when researchers develop appropriate methods for facilitating interspecies communication.

However, direct participation faces significant limitations. Consent proves fundamentally problematic - animals cannot provide informed consent to research participation in ways humans can, raising ethical questions about whether involvement is genuinely voluntary (Grillaert & Camenzind, 2016). Interpretation challenges mean designers can never be certain they correctly understand animal responses - behaviors that seem to indicate preferences might reflect entirely different motivations or experiences than designers assume (Hirskyj-Douglas & Read, 2014). Species specificity means methods developed for one species may not transfer to others - designing with dogs differs fundamentally from designing with insects, fish, or plants.

For SD contexts, direct participation applicability remains limited. Most SD projects involve spatial scales, temporal horizons, and participant numbers that make individual animal involvement impractical. A service redesigning urban mobility systems or food networks cannot meaningfully include every affected animal as active participant. Direct participation may prove valuable for specific SD scenarios - designing veterinary services, zoo experiences, or agricultural systems where animal welfare constitutes central concern. However, it cannot serve as primary approach for most SD projects seeking to account for BH stakeholders affected by design interventions.

(2) Expert proxy approaches involve humans with specialized knowledge representing natural nonhuman stakeholder interests in design processes. These experts - whether academic ecologists, wildlife biologists, farmers, Indigenous knowledge holders, or others with deep familiarity with particular species or ecosystems - speak on behalf of natural entities that cannot represent themselves in human-centered workshops and co-creation sessions.

This approach connects to Latour's (2004) concept of spokespersons, acknowledging the inherent uncertainty in representation. When experts speak for nature, they occupy wide range of positions mentioned in Chapter 3.2 (Latour, 2004, p. 64). This uncertainty is not failure but inherent condition - perfect representation proves impossible, and claiming it would be dishonest. Instead, expert proxies offer informed perspectives based on systematic knowledge while acknowledging the partiality and fallibility of their representations.

Puig de la Bellacasa's (2017) work on soil exemplifies productive expert proxy approaches. Through participation in permaculture collectives and sustained engagement with soil science, she developed representations of soil that make visible its vital agencies, microbial communities, and fundamental roles in supporting life. Her "soil stories" create proxies that honor soil's complexity while acknowledging these representations emerge from specific human-soil relationships and cannot claim complete or objective knowledge. This demonstrates how experts develop detailed representations and mediations that make nonhumans present and active in scientific and political processes - not by claiming perfect knowledge but through practices of careful attention and accountable representation.

Expert proxies offer significant advantages for SD. They scale across project types and contexts without requiring direct animal participation. They can represent entities impossible to involve directly - microorganisms, ecosystems, biogeochemical cycles. They bring systematic knowledge that informs design decisions with scientific understanding while remaining practically feasible within typical project constraints.

However, expert proxy approaches raise validity questions. The approach risks reducing complex ecological realities to expert opinions while obscuring the constructed, partial nature of all representations. It also concentrates power in expert voices, potentially marginalizing other forms of knowledge and excluding non-expert stakeholders from decisions affecting shared environments.

Despite these limitations, expert proxies appear highly applicable to SD contexts (Veselova & Gaziulusoy, 2022). Most SD projects already involve expert consultants - bringing ecologists, conservation biologists, or traditional ecological knowledge holders into workshops and co-creation sessions represents straightforward methodological adaptation. The key lies in structuring these expert contributions carefully: making visible that they are representations rather than nature itself speaking, inviting multiple expert perspectives to surface disagreements and uncertainties, and creating processes where expert knowledge informs but doesn't dominate design decisions.

And finally, (3) representative profile approaches develop artifacts that stand in for natural nonhuman stakeholders in design processes. Rather than including actual entities or expert proxies, designers create profiles based on research that synthesize knowledge about species, ecosystems, or natural processes into formats compatible with existing design tools.

Nonhuman personas extend user persona methodology to represent species rather than human user groups. Tomitsch et al. (2021) demonstrate how designers might create detailed profiles for species potentially affected by design projects - documenting behaviors, habitats, sensory capabilities, life cycle stages, and needs based on scientific literature and expert consultation. A nonhuman persona for urban bats, for example, might detail echolocation capabilities, roosting requirements, feeding behaviors, seasonal patterns, and threats from urban

development. Designers can reference these personas throughout design processes just as human personas guide user-centered design decisions.

Ecosystemas, proposed by Tomlinson et al. (2021), provide ecosystem-level profiles tailored to specific design contexts. Rather than representing individual species, ecosystemas describe particular ecosystems potentially impacted by design activities - documenting dominant species, ecological processes, seasonal dynamics, current threats, and potential intervention points. An ecosystema for a wetland where service infrastructure might be installed would detail hydrology, plant communities, wildlife dependencies, nutrient cycling, and how different design decisions might cascade through the ecosystem.

Representative profiles offer significant advantages for SD integration. They translate BH stakeholder information into formats already familiar to service designers. Personas and similar artifacts already populate SD workshops - adding nonhuman personas requires minimal methodological adjustment. Representative profiles can be developed before design workshops begin, avoiding time-consuming expert consultation during collaborative sessions. They provide consistent reference points throughout design processes rather than depending on expert availability.

However, representative profiles face substantial limitations. They risk reifying representations into seemingly objective facts, obscuring that profiles are constructed interpretations embodying particular framings and assumptions. The profile format may oversimplify ecological complexity - reducing dynamic, context-dependent relationships to static attributes and needs. Profiles can't account for emergence or unanticipated responses - they describe known patterns but can't represent how species or ecosystems might respond to novel design interventions. The approach also requires significant upfront research investment to develop credible profiles, potentially creating barriers for resource-constrained projects.

With that in mind the key of representative profiles lies in treating profiles as provisional representations requiring iteration and validation rather than as complete or authoritative knowledge, and in developing lightweight profile templates that enable reasonably credible representation without exhaustive research.

These three approaches - direct participation, expert proxies, and representative profiles - are not mutually exclusive but potentially complementary. Projects might combine approaches: using representative profiles to initially identify relevant stakeholders, engaging expert proxies to validate and refine profiles, and employing direct participation where feasible and appropriate. The optimal combination likely varies by project context: SD projects focused on companion animals might emphasize direct participation, projects addressing regional ecosystems might rely primarily on expert proxies, and projects requiring rapid iteration might favor representative profiles.

However, none of these approaches have been systematically tested in SD contexts specifically. Most applications exist in product design, human-computer interaction research, or theoretical exploration rather than professional SD practice.

3.5 Sustainability science and systemic approaches

Sustainability science emerged as transdisciplinary field employing systems thinking to understand complex human-nature interactions (Miller, 2013). Rather than treating environmental, social, and economic dimensions separately, systems approaches recognize that sustainability requires integrated analysis of socio-ecological complexity where changes in one domain cascade through others in often unpredictable ways (Abson et al., 2017).

The foundational definition - "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987) - established three pillars of sustainability: environmental, social, and economic. However, the "three pillars" model treating these as equal, separate domains has been critiqued for suggesting that environmental limits can be traded off against economic growth or social progress (Neumayer, 2003).

Nested sustainability models offer alternative framing. The International Union for Conservation of Nature (IUCN, 1991) proposed the "egg of sustainability" positioning economy within society and both within environment, recognizing that human systems ultimately depend on and cannot exist outside ecological constraints. Strong sustainability frameworks similarly argue that natural capital cannot be fully substituted by human-made

capital - some ecological functions and resources prove irreplaceable, creating absolute limits rather than flexible trade-offs (Neumayer, 2003).

Rupprecht et al. (2020) extend this thinking through multispecies sustainability models that distinguish between living beings and non-living natural components. Their framework recognizes nature's complexity, acknowledging differences between individual organisms, populations, species, ecosystems, and abiotic elements while maintaining that all exist within nested relationships. In comparison to more widely known sustainability models such as the strong sustainability model (Neumayer, 2003), this more granular understanding helps reveal what strong sustainability obscures (see Figure 2): not all "nature" functions identically, and different natural entities play different roles in supporting human and nonhuman flourishing.

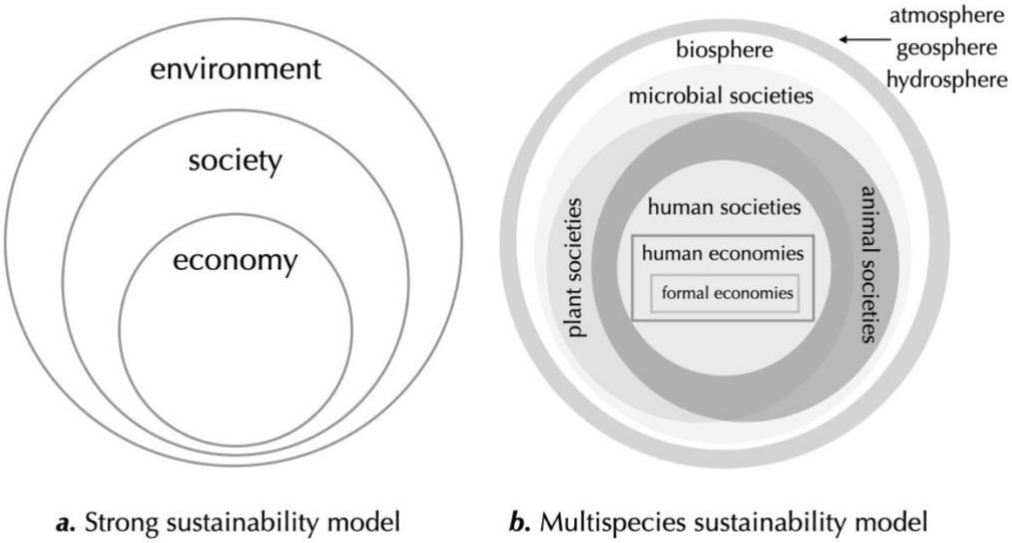


Figure 2. Visual models of (a) strong sustainability (Neumayer, 2003) and (a) multispecies sustainability (Rupprecht et al., 2020).

O'Brien and Sygna's (2013) three spheres of transformation framework (see Figure 3) adds critical insight into how change occurs. This model identifies practical innovations, political structures, and personal worldviews as nested, interdependent domains. The practical sphere involves concrete technologies, behaviors, and practices - designing electric vehicles, implementing recycling systems, modifying consumption patterns. The political sphere

encompasses institutions, governance, regulations, and power structures that enable or constrain what becomes possible practically - policies, economic systems, legal frameworks. The personal sphere includes worldviews, values, beliefs, and paradigms that shape what people imagine and accept as possible or desirable.

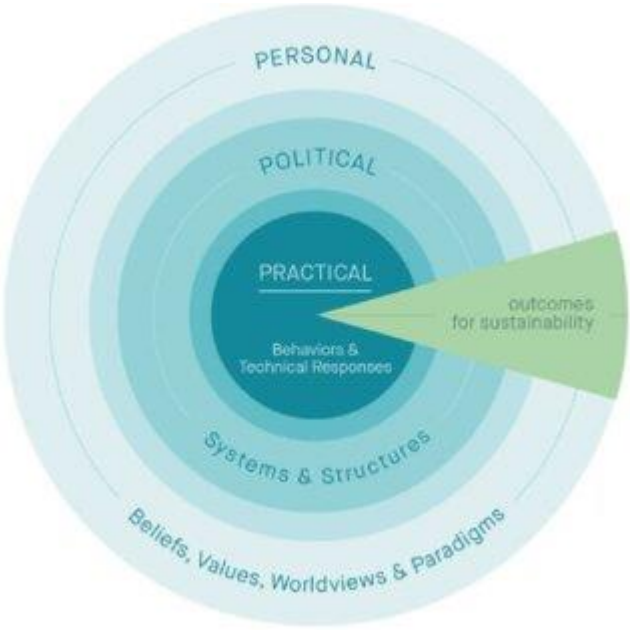


Figure 3. Three spheres of transformation framework (O'Brien & Sygna's, 2013).

Crucially, these spheres are not equal in transformative potential. The personal sphere - worldviews and values - forms the deepest domain, shaping what becomes imaginable in political structures and what gets accepted as practical solutions. Transforming personal and collective worldviews about human-nature relationships holds the greatest leverage for creating sustainability transitions (O'Brien & Sygna, 2013). This suggests that design's contribution to sustainability may depend less on technological innovations (practical sphere) or even policy advocacy (political sphere) and more on challenging the anthropocentric assumptions embedded in design practice itself (personal sphere) - transforming how designers and stakeholders conceptualize relationships with nature.

Systems thinking makes visible what anthropocentric frameworks obscure: human survival depends entirely on viable natural systems. Human bodies require oxygen produced through photosynthesis, clean water filtered through watersheds and purified by wetlands, food grown

in soil built through decomposition and nutrient cycling, and temperature ranges maintained through atmospheric and oceanic systems. Every material humans use - whether perceived as natural or artificial - originates in and is extracted from nature (Ives et al., 2018). Even synthetic materials derive from petroleum (ancient organic matter), minerals (geological processes), or other natural sources transformed through human labor and technology but not created ex nihilo.

Human-made systems extensively and inseparably interconnect with natural elements and systems through flows and exchanges of materials, nutrients, and energy (Ives et al., 2017). Cities depend on rural agricultural systems, which depend on soil organisms, pollinators, water cycles, and climate patterns. Supply chains extract resources from ecosystems worldwide, process them through industrial systems generating waste and emissions that enter ecological cycles, and distribute products whose use and disposal create further ecosystem impacts. These connections mean human and natural systems cannot be understood separately - they form integrated socio-ecological systems whose sustainability emerges from their interconnected dynamics.

However, dominant worldviews obscure these dependencies. Sustainability science identifies two interrelated perceptual frameworks as root causes of environmental crisis (Zylstra et al., 2014). First, the perceived separation from nature - the worldview that humans and nature constitute separate, independent realms. This human-nature divide is ingrained in Western beliefs, languages, social structures, behaviors, research traditions, and professional practices including design (Abson et al., 2017; Muhar et al., 2018; Raymond et al., 2018). Second, the perceived right to dominate nature - the worldview positioning humans as superior to nature, entitled to control, use, and exploit natural entities and systems for human purposes without consideration for nonhuman needs or limits (Flint et al., 2013; Muhar & Böck, 2018).

These worldviews shape everything from economic systems treating ecological degradation as externality, to technological development prioritizing human convenience over ecological impacts, to design methodologies positioning nature as resource rather than recognizing human-nature entanglement. Researchers argue that reconnecting with nature and recognizing

humans as part of rather than separate from natural systems proves essential for addressing sustainability crises (Ives et al., 2017; Zylstra et al., 2014).

3.6 The Gaia hypothesis and co-emerging futures framework

In the early 1970s, chemist James Lovelock and biologist Lynn Margulis proposed what would become one of the most provocative and influential theories bridging Earth science and biology: the Gaia hypothesis (Lovelock, 1972; Lovelock & Margulis, 1974). Named after the ancient Greek primeval goddess personifying mother earth, this hypothesis describes Earth as a complex, self-regulating system where living organisms and the inorganic geological environment actively shape, maintain, and regulate the conditions necessary for life on the planet.

The Gaia hypothesis fundamentally challenged mechanistic views of Earth as dead matter operating according to deterministic physical laws. Instead, Lovelock and Margulis demonstrated that the biosphere - all living organisms collectively - functions to maintain atmospheric composition, ocean salinity, and surface temperature within ranges conducive to life. This is not conscious intention but emergent self-regulation arising from countless interactions between organisms and their environments. Trees cool the planet through transpiration and cloud formation. Phytoplankton regulate atmospheric gases. Coral reefs buffer ocean chemistry. Soil microbes cycle nutrients. These processes, operating across scales from microscopic to planetary, create feedback loops that have maintained Earth's habitability for billions of years despite the sun's increasing luminosity.

Many principles of this initially controversial theory have since been validated by the wider scientific community (Brand, 2018). The hypothesis compels us to understand our place not as humans versus the environment, but as active agents participating in - and fundamentally dependent upon - a larger self-regulating system. A system also supported by a multispecies sustainability model by Rupprecht. Gaia emphasizes the natural dynamic balance and interconnected interplay between all living beings and the geological ecosystem. As Lovelock argues - the relatively shallow layer from soil through atmosphere where life concentrates - is

both shaped by and shapes its inhabitants. To cohabit is to mutually constitute both inhabitant and habitat.

Reon Brand's (2018) co-emerging futures framework (see Figure 4) extends Lovelock's insights by articulating four possible trajectories for human civilization, each rooted in fundamentally different worldviews about human-nature relationships and each leading toward distinct material and social futures. These are not predictions but possibilities - co-emerging scenarios that depend on which beliefs, mindsets, and practices become dominant.

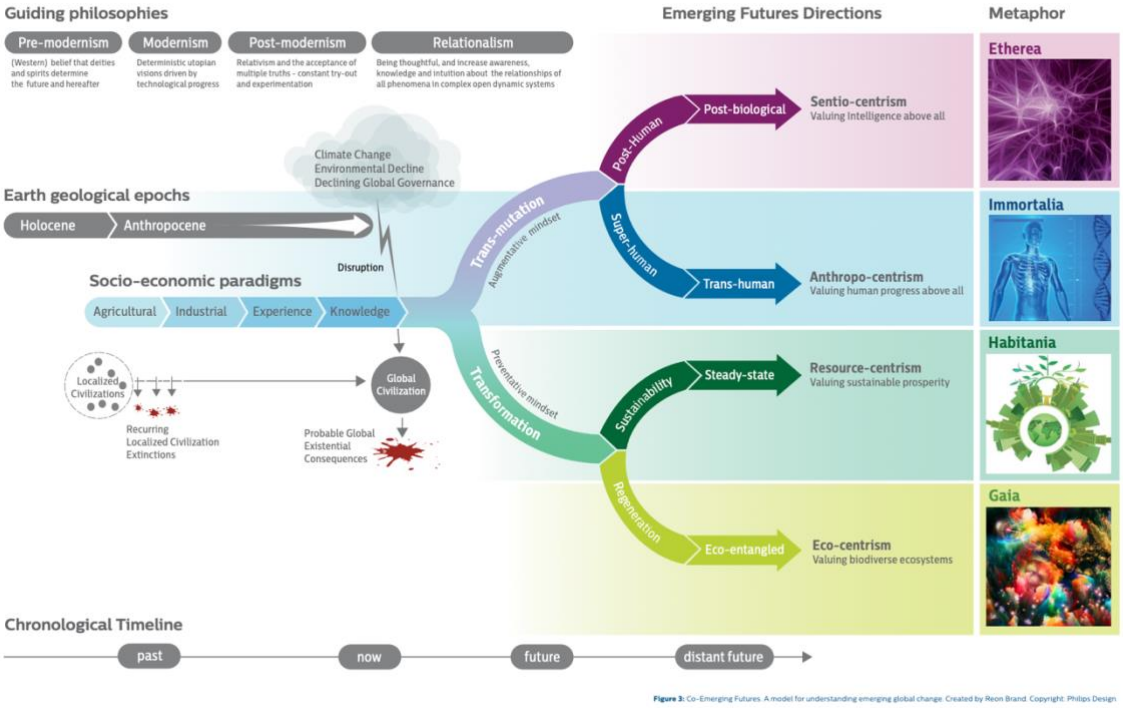


Figure 4. Co-emerging futures framework (Brand, 2018)

Etherea represents the transhumanist trajectory where humanity abandons biology as carrier of intelligence, pursuing digital transcendence and artificial enhancement beyond nature. This path embodies sentio-centrism - valuing intelligence above all else - with a post-identity, hive-mind orientation pursuing boundless knowledge immersion. It is fundamentally a flight from materiality and ecological embeddedness.

Immortalia extends anthropocentrism through utilitarian individualism, seeking to control human evolution and optimize human habitat through technological mastery. This trajectory maintains humans versus environment orientation, shaping Earth primarily for human civilization while treating nature as resource base to exploit ever more efficiently.

Habitania represents resource-centric sustainability approaches that aim to manage and sustain steady flows of resources for human exploitation. People see themselves as next to nature rather than above it, pursuing cooperative pragmatism to adapt human civilization for sustainable production and consumption. While more ecologically conscious than Immortalia, Habitania maintains human interests as primary concern, seeking balance through managed consumption rather than fundamental relational transformation.

Gaia offers radically different possibility: a post-anthropocentric worldview that recognizes humans as part of ecosystems rather than separate from or superior to them. This trajectory, borrowing Lovelock's metaphor, understands Earth as entangled system where humans are eco-entangled with nature - neither masters nor managers but participants in living planetary systems. The Gaia ideal focuses human activity toward restoring natural dynamic balance of ecosystems that nourish all life, not pursuing deterministic goals but different balance creating vibrant, dynamic, evolving natural ecosystems (Brand, 2018).

The Gaia mindset resonates with ancient philosophical traditions viewing Earth and cosmos as entangled, interconnected whole (Brand, 2018). This differs profoundly from Anthropocentric mechanistic worldviews that have dominated Western thought and enabled treating nature as machine to manipulate. It aligns instead with contemporary physics (quantum entanglement), posthumanist philosophy (Haraway's naturecultures, Barad's agential realism), and Indigenous knowledge systems that have long recognized human-nature interdependence. This thesis will explore ways how SD process can be shaped in a way that supports Gaia as not fantasy but possible future.

4. METOHDOLOGY

This chapter describes the research design and methods employed to investigate how SD can integrate BH stakeholders into collaborative design processes. The methodology follows Saunders et al.'s (2019) research onion framework (see Figure 5), moving from outer philosophical layers through strategic choices to specific data collection techniques at the center.

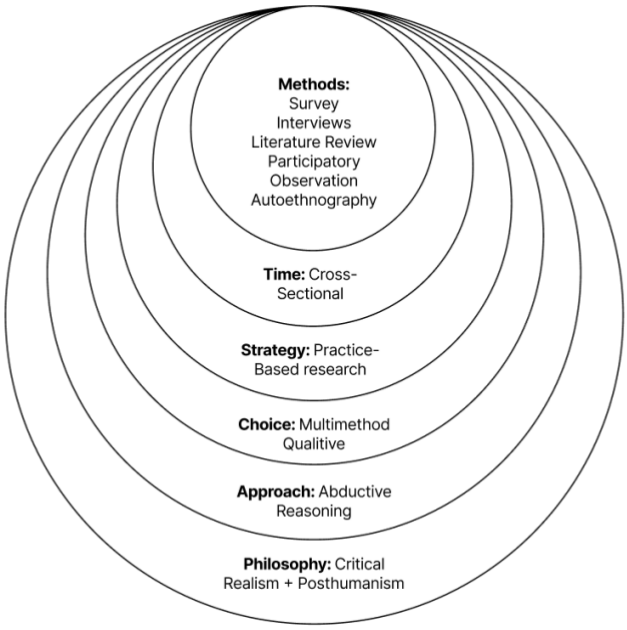


Figure 5. Research onion showing methodological architecture from philosophical positioning through data collection methods

This research adopts critical realism (Bhaskar, 1975) as its ontological stance, recognizing a reality-independent truth while acknowledging that our understanding of reality is mediated through social and cultural frameworks. Critical realism provides foundation by recognizing both the existence of real ecological crises - planetary boundaries transgressed (Stockholm Resilience Centre, 2025), species extinctions accelerating (Ceballos et al., 2017), climate systems destabilizing (IPCC, 2018) - and the socially mediated nature of how we understand and respond to these crises.

4.1 Research philosophy

This research is grounded in critical realism informed by posthumanist and new materialist perspectives. Critical realism, developed by Bhaskar (1975), holds that reality exists independently of human perception but that our access to it is always partial, mediated, and situated. This distinguishes the philosophical position from naive realism, which assumes direct access to objective truth, and from social constructivism, which reduces reality to discourse and representation. For this research, ecological systems and their relationships with human design practice exist as real conditions with real consequences. The systematic exclusion of non-human entities from service design stakeholder frameworks is a material reality with ecological effects, not merely a conceptual or discursive position.

Critical realism operates on three levels that shape the research design. The empirical level concerns what is observable - survey responses, interview accounts, workshop behaviours. The actual level concerns events that occur whether observed or not - the structural conditions of SD education, the commercial constraints practitioners operate within. The real level concerns the underlying mechanisms that generate those events - the anthropocentric worldview embedded in SD tools, methods, and professional formation. The research moves across all three levels, using empirical data to reveal actual conditions and underlying mechanisms.

The posthumanist inflection follows Haraway's (1988) concept of situated knowledges, which argues that objectivity emerges from making the knower visible within the knowing process rather than from impossible neutrality. Haraway's feminist epistemology challenges the view from nowhere - the idea that rigorous knowledge requires a detached, universal standpoint - and replaces it with positioned rationality: a joining of partial views that acknowledges limitations while claiming accountability for perspectives. Barad's (2007) agential realism extends this by arguing that knowledge is not merely situated but intra-active - produced through specific material-discursive practices rather than residing in a pre-existing world waiting to be discovered. For this research, these epistemological commitments mean that the researcher's background, professional experience, and personal ecological commitments are not sources of bias to be controlled but legitimate dimensions of the situated knowledge the

research produces. This is made explicit in Chapter 1 and in the autoethnographic method described in section 4.7.1.

Together, critical realism and posthumanist epistemology position the research to hold structural conditions and situated experiences simultaneously - to claim that anthropocentric exclusion is a real structural condition while acknowledging that all accounts of it, including this one, are partial and positioned.

4.2 Research approach

The research employs abductive reasoning, moving iteratively between theory and empirical observation. This differs from deduction (testing predetermined hypotheses derived from theory) or induction (nuilding theory purely from empirical data).

Abductive process ensure that theory provides conceptual grounding (posthumanist philosophy, natural stakeholder frameworks, co-emerging futures), but then empirical encounters generate surprises and tensions that send research back to theory with new questions. This produces frameworks that are theoretically grounded yet empirically responsive.

Example: Survey data revealed only 60% of respondents included soil in urban park scenario compared to 80% for birds and animals. This "soil blindness" was surprising given soil's foundational ecological role. Returning to literature revealed scholarship on charismatic species bias and below-ground ecosystem invisibility. This theoretical insight shaped interview questions about what makes certain entities perceptually available as stakeholders. The refined understanding fed into framework development for stakeholder identification criteria.

This iterative movement between theory and data characterizes the entire research process, avoiding both pure abstraction detached from practice and atheoretical description lacking analytical depth.

4.3 Theoretical Lens

The literature review established six theoretical domains foundational to this research. This section specifies which function as primary analytical lenses through which empirical data is

interpreted. Three frameworks operate as the primary interpretive lenses, working at different levels of analysis and together orienting the research toward Gaia futures as both analytical horizon and normative goal.

At the level of practice, Veselova and Gaziulusoy's (2021) systemic typology of natural nonhuman stakeholders and their three inclusion modes - direct participation, expert proxy, and representative profile - provide the analytical categories for assessing which BH entities are present in a given design context and what conditions make each mode accessible or inaccessible. Survey responses, interview accounts, and workshop observations are all read through this lens, asking which inclusion mode each encounter supported and what enabled or prevented it.

At the level of explanation, Meadows' (1999) leverage points framework - specifically the argument that worldview is the highest leverage point in any system -- provides the explanatory lens for understanding why practitioners behave as they do. Survey and interview data are analysed for evidence of worldview positions and their relationship to practice, asking why barriers cluster differently depending on where practitioners stand in relation to the living world. This connects directly to O'Brien and Sygna's (2013) three spheres of transformation, which positions the personal sphere - worldviews and values - as the deepest domain shaping what becomes possible in political structures and practical solutions.

At the level of orientation, Brand's (2018) co-emerging futures framework and Lovelock and Margulis's (1974) Gaia hypothesis provide the normative horizon for the research. The Gaia future - characterised by post-anthropocentric worldviews recognising humans as participants in living planetary systems rather than managers of them - frames what the framework is working toward. This means the research does not treat BH inclusion as a technical add-on to existing SD practice. It treats it as a step in the direction of a fundamentally different relationship between design and the living world. The Gaia lens explains why worldview transformation - addressed in Stage 2 of the framework - is the highest leverage point available to practitioners working within real project constraints.

These three lenses together produce the analytical architecture of *Designing With*. The inclusion modes typology informs Stage 3 - the method selector. The worldview leverage point framework informs Stage 2 - the relational self-assessment. The Gaia orientation informs Stage 1 - the project context assessment - by establishing why ecological stakes in any project deserve investigation regardless of whether the client has asked for them.

4.4 Methodological choice

This research employs a multimethod qualitative design -- five qualitative methods (see Table 2) used in combination. While the survey generates some numerical data through Likert scales and frequencies, all analysis is qualitative, focused on understanding meanings, experiences, and relational patterns rather than statistical generalisation. This is consistent with the critical realist philosophy described in section 4.1: the research seeks to identify underlying mechanisms and structural conditions, not to measure surface-level variables across a representative population.

Table 2. Research method summary and roles

Method	Sample	Role in the research
Survey	N=20	Maps current landscape of awareness, attitudes, and practices
Semi-structured interviews	N=3	Generates depth on barriers, contradictions, and lived experience
Participatory observation	6 contexts	Provides embodied understanding of BH design methods in practice
Literature review and framework analysis	6 theoretical domains	Establishes theoretical lens and synthesises existing approaches

Autoethnography	2-year programme	Makes visible the researcher's positioned perspective and transformation

The qualitative orientation is appropriate because BH stakeholder integration is an emerging, under-researched phenomenon in SD contexts. As Denzin and Lincoln (2011) argue, qualitative methods are suited to exploring new territory where established variables and measures do not yet exist, to understanding meanings and lived experiences, and to generating theory and frameworks rather than testing predetermined hypotheses. Quantitative methods could map frequencies of BH awareness across a larger sample, but they cannot access why awareness does not translate into practice - the psychological, institutional, and cultural texture of that gap - which is where the research problem actually lives.

The five methods were selected to work through two complementary principles identified by Greene et al. (1989) as central to multimethod design. Triangulation strengthens confidence in findings that appear across multiple methods - time and budget constraints as a barrier emerged independently from the survey, the interviews, and the participant observation, making it a robust rather than method-specific finding. Complementarity ensures that different methods reveal different facets of the same phenomenon: the survey shows what practitioners think, interviews reveal why, observations demonstrate what happens in practice, the literature review and framework analysis establishes what already exists and what is missing, and autoethnography captures what transformation feels like from the inside.

The methodological choices follow a coherent internal logic shaped by the nature of the research problem. A critical realist philosophy that treats ecological exclusion as a real structural condition demands abductive reasoning, because the phenomenon is simultaneously under-theorised and under-documented in SD contexts. Abductive reasoning in turn requires qualitative methods capable of surfacing nuance, contradiction, and lived experience. The five methods were selected to produce breadth through the survey, depth through interviews and observation, theoretical grounding through the literature review and framework analysis, and embodied institutional knowledge through autoethnography - together covering dimensions that no single method could reach.

4.5 Research strategy

The research employs a practice-based research strategy, specifically what Frayling (1993) terms research for design - research whose primary purpose is to produce knowledge that serves design practice rather than knowledge about design as a cultural phenomenon or knowledge through design as a reflective making process. Research for design is oriented toward developing frameworks, tools, and methods that practitioners can use, which directly corresponds to the thesis's primary output: Designing With, a positioning framework for ecological inclusion in SD.

SD practice in Northern European educational and commercial contexts constitutes the bounded case under investigation. This thesis is an examination of a professional community and its relationship to a specific methodological challenge. The exploratory orientation follows Yin's (2014) argument that case study is appropriate when the research asks how and why questions about contemporary phenomena within real-world contexts, which is precisely the orientation of RQ1 through RQ4. The Gaia lens shapes what the bounded case is: not simply a professional community but a discipline whose tools and assumptions reproduce a particular worldview, and whose transformation toward Gaia futures is both the research problem and the normative goal.

The practice-based strategy also shapes what counts as valid knowledge in this research. Following Schön's (1983) concept of the reflective practitioner, practitioner experience and tacit knowledge are treated as legitimate data sources rather than as anecdotal evidence to be discounted. The expert interviews draw on practitioner expertise as knowledge, not merely as opinion. The participatory observation treats embodied encounter with BH methods as analytically meaningful. The autoethnography treats the researcher's professional experience as evidence of structural conditions rather than merely personal history.

4.6 Time horizon

The research operates across two temporal registers. The cross-sectional register captures a snapshot of current SD practice through the survey, interviews, and six workshop observations conducted between September 2025 and March 2026. The longitudinal register runs through

the two-year SDSI programme experience from 2024 to 2026, providing the autoethnographic thread connecting personal educational experience to the structural claims the thesis makes about the field.

The combination of temporal registers reflects both methodological and theoretical commitments. Methodologically, cross-sectional data establishes what current practitioners think, know, and do, while longitudinal data establishes how the educational conditions that produce those practitioners operate over time - a distinction that matters for making structural claims rather than merely observational ones. Theoretically, the Gaia-oriented argument that temporal scale matters in ecological thinking extends into the research design itself: understanding where the field is now requires understanding how that position was produced over time, which the longitudinal autoethnographic thread provides.

4.7 Data collection and analysis

4.7.1 Autoethnography

Autoethnography is a qualitative research method that uses the researcher's own experience as data, treating personal encounters, positionality, and situated knowledge as analytically meaningful rather than as sources of bias to be neutralised (Ellis et al., 2011). It connects the personal to the cultural and systemic, asking not simply what happened to the researcher but what that experience reveals about the structures, institutions, and conditions the researcher was moving through. Chang (2008) identifies autoethnography as particularly suited to research at the intersection of personal transformation and institutional critique - precisely the position this thesis occupies.

The choice of autoethnography for this research is theoretically grounded. Haraway's (1988) situated knowledges framework, which underpins the research philosophy described in section 4.1, demands that the knower be made visible within the knowing process. The autoethnographic method operationalizes this demand: rather than presenting findings from a fictitiously neutral standpoint, the research makes explicit that the knowledge produced here emerges from a specific subject position - a Latvian service designer completing the SDSI

programme during 2024-2026, carrying ecological commitments developed through cultural formation and professional experience, observing from inside the institution whose limitations the thesis critiques. This positioning provides access to experiential data about structural conditions that external observation could not reach.

The central structural claim of this research - that SD practice is institutionally unprepared to include BH stakeholders - is supported by speaking from inside the institution being examined. My experience of the SDSI programme is itself a data source for understanding where the field currently sits and what it systematically excludes. This autoethnographic evidence is not offered in isolation but triangulated against survey findings, interview accounts, and participant observation, following Denzin and Lincoln's (2011) argument that autoethnographic claims gain credibility through convergence with other data sources rather than standing alone.

The autoethnographic strand covers three analytically distinct threads. The first documents the experience of the SDSI programme itself - what it covered, what it excluded, what the absence of ecological thinking felt like from inside a curriculum that could have addressed these questions and chose not to. The second documents the experience of seeking missing knowledge outside the programme - the six research encounters and the independent engagement with posthumanist design scholarship that produced this thesis. The third captures the practitioner perspective - the insistence that speculative thinking must connect to actionable method, that frameworks without tools are inadequate responses to a structural problem.

Autoethnographic data was analysed through reflective thematic analysis following Clarke et al. (2015). Field notes, reflexive journal entries maintained throughout the research period, and documentary evidence from the SDSI programme - syllabi, course descriptions, feedback records -- were read iteratively across multiple sessions. Initial open coding identified recurring patterns and tensions. Focused coding developed systematic categories from emerging themes. Three analytical threads emerged and were refined through iterative comparison: the institutional absence of ecological thinking in the curriculum, the search for that knowledge outside formal study, and the practitioner perspective on the gap between speculative theory and actionable method. These threads were then read through the Meadows (1999) worldview lens, asking what worldview the programme structure implicitly reproduced and at which

leverage point a curriculum change would need to intervene. Where the autoethnographic account aligned with patterns visible across survey and interview data, the structural claim was strengthened. Where it diverged, that divergence is noted in the results chapter.

4.7.2 Survey research

The survey Beyond-Human Stakeholders in Service Design Practice was designed as a primary quantitative-qualitative hybrid instrument to systematically map current service designer perspectives on sustainability, stakeholder conceptualisation, and BH awareness. The survey architecture follows a deliberate progression across six sections (see Table 3), moving from baseline professional context through increasingly specific engagement with BH stakeholder concepts. This progressive structure reflects the abductive reasoning approach described in section 4.2: establishing what practitioners currently hold before introducing new conceptual frames, so that the gap between existing practice and BH inclusion becomes visible rather than assumed.

Table 3. Survey section reasoning

Section	Focus	Rationale
1	Professional background	Establishes respondent characteristics for interpreting subsequent responses
2	Current stakeholder conceptualization	Documents baseline understanding before BH framing is introduced
3	Sustainability orientation	Establishes personal values and education background
4	Introduction to BH stakeholders	Introduces the concept mid-survey to prevent priming effects on sections 1-3

5	Scenario-based identification and barriers	Tests inclusion when ecological framing makes it contextually appropriate
6	Tool preferences and follow-up	Identifies what practitioners want and who is available for further participation

The survey combined Likert scales, multi-select options, and open-text fields across all six sections, generating both quantitative patterns and qualitative depth. The mixed format reflects the complementarity principle described in section 4.4: quantitative data maps the landscape while qualitative data reveals the texture of why that landscape looks the way it does.

Quantitative data was analysed using descriptive statistics including frequencies, means, and cross-tabulations identifying relationships between variables - for instance, whether personal sustainability commitment correlates with prior attempts at BH inclusion, or whether students and practitioners differ in their familiarity with BH concepts. Open-text responses were analysed using inductive thematic analysis following Braun and Clarke (2006). Responses were read in full across multiple iterations, initial codes were generated line by line without predetermined categories, and codes were clustered into themes through iterative comparison and refinement. Four themes emerged from the human-nature relationship question: extraction and exploitation, critique of Western framing, interdependence and belonging, and systemic inaction despite individual awareness. These themes were then read through the Meadows (1999) worldview lens and Brand's (2018) co-emerging futures spectrum to identify which worldview position each respondent most closely occupied and how far each sat from the Gaia orientation the framework is working toward. The survey overview and key findings are presented in full in section 5.2, with a summary table mapping findings to research questions.

4.7.3 Semi-structured interviews

Semi-structured interviews were designed to generate depth and nuance that survey data alone cannot provide, revealing the psychological, cultural, ideological, and structural dimensions of why BH stakeholder integration remains rare even among ecologically committed designers. While the survey maps the landscape and identifies patterns across twenty respondents,

interviews explore the complexities, contradictions, and lived experiences of individual practitioners navigating tensions between sustainability commitments and anthropocentric design practice.

Three interviews were conducted with SD practitioners and educators selected through purposive sampling (see Table 4) - a non-probability sampling strategy that deliberately targets information-rich cases illuminating different dimensions of the research problem (Patton, 2002) - to represent fundamentally different relationships to sustainability and BH stakeholder integration.

Table 4. Interview participant purpose

Position	Profile	Analytical purpose
Interviewee A	Sustainability educator with circular economy experience	Tests whether barriers persist beyond awareness and education gaps
Interviewee B	Ethical commercial designer without systematic BH consideration	Reveals whether ethical design discourse includes ecological thinking
Interviewee C	Researcher developing human-nature transformation methodologies	Provides empirical grounding in what BH practice actually requires

This tripartite structure reflects the Veselova inclusion modes lens: the committed skeptic represents a practitioner positioned at the threshold of expert proxy approaches; the unconscious anthropocentrist represents current mainstream SD practice without any inclusion mode; and the intentional practitioner represents active engagement with all three modes. Together they enable comparative analysis of what distinguishes practitioners who have

engaged with BH thinking from those who have not, and what psychological, methodological, and organizational factors shape that distinction.

Interviews followed a semi-structured format lasting 45-100 minutes, conducted remotely via video call with explicit consent obtained prior to participation. Core question areas covered personal sustainability approach, BH awareness and practice attempts, barriers and constraints, ethical decision-making processes, and enabling conditions for future practice. The semi-structured format, following Kvale and Brinkmann (2009), allowed prepared core questions while maintaining flexibility to follow emergent themes, probe unexpected responses, and adapt to each participant's specific experiences.

Interview transcripts were analysed through four stages following Braun and Clarke's (2006) thematic analysis framework. Initial reading and immersion involved reading each transcript multiple times to understand the participant's overall narrative and identify provisional themes and tensions. Open coding involved coding line by line without predetermined categories, identifying concepts, patterns, contradictions, and emotional registers. Focused coding developed systematic categories from patterns emerging across transcripts - including categories such as commercial divorce, positional constraint, methodological uncertainty, and worldview dissonance. Comparative analysis systematically examined convergences and divergences across the three positions, asking where accounts aligned and where they contradicted each other. Theoretical interpretation connected empirical patterns to the Veselova inclusion modes typology and Meadows worldview framework, locating each participant on the worldview axis and identifying which inclusion mode barriers they primarily encountered. The Gaia lens was applied to identify which of Brand's (2018) worldview trajectories each participant's practice most closely reflected, providing a normative reference point for understanding the distance between current practice and the Gaia orientation the framework is working toward.

4.7.4 Participatory observation

Participatory observation across six contexts between September 2025 and March 2026 (see Table 5) provides direct, embodied understanding of how BH design methods work in practice

- what they demand of participants, what perspective shifts they generate, and what barriers emerge during implementation rather than in anticipation. This method addresses a critical gap in the existing literature: posthumanist design scholarship is philosophically rich but sparse in detailed methodological documentation showing how practitioners actually facilitate BH engagement in practice (Poikolainen Rosén et al., 2022).

The participatory observation follows Hammersley and Atkinson's (2007) framework for ethnographic fieldwork, adapted to a multi-site context. The research role across all sessions was participant-observer - simultaneously engaging with workshop activities and maintaining analytical distance to observe participant responses, engagement levels, and barriers. This dual role is methodologically deliberate: participation enables the embodied understanding that pure observation cannot reach, while maintained analytical attention ensures systematic data collection rather than immersive absorption.

Figure 5. Summary of participatory observation

Session	Date	Format
Workshop A	Sept-Dec 2025	Semester course
Workshop B	Jan 2026	2-day intensive symposium
Workshop C	Feb 2026	90-min workshop
Workshop D	Mar 2026	90-min workshop
Workshop E	Mar 2026	90-min workshop
Workshop F	Mar 2026	90-min webinar

Data collected across all sessions included field notes documenting activities, instructions, materials, and facilitation approaches; participant response observations noting engagement

levels, hesitations, dropout rates, and apparent perspective shifts; and personal reflexive journal entries capturing what felt generative or limiting from the perspective of a service designer evaluating transferability to commercial SD contexts.

Data from each session was analyzed using a systematic comparative method across five pedagogical approaches: affective and embodied; temporal and rhythmic; imaginative and speculative; ecological and mythological; and strategic and organisational. This categorisation was developed inductively from the field notes across the six sessions rather than imposed in advance. Each session was assessed against four criteria derived from the Veselova inclusion modes lens: theoretical grounding, specific techniques used, participant responses and engagement levels, and transferability to commercial SD contexts with their distinctive constraints of time, budget, and client expectations. Comparative analysis across sessions identified which methods demonstrated highest participant engagement, lowest specialist knowledge requirements, and strongest transferability - criteria that directly determined card selection and the method mapping in Stage 3 of the framework. The Gaia lens was applied to assess which sessions moved participants most clearly toward relational worldview positions in Brand's (2018) spectrum, providing a normative reference point for evaluating the direction of each method's effect. The finding that the session generating the highest engagement never used specialist ecological or posthumanist terminology emerged from cross-session comparison of engagement observation notes and was not anticipated at the outset of the research, making it an abductively generated rather than hypothetically predicted result.

4.7.5 Framework Analysis

The systematic literature review conducted across six theoretical domains in Chapter 3 constitutes a primary data collection activity in this research, following Tranfield et al.'s (2003) argument that systematic review functions as an empirical method for identifying patterns, gaps, and contradictions across an existing body of knowledge. The six domains - HCD critique, posthumanist and MTH design theory, environmental ethics and stakeholder frameworks, approaches to non-human representation in design, sustainability science and systemic approaches, and the Gaia hypothesis and co-emerging futures framework - were treated as a corpus of data to be read, coded, and compared rather than as background context to be

summarised. This positions the literature review as methodologically active: a systematic examination of what existing scholarship offers for SD practice specifically and where it structurally falls short.

The literature review served two distinct methodological functions. First, it established the theoretical lens described in section 4.3 - the Veselova and Gaziulusoy inclusion modes typology, the Meadows worldview leverage point framework, and the Gaia orientation as the normative horizon - by identifying which theoretical frameworks had the strongest analytical purchase on the research problem. Second, it generated the data for framework analysis by mapping what existing MTH design frameworks can and cannot do, producing the pattern of absences that directly informed the three-stage structure of *Designing With*.

Each framework was evaluated against four criteria derived from the research questions and the theoretical lens: whether it helps identify ecological stakes in a specific project; whether it supports the designer in understanding their own relational position; whether it recommends methods appropriate to different project conditions; and whether it operates within the time and resource constraints of commercial practice. These four criteria were developed through the abductive process described in section 4.2 - emerging from the combination of the research questions, the theoretical lens, and what the survey and interview data identified as the most consequential gaps practitioners face.

4.8 Ethical considerations

This research was conducted in accordance with the guidelines for responsible conduct of research issued by the Finnish National Board on Research Integrity (TENK, 2023). The following considerations shaped the design, conduct, and reporting of all primary data collection.

Informed consent and voluntary participation. The survey was distributed with a clear cover statement describing the research purpose, the researcher's institutional affiliation, and the intended use of the data. Participation was entirely voluntary and respondents could exit at any point. No incentives were offered. The three expert interviews were conducted with the explicit

prior agreement of all participants. Each interviewee was informed of the research context, the thesis topic, and how their responses would be used before the interview took place.

Confidentiality and anonymity. The survey collected no personally identifying information beyond the optional offer to leave contact details for follow-up participation. Responses are reported in aggregate and in paraphrase, with no individual respondent identifiable from the findings. The expert interviewees are named in this thesis with their knowledge and consent. Their professional positions are described as part of the research context because their expertise and positionality are directly relevant to the analytical value of their contributions. No confidential or sensitive personal information was collected in any data gathering encounter.

Participant observation. The six research encounters were attended as open researcher participation. At no session was the researcher's role concealed. Where facilitated by external researchers or practitioners, the observer role was either announced to the facilitator in advance or was evident from the researcher's conduct during the session. Participants in the sessions were not individually recruited as research subjects and their responses or behaviours are reported only in aggregate observational terms, not attributed to identifiable individuals.

Researcher positionality. This research carries a declared positionality. The researcher holds strong personal and professional commitments to ecological sustainability and MTH design, which shaped the research questions, the choice of research encounters, and the interpretive frameworks applied to the data. Following Haraway's (1988) concept of situated knowledges, this positionality is treated as an epistemological condition to be named rather than a bias to be neutralised. All knowledge is produced from somewhere. Naming that somewhere is itself an ethical act, and the autoethnographic chapter of this thesis makes that positioning explicit rather than concealing it behind a claim to neutrality.

The ethics of representing nature. A distinct ethical consideration arises from the subject matter of the research itself. This thesis argues for the inclusion of BH entities as stakeholders in design processes, and the framework it proposes creates instruments through which human designers interpret and represent non-human interests. That act of representation is not ethically neutral. All three inclusion modes identified by Veselova and Gaziulusoy (2021) involve

human decisions about how to translate non-human stakes into design processes. The framework attempts to make it transparent by building the limits of the designer's knowledge into the self-assessment instrument and by insisting that method choice follows honest positioning rather than assumed competence.

Data storage and handling. Interview recordings and transcripts were stored securely and accessed only by the researcher. Survey responses were collected through a password-protected platform and are not linked to any identifiable individual. No data will be shared beyond the research context without the explicit consent of the relevant participants.

4.9 Limitations

Every methodological choice in this research carries constraints, and naming them honestly is part of responsible scholarship. The following limitations are acknowledged across the four primary methods used in this study.

Survey sample. The survey gathered twenty responses from a self-selecting sample drawn primarily from SD education and practitioner communities. The sample likely overrepresents ecological awareness and sustainability orientation relative to the broader SD profession - people who completed a survey about BH stakeholders are probably more ecologically engaged than those who did not. The findings are directional and thematic rather than statistically generalizable. They describe patterns and orientations within this sample, not the field as a whole. A larger and more systematically recruited sample would be needed to make generalizable claims about SD practice at population level.

Expert interviews. Three interviews cannot be claimed as representative of any broader community of practitioners or researchers. The three interviewees were selected through purposive sampling for the distinct positions they represent, but those labels are interpretive constructs applied by the researcher, not objective categories. Each interviewee is a complex professional whose views cannot be reduced to a single position. Additionally, all three interviews were conducted within a frame that announced the research's concern with BH design, which may have shaped how interviewees responded. Social desirability effects cannot be ruled out.

Participant observation. The six research encounters were attended as a participant-observer rather than as a controlled evaluator. No standardized observation protocol was applied. Observational notes were made during and immediately after sessions, but the quality and completeness of those notes varied across sessions. The dual role of participant and researcher means that observations are inevitably shaped by the researcher's own engagement in each session - what was noticed, what was recorded, and what was interpreted as significant reflects the researcher's perspective rather than an objective account. The six sessions were also diverse in format, context, facilitator, and participant group, which limits direct comparison between them.

Autoethnography. The autoethnographic account is by definition partial and situated. It reflects one student's trajectory through one programme cohort, and other students in the same programme may have had substantively different experiences. The account is presented as evidence of a structural condition - the absence of ecological thinking in a mainstream SD curriculum - but it is a single instance. Its value lies in triangulating with the survey and interview data, not in standing alone as a generalizable claim.

Framework validation. The proposed framework is a research-grounded proposal, not a tested instrument. The framework was developed through analysis of primary and secondary data and refined iteratively through the research process, but it has not been deployed in live project contexts. Its effectiveness in practice - whether it achieves the positioning clarity it proposes, whether practitioners find it usable, whether the method cards it points toward produce the outcomes claimed - is not yet known. The concept cards draw on workshop sessions that were attended observationally. The card descriptions are the researcher's interpretations of those sessions rather than validated accounts agreed with the original facilitators, with the exception of those documented in existing published sources.

Scope and cultural situatedness. The research is conducted by a European researcher, in a European educational context, drawing primarily on Western posthumanist theory and European design practice literature. The more-than-human design field engages substantially with Indigenous ecological knowledge as a reference point for relational ontologies, but this thesis does so only from the outside - citing Indigenous knowledge holders as sources rather

than engaging with Indigenous design traditions as autonomous research frameworks. A decolonial account of BH design practice that does not position Indigenous knowledge as a resource for Western frameworks to draw on is beyond the scope of this thesis but represents a significant gap. Future research in this area would benefit from co-production with Indigenous researchers and practitioners rather than citation from a distance.

5. RESULTS

This chapter presents findings across five data sources: autoethnographic reflection, survey research, expert interviews, participant observation across six research encounters, and framework analysis of existing MTH design approaches. Each data source addresses different dimensions of the four research questions. The autoethnographic reflection and survey establish the structural conditions and practitioner positions that define the problem. The interviews generate depth on the barriers, worldview positions, and enabling conditions that the survey surfaces. The participant observation documents nine workshop concept cards mapping available MTH methods to service design contexts. The framework analysis identifies the gap that the research contribution addresses. These five sources converge on the framework presented in section 5.5 - *Designing With: A Positioning Framework for Ecological Inclusion* - which synthesises the empirical findings into a practitioner-facing instrument grounded in the Veselova and Gaziulusoy (2021) inclusion modes typology, the Meadows (1999) worldview leverage point framework, and the Brand (2018) Gaia orientation established as the theoretical lens in Chapter 4.

5.1 Autoethnographic reflection

I completed the SDSI master's programme as part of the 2024–2026 cohort. The decision followed direct experience in public sector SD that had exposed a specific inadequacy in my own knowledge: an inability to navigate situations where the ethical dimensions of design work exceeded what the available tools and frameworks could hold. I came to the programme expecting holistic, critically grounded preparation for exactly those situations.

The first semester delivered competent coverage of SD fundamentals. Double diamond frameworks appeared repeatedly, practical tasks were organized around real clients and live case studies, and the mechanics of the discipline were taught with reasonable rigour. The second semester shifted focus toward business reasoning, largely within anthropocentric, growth-oriented design logic. The questions this thesis is built around - what are the environmental implications of our solutions, what kinds of futures do our designs support, what

are the posthumanist and MTH stakes of the choices we make - were absent from the curriculum.

One mandatory course, Sustainable Transitions, addressed sustainability in the third semester. It was the main reason for me to choose EKA as the home base for the semester. Its framing was narrow, oriented primarily toward European sustainability goals within the Green Deal. Sustainability was treated as an organizational compliance challenge rather than an epistemological one. The course included a client project in which sustainable transitions could theoretically have been explored with depth, but in practice the connection between sustainability frameworks and the design process was not made explicit in the classroom or in mentorship. It remained a possibility that was not pursued. Meanwhile EKA provided extra curriculum course that supported in theory what I was lacking, that will be analyzed more in detail in Chapter 5.4.1.

My experience in SDSI was not anomalous. Feedback and discussions across roughly thirty other participants in the programme over two years did not surface anything that contradicted this account. The questions this thesis raises were not raised in class. The gap between what the programme offered and what it would need to offer in order to support the kind of ecological design thinking this research explores is structural, not incidental. It is a gap confirmed by sixteen out of twenty survey respondents who rated their SD education's coverage of environmental sustainability at 1 or 2 out of 5, and by the finding that not a single respondent rated their education at 4 or 5, more on the survey results will be covered in the next Chapter.

Read through the Meadows (1999) leverage points lens, the SDSI programme reproduces a Habitania worldview (Brand, 2018) - one that recognizes sustainability as organisational compliance and resource management but does not challenge the anthropocentric paradigm from which that framing emerges. The personal sphere of transformation (O'Brien & Sygna, 2013) - worldviews and values - was not addressed. The practical sphere - tools and methods - was addressed through conventional HCD frameworks that encode anthropocentric assumptions invisibly. A curriculum change that could shift this would need to intervene at the worldview level rather than simply adding sustainability content to existing project structures.

5.2 Survey

The survey *Beyond-Human Stakeholders in Service Design Practice* ran in February 2026 and collected 20 responses from SD students and practitioners. The instrument was structured in six sections, moving from professional background through stakeholder conceptualization, sustainability orientation, BH awareness, barriers and enablers, and finally tool preferences. It combined closed questions, Likert scales, multi-select options, and open-text fields, generating both quantitative pattern data and qualitative depth. The sample is self-selecting toward people already engaged with design education -- responses likely overrepresent ecological awareness relative to the broader profession.

Nine findings emerged from the analysis, mapped across the four research questions. Each finding was read through the Veselova and Gaziulusoy (2021) inclusion modes lens and the Meadows (1999) worldview leverage point framework, asking what each pattern reveals about where practitioners currently sit and what kind of intervention would be most consequential.

Finding 1: Stakeholder definitions are split (RQ3)

Thematic coding revealed nine respondents using exclusively human framing in their stakeholder definitions, and ten using an entity or system framing open to non-human inclusion. One respondent explicitly included nature, city, and building alongside persons and institutions. Crucially, when asked how they prioritise stakeholders in practice, not one respondent mentioned ecological criteria or non-human entities unprompted. Even those whose definition accommodated non-human entities defaulted to human-centred prioritisation logic: client requirements, impact on humans, access, and who pays. Through the Veselova and Gaziulusoy (2021) lens, this reveals a field where the conceptual preconditions for representative profile inclusion already exist in roughly half of practitioners, but where no methodological scaffolding exists to operationalize that openness. The gap is between definition and practice, not between awareness and values.

Finding 2: High personal commitment, low institutional confidence (RQ1, RQ2)

Fourteen out of 20 respondents rated their personal sustainability commitment at 4 or 5. Only one rated their confidence in human-centred design's capacity to address ecological crises at 5. Eleven rated it 1 or 2. The qualitative responses on designer responsibility reinforced this gap with honesty. Several respondents described feeling structurally trapped: idealistic when entering the field, gradually understanding why decisions are made the way they are, and recognising that designers without seniority rarely have the leverage to act on their values. Through the Meadows (1999) lens, this pattern confirms that the personal sphere - values and worldviews - is not the leverage point that needs intervention, but the structural sphere is. The missing infrastructure is methodological and institutional.

Finding 3: Education has not prepared practitioners (RQ2)

Sixteen out of 20 rated their SD education's coverage of sustainability at 1 or 2 out of 5; nobody rated it 4 or 5. This finding directly corroborates the autoethnographic account in section 5.1 and extends it beyond a single personal experience to a pattern across the sample.

Finding 4: Awareness Exists, Practice Lags (RQ1, RQ4)

Twelve respondents were familiar or very familiar with BH design concepts. Ten had attempted BH inclusion at least once. The qualitative accounts of how they approached it converged on expert consultation as the primary strategy: ecologists, biologists, ornithologists, Indigenous knowledge holders. This corresponds to Veselova and Gaziulusoy's (2021) expert proxy mode - the most accessible inclusion mode for practitioners without deep ecological literacy. Several described genuine confusion about method, with one noting how quickly the complexity escalates and concluding that it is almost only resolvable by a long workshop with many experts.

Finding 5: The urban park scenario reveals ecological sensibility (RQ3)

Non-human entities were selected at near-equal rates to human stakeholders when the framing made ecological inclusion feel contextually appropriate. Birds and animals, water systems, the park ecosystem, trees and vegetation, and insects each received 15–16 selections; park visitors and staff received 17. One respondent who had not selected soil commented: I have never

thought of soil as an entity. Plants and animals yes but not soil. But it is so important - it holds everything together. Through the Veselova and Gaziulusoy (2021) lens, this demonstrates that representative profile inclusion is within reach for most practitioners when the project context makes it legible. The barrier is perceptual rather than philosophical.

Finding 6: Barriers are structural and positional (RQ2)

Time and budget constraints were cited by 11 respondents, client support by 10, lack of ecological knowledge by 7, and lack of tools by 5. Only 3 cited irrelevance. The open-text additions sharpened this: the task is prescribed before practitioners arrive, you need to be high up to influence decisions, and BH considerations get translated into human terms because that is the only currency the process accepts. Through the Meadows (1999) lens, these are structural sphere barriers - they require institutional and methodological intervention rather than individual value change.

Finding 7: Ecological consciousness without professional outlet (RQ1)

Thematic analysis of the human-nature relationship responses identified four themes mapped onto Brand's (2018) worldview spectrum: extraction and exploitation (12/20 responses, corresponding to Immortalia), critique of Western framing and Indigenous contrast (4/20, moving toward Gaia), interdependence and belonging (5/20, corresponding to life within Earth systems), and systemic inaction despite individual awareness (multiple, corresponding to Habitania). The most incisive summary came from one respondent: nature is what keeps us alive, but in such an abstract way that for individual actors it is so illusory that we do not do anything about it.

Finding 8: Value recognised, definition of outcome contested (RQ1, RQ4)

Seventeen out of 20 selected more sustainable solutions, more systemic understanding, and better long-term outcomes as the value BH inclusion would bring. The strongest challenge came from a respondent who asked: improve design outcomes for whom? When BH stakeholders are prioritised over human needs, do we call that improvement? That question is not resolved in the survey. It is the right tension to carry into the thesis.

Finding 9: Strong Tool Demand, Expert-Grounded Preference (RQ4)

Seventeen out of 20 respondents wanted tools to support BH inclusion. Expert consultation was the most preferred approach (18/20), followed by Indigenous ecological knowledge (16), ecosystem mapping (15), and systems thinking tools (13). Nine respondents had not encountered any relevant frameworks. Those who had named Life-Centred Design, Doughnut Economics, Transition Design, non-human personas, and multispecies ethnography - a list that closely mirrors the academic frameworks this thesis engages with.

Summary

Taken together, the survey findings (see Table 6) paint a coherent and somewhat urgent picture of a field caught between ecological awareness and methodological stagnation. Respondents care deeply about sustainability, hold critical views about the extractive relationship between human activity and the natural world, and are broadly open to BH inclusion. What they lack is positioning infrastructure: clear frameworks for identifying which non-human entities are relevant, practical tools for representing them, educational grounding that would make ecological inclusion professionally legitimate, and organisational conditions that would give them the authority to act on values they already hold.

Table 6. Summary of survey findings

Finding	Key data point	RQ	Theoretical lens
Stakeholder definitions split; prioritization logic all-human	10/20 open definitions; 0/20 ecological criteria in practice	RQ3	Veselova inclusion modes
High commitment, low HCD confidence	14/20 committed; 11/20 low confidence in HCD	RQ1, RQ2	Meadows structural sphere

Education unprepared	16/20 rated education 1–2/5	RQ2	Meadows personal sphere gap
Awareness high, practice inconsistent	12/20 familiar; 10/20 attempted	RQ1, RQ4	Veselova expert proxy mode
Scenario enables ecological inclusion	Non-human selected at near-equal rate to human	RQ3	Veselova representative profile
Barriers structural and positional	Time, client, knowledge, tools dominate	RQ2	Meadows structural sphere
Ecological consciousness without professional outlet	4 themes across open-text responses	RQ1	Brand Gaia spectrum
Value recognized; outcome definition contested	17/20 see value; qualitative disagreement on what improvement means	RQ1, RQ4	Gaia relational ethics
Strong tool demand, expert-grounded preference	17/20 want tools; 18/20 prefer expert consultation	RQ4	Veselova expert proxy mode

5.3 Interviews

Three expert interviews were conducted as part of the primary research for this thesis. Interviewee A is a SD educator and long-term practitioner currently based in academia; Interviewee B is an independent design and strategy practitioner working primarily in organisational contexts; Interviewee C is a researcher whose doctoral work produced the systemic typology of natural nonhuman stakeholders used as a theoretical foundation throughout this thesis. Together the three interviews represent a range of positions - academic-

practitioner, commercial practitioner, and researcher-turned-practitioner - that triangulate around the same set of structural problems from different vantage points.

Finding 1: Barriers

All three interviewees identified barriers to more-than-human inclusion in design practice, and despite their different professional positions, their accounts converge with striking consistency.

Interviewee A located the primary barrier in economic logic. Design decisions, they argued, are ultimately governed by what clients and organizations are willing to pay for and priorities, and nature has historically not appeared in that equation. The effects of design on ecological systems are absent from conventional accounting frameworks, making it structurally difficult to justify ecological considerations even when designers want to include them. This is a systemic problem rather than an individual one - the issue is not that designers lack values but that economic conditions do not create legitimate space for those values to operate. Through the Meadows (1999) lens, this is a rules-of-the-system barrier: the accounting frameworks that govern design practice encode anthropocentric assumptions at a structural level that individual worldview change cannot override.

Interviewee B framed the barrier as cultural rather than economic. Most organisations and design briefs are built around transactional logic, and introducing relational thinking requires translation work that is rarely acknowledged as part of the designer's role. They described feeling the tension between what design methods make possible and what project contexts make permissible - a positional constraint.

Interviewee C offered the most detailed taxonomy, identifying four barriers that operate simultaneously. Social anxiety - the fear of professional judgment for proposing approaches outside established norms. Methodological uncertainty - most designers lack both ecological literacy and practical MTH experience, a gap compounded by the fact that the field is still developing. The commercial divorce - most MTH design research has been produced within academic contexts that have not engaged seriously with economic viability, leaving practitioners without a vocabulary for connecting ecological inclusion to business value.

Emotional labour - the sustained discomfort of working against professional and cultural norms. Through the Meadows (1999) lens (see Table 7), these four barriers operate at different leverage points simultaneously: social anxiety and emotional labour at the personal sphere, methodological uncertainty at the practical sphere, and commercial divorce at the structural sphere.

Table 7. Barriers mapped to Meadows leverage points and Brand worldview

Barrier	Interviewee	Meadows sphere	Brand worldview reproduced
Economic logic of design decisions	A	Rules of system	Immortalia / Habitania
Transactional organizational culture	B	System structure	Immortalia
Social anxiety about professional norms	C	Personal sphere	Habitania
Methodological uncertainty	C	Practical sphere	Habitania
Commercial divorce of MTH research	C	Structural sphere	Habitania
Emotional labour	C	Personal sphere	Gaia

Finding 2: Entry points

All three interviewees aligned around the same principle: build capacity outside of project pressure before attempting to use it inside a project.

Interviewee A drew attention to the need for interdisciplinary knowledge, arguing that designers need to engage seriously with natural sciences as a professional competency rather than a secondary interest. They described a gap between practitioners oriented toward technology and those oriented toward ecological systems, and suggested the discipline's future depends on bridging them. Through the Veselova and Gaziulusoy (2021) lens, this maps onto the expert proxy mode: building the knowledge needed to identify and consult relevant ecological experts before entering a project.

Interviewee B emphasized values clarification before method acquisition. Before a designer can introduce ecological considerations into a project, they need to understand their own relationship to nature clearly enough to hold it under pressure. Their framing of the shift from egocentric to ecosystemic thinking as a prerequisite resonates directly with Stage 2 of *Designing With* - the argument that where you stand shapes what you can do before any method is selected.

Interviewee C's three recommendations were the most operationally specific. First, build MTH skills outside project contexts - practise making non-human personas for entities in your immediate environment, learn which ecological experts are relevant to your practice area, develop fluency with the language and concepts before deploying them under commercial pressure. Second, understand the scale and type of project before choosing a MTH approach. Third, be brave - stop asking for permission to include non-human perspectives, since most people who encounter these approaches when invited find them intuitive rather than threatening. That third recommendation carries a particular resonance given the survey finding that non-human entities were selected at near-equal rates to human stakeholders when framing made inclusion contextually appropriate. The barrier is the absence of a professional context that treats ecological inclusion as normal, which happens through accumulation, and accumulation requires someone to go first.

Finding 3: What needs to change

The question of what would need to shift at the level of education, culture, and industry produced the most divergent responses.

Interviewee A focused on recovering a sense of the commons - reframing HCD not as customer-centred but as oriented toward shared, long-term, ecological wellbeing. They placed hope in crisis moments creating openings, in the possibility that acute failures in the existing system might create conditions for different approaches to gain legitimacy.

Interviewee B focused on cultural shift within design practice - from a discipline that helps organizations achieve predetermined goals to one that helps them ask different questions. Their framing of design as facilitating collective action rather than individual authorship points toward the kind of worldview reorientation that Stage 2 of the framework addresses.

Interviewee C's account was the most comprehensive. On design education: fundamental restructuring is needed - new educators with natural science backgrounds, ecological literacy as an entrance requirement, and dedicated MTH methods courses. On industry: unexpected optimism - the business world is increasingly pushing nature-positive transitions out of financial self-interest rather than values, and that pressure from the World Economic Forum, insurance companies, and banks calculating nature-related risk may ultimately do more to normalise ecological inclusion than academic advocacy. This observation is uncomfortable and probably correct. The most realistic path to normalizing MTH inclusion in SD runs not through philosophical conversion but through the convergence of ecological necessity and economic risk - a convergence already underway in finance and insurance that design practice will need to respond to whether it is ready or not.

5.4 Participatory observation across workshops

Participant observation across six research encounters (see Table 8) between September 2025 and March 2026 formed one of the primary data sources for this thesis. Each encounter involved methods for including MTH stakeholders in design or research processes, ranging from ninety-minute workshops to multi-day symposia.

Table 8. Summary of workshops and facilitators

Workshop	Theme	Facilitators
Workshop A	Creative research methods for co-creation	Facilitator A, Facilitator B
Workshop B	Eco-mythology	Facilitator C, Facilitator D, Facilitator E, Facilitator F
Workshop C	Representing MTH bodies	Facilitator G, Facilitator H
Workshop D	Participatory drawing method on multispecies time	Facilitator I
Workshop E	Careful futures	Facilitator J
Workshop F	Planetary future	Facilitator K

Each session was assessed against four criteria derived from the Veselova and Gaziulusoy (2021) lens and the framework analysis described in section 4.7.5: theoretical grounding, specific techniques used, participant engagement levels, and transferability to commercial SD contexts. The methods that proved most relevant are documented as workshop concept cards. Each card captures a single method as observed in practice, covering its origin, core idea, design question, SD relevance, double diamond placement, Veselova inclusion mode, and strengths and limits. The cards are written to function as replication guides for service designers working in MTH contexts.

5.4.1 Workshop A

The first research encounter was the most sustained of all: a semester-long (September 2025-December 2025) elective course, run by Facilitator A and Facilitator B at EKA. It was not part

of the SDSI master programme. Attending required a deliberate choice, and for most of my classmates from that programme, it turned out to be a choice they eventually reversed. Out of five SDSI students who began the course, two finished and produced output: SDSI student with similar thesis topic and myself.

The course combined theoretical reading with embodied practice across a full semester. The theoretical content moved across a wide range: the Anthropocene as framing for the current ecological moment, degrowth and post-growth methodologies and their implications for design, the history of human-nature coexistence in artistic practice, and how contemporary artists use ecological relations as material and method. Participants were given substantial reading lists running from political ecology to speculative art theory, creating a foundation deliberately wider than any single discipline. These sessions were discussions rather than lectures, and the line between theoretical framing and lived experience was kept deliberately permeable.

Alongside the theory, the course ran practical sessions that used making as a form of thinking. In one session, participants worked with leftovers of industrial netting to create a collective art piece, exploring how materials discarded by industrial processes carry traces of the relationships that produced them. In others, participants reflected on examples of Anthropocene disruption from their own local contexts.

The course's most immediately transferable method was its opening session (see Figure 6). Facilitator A and B took participants to the nearest park and asked them to draw a plant, then zoom into a specific detail, then map the relationships happening around it. No artistic skill was required or assumed. The three steps moved from observation to detail to relation, each demanding a different kind of attention. By the end, participants had produced something functioning less like a drawing and more like a stakeholder map: a record of what a non-human entity is, what it does at the level of texture and particularity, and who and what it exists with.

1. Observational drawing in nature

Origin: practice-based research, post-growth design, interspecies co-creation, EKA
Core idea: Drawing as attunement: zoom from full plant to specific detail to relational network around
Methods used: Outdoor sketch session: full plant, close detail, relational map of what happens around the plant; group reflection discussion
Design question: How does close observation of a non-human entity shift how a designer perceives it as a stakeholder?
SD relevance: Low-barrier field method; applicable in any local outdoor context, no remote nature access needed
Double diamond: Discover - embodied stakeholder observation before problem framing; builds relational attunement
Inclusion mode: Direct participation - bodily, sensory encounter with the entity in its own environment
Strengths: No artistic skills required; shifts perception rapidly; works in urban parks and everyday settings
Limits: Personal output is hard to translate into design deliverables without further scaffolding

Figure 6. Workshop card: Observational drawing in nature

The course's final deliverable was an individual intervention (see Figure 7): each participant designed an artifact or experience that disrupted anthropocentric assumptions and created conditions for co-creation with nature. My own intervention (see Appendix A) combined text and photography to document five everyday scenes of human-nonhuman co-creation in urban space, ending with a cemetery tombstone as the site where dying releases human agency entirely and lets the ground absorb what remains. The piece argued that most encounters with the MTH world are already happening, mundanely and continuously. What is absent is the attention paid to them.

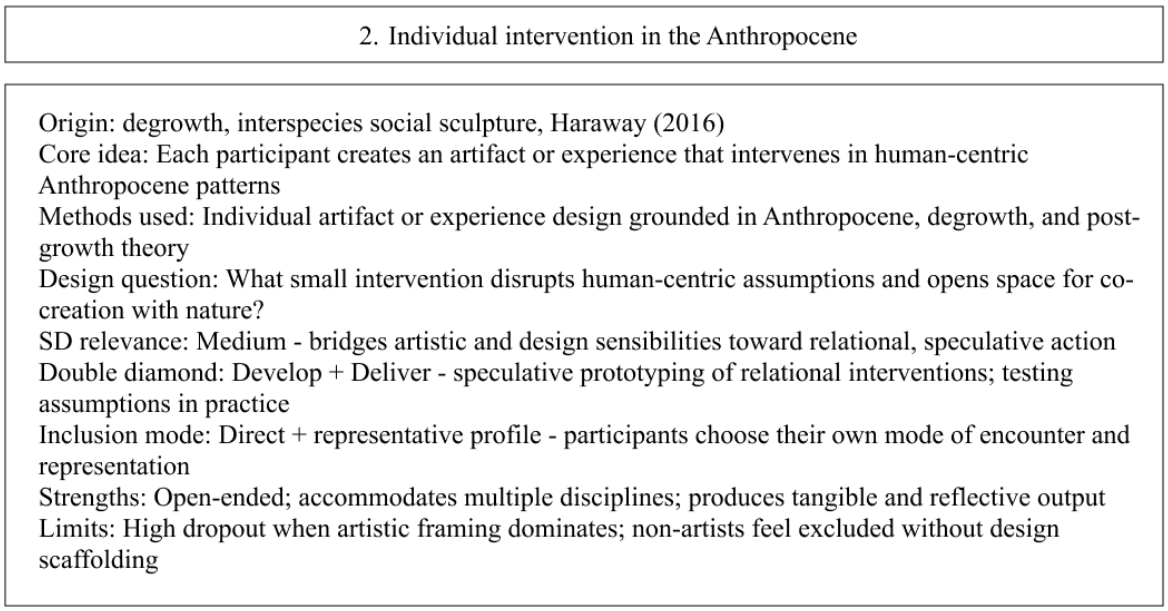


Figure 7. Workshop card: Individual intervention in the Anthropocene

The course drew heavily on Remm and Konovalov's (2025) practice-based method cards, developed as part of their project positioning the garden as both a literal multispecies environment and a design research site. Their framing holds that if emotional connection with nature and non-human species is absent, care cannot follow (Remm & Konovalov, 2025).

The dropout rate among SDSI students is itself a research finding. Three out of five SD students left before completing the course. The most commonly cited reason was that it felt too artistic and too soft. This points to a structural tension this thesis keeps returning to: the methods that generate the richest relational knowledge with non-human actors tend to be the ones that feel least legible within professional design culture.

Both my classmate with similar thesis topic and I stayed, and both proceeded with bridging the practice and SD further. My classmate is completing a master thesis on how to integrate BH approaches into SD pedagogy. For both of us, this course was the moment we understood that SD, as we had been taught it, was structurally missing a framework for inclusion of the non-human.

Through the Veselova and Gaziulusoy (2021) lens, the observational drawing method supports direct participation at the lowest end of the inclusion spectrum -- bodily, sensory encounter with an entity in its own environment -- while the individual intervention supports representative profile through the designer's own interpretive making practice. On Brand's (2018) worldview spectrum, the course consistently moved participants toward a life within Earth systems orientation and, for those who completed it, toward Gaia.

5.4.2 Workshop B

I entered this symposium from January 17th to 18th as an observer. Among roughly 40 attendees, predominantly women, many of them PhD researchers, writers, and contemporary artists working at the intersection of ecology and cultural practice, I held back from open discussion and watched instead. This was a deliberate methodological choice, and one that shaped what I was able to see. The symposium was held for 2 full days and held 15 workshops (see Appendix B). Moving forward, the emphasis will be placed only on the workshops that felt most replicable to SD practice.

The participant composition is itself significant data. This was a self-selecting group: people already committed to MTH thinking, already fluent in its language, already operating from within what Wakkary (2021) describes as a shared commitment to thinking-with rather than thinking-after. That shared orientation produced richness. It also produced a limit. The symposium generated dense relational knowledge. What it did not generate was evidence that these frameworks travel beyond communities already persuaded by them - the gap is where the design challenge for this thesis lives.

Warm data as the dominant research currency

Across both days, one concept kept reframing what I was observing: warm data. The term, developed by Nora Bateson, describes relational, transcontextual information - knowledge that lives within and between the interconnections of a complex system rather than emerging from isolating its parts. Every method deployed - cauldron, photovoice, storytelling, writing with plants - was oriented toward generating this kind of intelligence rather than producing replicable findings. Warm data is exactly what growth-economy logic cannot process. It resists

quantification, acceleration, and extraction. That is what makes it ecologically honest, and what makes it practically invisible inside most organizational decision-making frameworks.

Storytelling as dialogue

Facilitator's C storytelling session produced the most concentrated and emotionally alive participant response of the two days. The method was structurally simple: a story, individual reflection time, then collective dialogue (see Figure 8). Willis et al.'s (2022) empirical research with 56 performance storytellers across the UK identified that narrative's relational power is fundamentally dialogical: meaning does not reside in the story itself but emerges through the encounter between story and listener, shaped by the quality of the reflective space that follows. Participants responded personally rather than analytically, and then discovered in the discussion that their personal responses were also collective ones.

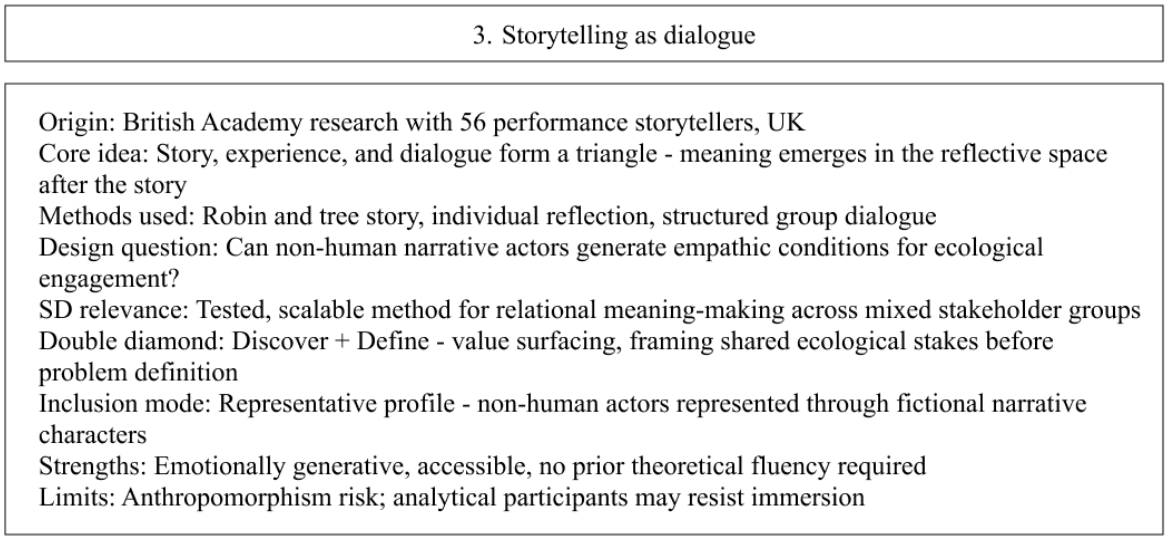


Figure 8. Workshop card: Story telling as dialogue

The non-human characters in the story functioned as co-creators of meaning, which aligns with Haraway's (2016) conception of response-ability -- the capacity to affect and be affected by others, constituting mutual transformation in the encounter. The triangle of story, experience, and dialogue (Willis et al., 2022), where each point activates the others, is the mechanism that makes this method work.

Figure 9. The triangle of story (Willis et al., 2022)

Research on seasonal variation in moral values suggests that human ethical orientation is itself embedded in ecological rhythms, with values like loyalty and relational obligation fluctuating with seasonal cycles in ways that implicate the MTH world as a shaping force in moral life (Hohm et al., 2024). If human moral sensibility is already partially constituted by ecological patterns, the boundary between projecting values onto nature and recognizing values that emerge with nature becomes considerably less stable.

Birch time and the collapse of human temporality

The session on birch time, offered by Facilitator D, Facilitator E, and Facilitator F, drew on artistic practices and ethnographic research across Denmark, Finland, Iceland, China, and Latvia to position the birch tree as a relational presence, something to attune to rather than study from a distance. The concept of birch time - a temporality that operates outside human categories of past and future, existing only in the present cycle of growth, dormancy, and return - opened something difficult to resolve. I wrote in my own reflection that a birch tree lives only in the present tense. Attuning to that rhythm asks something disorienting of a human subject trained to plan, to accumulate, to narrate progress.

The mythopoetic spectrum as a design taxonomy

The session on writing with plants introduced a framework I find directly applicable to this thesis: an eight-degree spectrum of mythopoetic plant engagement (see Table 9), ranging from zero mythopoetic load through to cosmogenic. Between those poles sit functional-but-culturally-loaded plants, biographical plants, folk-symbolic plants, ritually active plants, archetypical plants, and liminal-dangerous plants.

Table 9. Eight-degree spectrum of mythopoetic plant engagement (Wyuts et al., 2026)

Degree	Name	Description	Examples
0-1	Zero / near-zero mythopoetic load	No meaning; plant seen as pure resource or object	Industrial wheat, industrial hemp
2	Functional but culturally thin	Has use value but carries little cultural or symbolic weight	Broccoli
3	Personally mythopoetic / biographical	Meaning is rooted in personal memory and individual relationship	Willow tree from your grandmother's garden
4	Folk-symbolic / regional	Sacred or symbolic within a specific geography or cultural tradition	Birch, hawthorn in NW-Europe
5	Ritual-active, mediating / protecting	Carries active ritual agency; can affect the world wherever it exists	Ayahuasca, tobacco, cedar, sage, san pedro cactus
6	Archetypical	Connected with gods and archetypal forces across traditions	Laurel, myrrh, marsh reed, Medusa head cactus, oak
7	Liminal and dangerous / chthonic	Sits at boundaries; associated with danger, chaos, or the underworld	Belladonna, yew
8	Cosmogenic	Represents entire worldviews and cosmologies	Bodhi tree, Tree of Knowledge (Genesis)

This taxonomy is potential as a SD tool (see Figure 10). It offers a way of mapping where any given community, organization, or place sits in its relationship to the non-human world, and therefore where design interventions might meaningfully enter. It acknowledges that not all human-plant relationships carry the same weight, and that weight is not fixed. It shifts across geographies, generations, and contexts. A taxonomy that could travel into boardrooms as a diagnostic for understanding what kinds of MTH relationships an organization is already embedded in, whether it knows it or not.

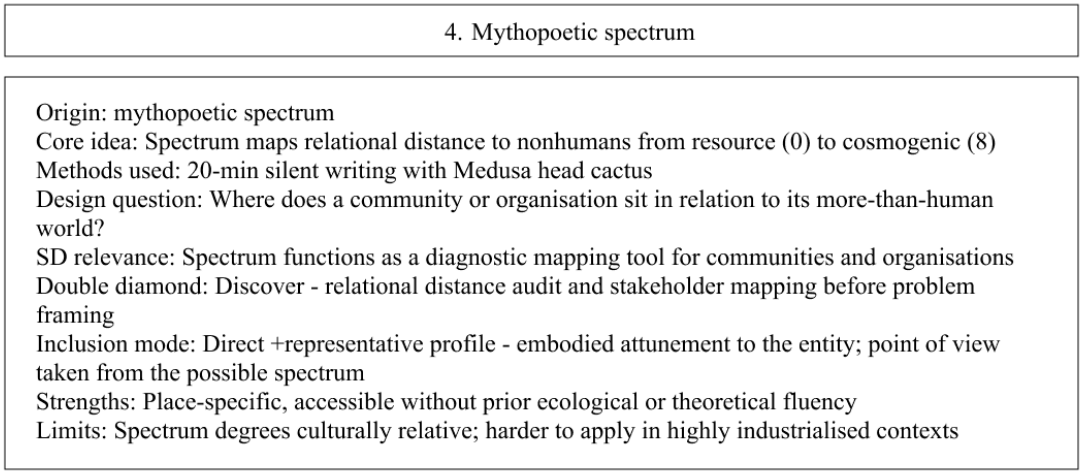


Figure 10. Workshop card: Mythopoetic spectrum

Through the Veselova and Gaziulusoy (2021) lens, the storytelling method supports representative profile inclusion - participants develop relational knowledge of non-human entities through narrative encounter. The mythopoetic spectrum supports expert proxy inclusion - it provides a structured vocabulary for assessing the cultural and relational distance between a community and specific non-human entities. Both methods sit within what Brand (2018) would describe as moving practitioners from Habitania toward life within Earth systems.

5.4.3 Workshop C

This workshop was on 24th of February 16:00 CET and facilitated by Facilitator G and Facilitator H, drawing on affect theory and ecofeminist pedagogy to explore how design methods might make absent or erased MTH bodies present again. The facilitators opened with three anchoring concepts: re-present-ing as the practice of bringing the absent into felt

presence; MTH bodies as the porous, entangled field in which presence and erasure operate; and affective methodology as the design of moments that resist premature collapse into explanation.

For a researcher working in SD, this framing landed with particular force. Much of SD practice is organised around making things legible, communicable, and transferable across organisational contexts. This workshop was asking what gets lost in that translation, and whether design methods could instead hold the space where legibility has not yet arrived.

From naming to making present

The workshop opened with a disarmingly simple task (see Figure 11). Participants were divided by birthday into two groups: one writing verbs describing ways of being with the MTH world, the other naming erased MTH bodies. Thirty-three verbs emerged: growing, smelling, listening, attuning, tracing, caring, sowing, photographing, and others. Twenty-two erased bodies followed: river, seacoast, soil, fungi, moths, coral, marl, rainwater, light. The facilitators then constructed 31 pairings from this collective material, and participants were assigned a combination based on their birthday number, tasked with developing a design gesture that would make that erased relation present enough to be sensed.

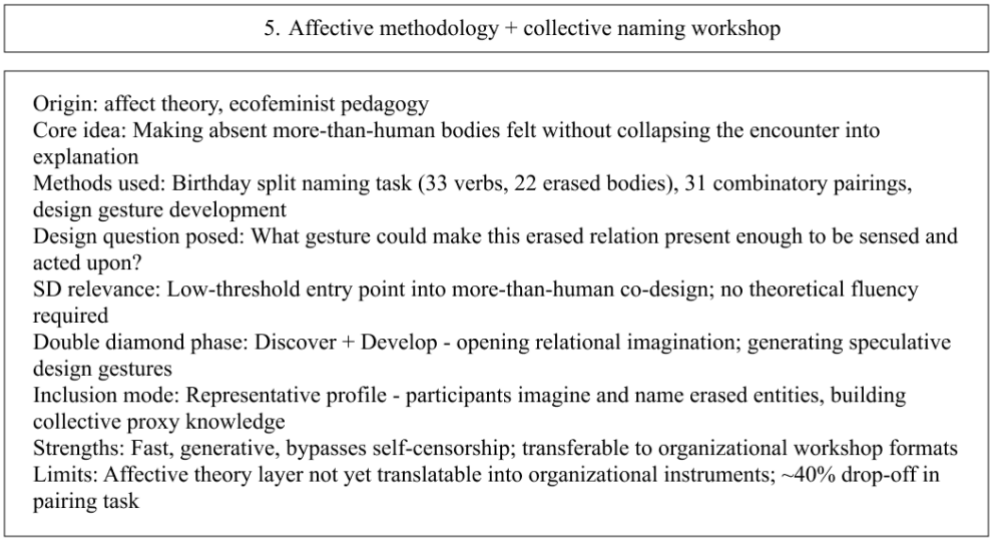


Figure 11. Workshop card: Affective methodology + collective naming workshop

The method removed the evaluative frame entirely, and the result was a collective vocabulary that belonged to no single participant. This connects to Wakkary's (2021) concept of designing-with: creating conditions in which values and relationships emerge through the encounter rather than being specified in advance. Only 12 of the participants then engaged with the pairing task - a drop that is methodologically significant. The activity required imaginative investment and comfort with open-ended speculation that not everyone could bring. This points to a recurring challenge in MTH design practice: the methods that generate the most ecologically honest relational knowledge tend to demand the most from participants in terms of tolerance for ambiguity.

The flow feelers: design acting in disenchanted landscapes

The workshop's most resonant contribution came through the case study of a men's study circle in Sweden, that worked over three semesters to reconnect with a brook buried underground in a culvert almost a century ago and largely erased from collective memory. The project drew on Bird Rose's (2011) concept of social death - a socially constructed power relation in which the lives of most nonhumans are deemed either useful to the powerful or superfluous, their meanings irrelevant, their destruction registered only as property loss. The group positioned the brook as a body that had undergone exactly this kind of erasure: forced underground, stripped of its manifold relations with the surrounding community, reduced to infrastructure.

Their methods were physical, slow, and deliberately embodied (see Figure 12). They searched archives, read the topography with their bodies, placed their ears to the ground hoping to hear water moving below. In the final intervention, they painted blue dots along the route of the buried culvert every ten metres, a slow performative procession that attracted passersby and gradually transformed into what the facilitator described as a watery telling-in-action, the brook little by little being reconnected with human beings again (Laurien et al., 2024).

6. Social death + embodied place-based intervention
Origin: Bird Rose, D. (2011) - social death Core idea: Nonhumans rendered invisible by power; design reverses erasure through embodied, public, place-based action Methods used: Archival research, bodily attunement, performative procession, watery telling-in-action Design question posed: How do you re-presence a socially dead more-than-human body in urban space over time? SD relevance: Proof of concept for more-than-human design in disenchanted urban and organisational landscapes Double diamond phase: Define + Deliver - framing the design problem; implementing relational interventions in context Inclusion mode: Direct + expert proxy - bodily encounter with the entity; archival and local knowledge as proxy Strengths: Generates community engagement without requiring theoretical buy-in; scalable across sessions Limits: Resource-intensive; requires sustained multi-session commitment and place-based access

Figure 12. Workshop card: Social death + embodied place-based intervention

This case study demonstrated that affective methodology can produce genuine community engagement in explicitly disenchanted urban landscapes, directly challenging the assumption that ecological relationality requires access to forests or coastlines. A buried brook beneath asphalt is as much a MTH actor as a birch tree in a Nordic forest - it requires different methods to become perceptible.

Through the Veselova and Gaziulusoy (2021) lens, the collective naming method supports representative profile inclusion through collective vocabulary generation, while the Flow Feelers case demonstrates direct participation at a community scale - designing interventions that make a specific non-human entity perceptible and relationally present. On Brand's (2018) spectrum, both methods move participants toward the Gaia orientation by making ecological entanglement felt rather than merely understood.

5.4.4 Workshop D

This ninety-minute workshop was facilitated on 5 March by Facilitator I, architect and PhD researcher. The session introduced tidalectic drawing as a method for mapping MTH temporalities and ecological relations, building directly on published research into multispecies interactions and human-nonhuman synergies in intertidal zones through peripatetic

autoethnography (Inglezaki et al., 2025). The workshop drew on multispecies ethnography, walking as a research practice, and Brathwaite's concept of tidalectics: the cyclical movement of water as a model of thought that resists the binarism of Western linear time.

The session opened with two framing concepts. Tidalectics positioned non-human time as rhythmic and relational, asking how design might attune to cycles that operate at different speeds simultaneously. Multispecies ethnography, as Ogden et al. (2013) define it, grounds research in the shifting assemblage of beings with agency, treating both biophysical entities and the unknown ways matter animates life as legitimate research subjects.

Facilitator I then introduced walking as attunement before presenting the five-step tidalectic drawing exercise The steps moved from temporal attunement, through life cycle and relational mapping on a circular annual calendar, a non-human perspective shift sketch using sentence prompts, temporal layering to identify fast, medium, and slow rhythms, and finally a tidalectic composition synthesising findings into a multispecies time map. The circular format enacted Brathwaite's tidal logic directly, replacing the linear timeline with a structure that accommodates return, overlap, and ecological pulse.

In practice, roughly twenty-five percent of participants engaged with the full exercise (see Figure 13). The method's complexity was the primary barrier. Without sustained facilitation at each step, the conceptual distance between the framing and the practical task was too wide for most participants to bridge independently.

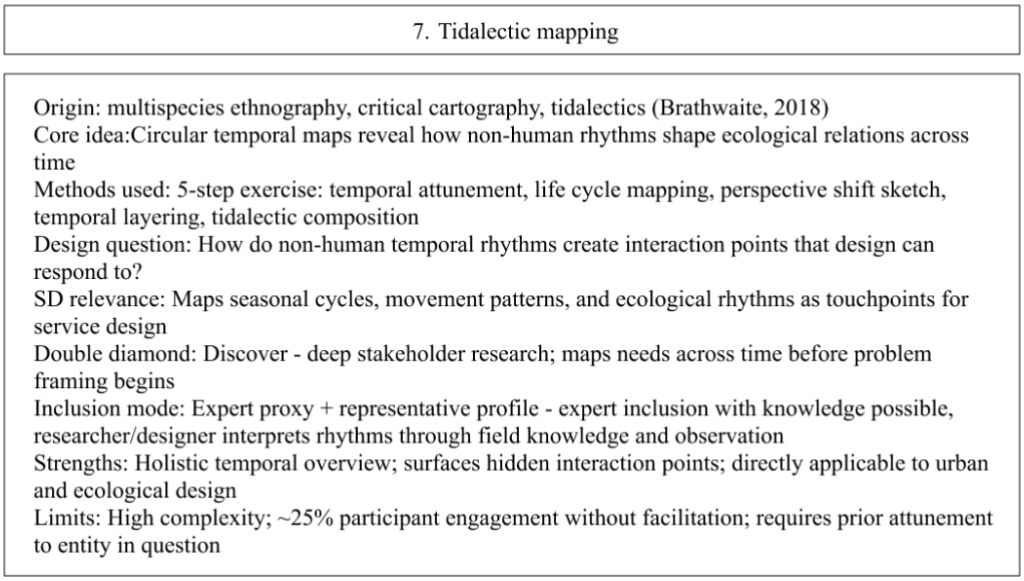


Figure 13. Workshop card: Tidalectic drawing + multispecies time mapping

The circular temporal map produced a genuinely different kind of stakeholder representation, one that captures when a MTH actor's needs arise, how those needs shift across seasons, and where human activity intersects productively or destructively with non-human cycles. A linear service blueprint cannot capture that the same urban rooftop functions as nesting ground in spring, shelter in winter, and a migration waypoint in autumn - the tidalectic map holds all three simultaneously.

Through the Veselova and Gaziulusoy (2021) lens, the tidalectic drawing method supports expert proxy inclusion - the designer develops detailed knowledge of the entity's rhythms and cycles through sustained observation and research. Its commercial SD transferability is moderate: the method requires facilitation skills and prior attunement that most practitioners would need to build outside project pressure, consistent with Veselova's (2026) recommendation. On Brand's (2018) spectrum, the method moves participants toward life within Earth systems - recognising ecological rhythms as structurally relevant to design - with potential for movement toward Gaia when the circular temporal mapping produces genuine relational encounter.

5.4.5 Workshop E

This was the most attended session across all research encounters, drawing roughly sixty participants into a shared Figma space facilitated by Facilitator J on 3rd March. It was also the most generative in terms of participation. And it never once used the words MTH, multispecies, or posthumanism. That absence is the most significant observation from this session. Every other workshop carried specialist terminology that, however intellectually grounded, created a threshold. Here, the entry point was simply: what feels broken, and what are you carrying quietly? The frame filled immediately.

The session moved through five sequential frames (see Figure 14). The rooting frame asked participants to name present realities across four areas: naming reality, naming beliefs, naming stories, and personal impact. The structure was deliberately non-analytical. Being witnessed was framed as sufficient. The composting frame invited participants to release beliefs, norms, and inherited stories that felt extractive or outdated, drawing on the metaphor of decomposition as generative rather than destructive, resonant with Haraway's (2016) framing of staying with the trouble as making fertile ground from what has failed.

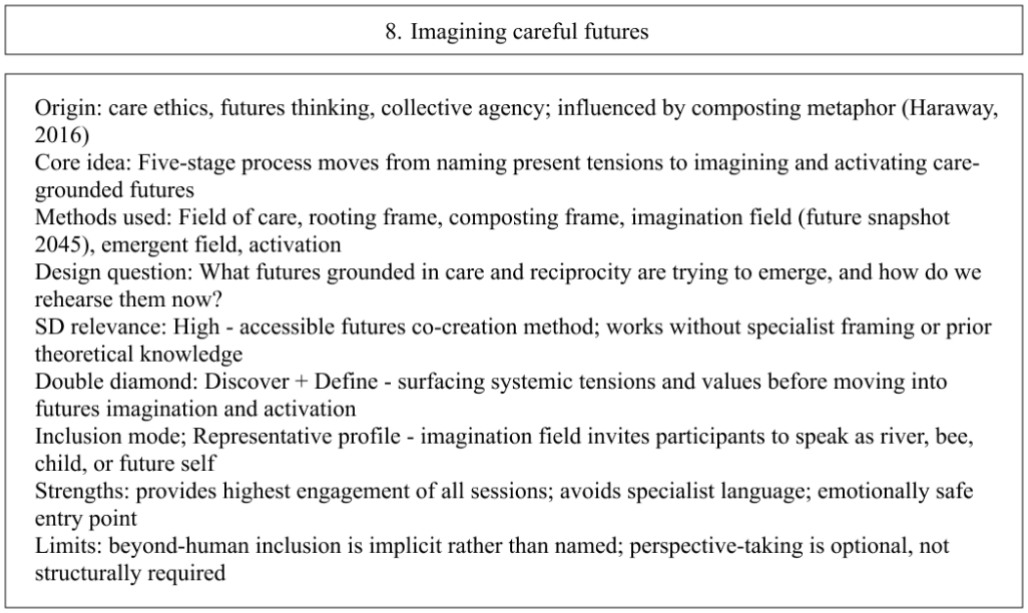


Figure 14. Workshop card: Imagining care-full futures together

What this session demonstrates is that the methods that generated the most human engagement with MTH perspectives were the ones that did not announce themselves as such. A service designer trying to introduce ecological stakeholder thinking into an organization may find that the rooting-composting-imagination sequence opens doors that a posthumanist framing closes.

Through the Veselova and Gaziulusoy (2021) lens, the careful futures method supports representative profile inclusion - participants temporarily inhabit non-human perspectives through speculative imagination. Its commercial SD transferability is high: the method requires no specialist framing, scales to large groups, and produces the kind of futures material that organizations can work with. On Brand's (2018) spectrum, the session reliably moves participants from Habitania toward life within Earth systems - and for those who engage deeply with the imagination field, toward Gaia.

5.4.6 Workshop F

The final research encounter was a webinar (14th of March, 16:00 EET), facilitated by Facilitator K, planetary futurist, PhD researcher in Planetary Governance. Unlike the other five encounters, this was a presentation of a framework rather than a participatory workshop. Facilitator K was not asking participants to do something, but showing leaders and decision-makers what it would mean to think differently.

The session opened with a provocation that Meadows (1999) had already identified: worldview is the highest leverage point in any system. Worldview shapes goals, goals shape rules, rules shape decisions, and decisions shape outcomes. Facilitator K presented four worldviews operating simultaneously - the world as machine, the anthropocentric view, life within Earth systems, and the planetary worldview - which maps directly onto Brand's (2018) co-emerging futures spectrum.

The planetary worldview draws directly on the Gaia hypothesis (Lovelock & Margulis, 1974). Hamed's contribution is not the theory itself but its translation into a strategic design instrument. The Planetary Foresight Framework takes the standard double diamond and rebuilds each stage with planetary questions embedded throughout: the research phase incorporates Planetary PESTEL alongside conventional stakeholder insight; the hypothesis stage asks how the

planetary perspective brings new logic; ideation asks how planetary perspectives are integrated into possible solutions; and deliver and review stages ask how planetary data and wellbeing metrics are tracked over time. Every stage has a planetary prompt.

This is what makes the framework significant for this thesis. It is the first framework (see Figure 15) encountered across all six research sessions that embeds MTH and relational planetary thinking directly into the full design process as structural requirement rather than optional framing. Facilitator's K framework asks what the design phase would look like if planetary interdependencies were considered from brief to review.

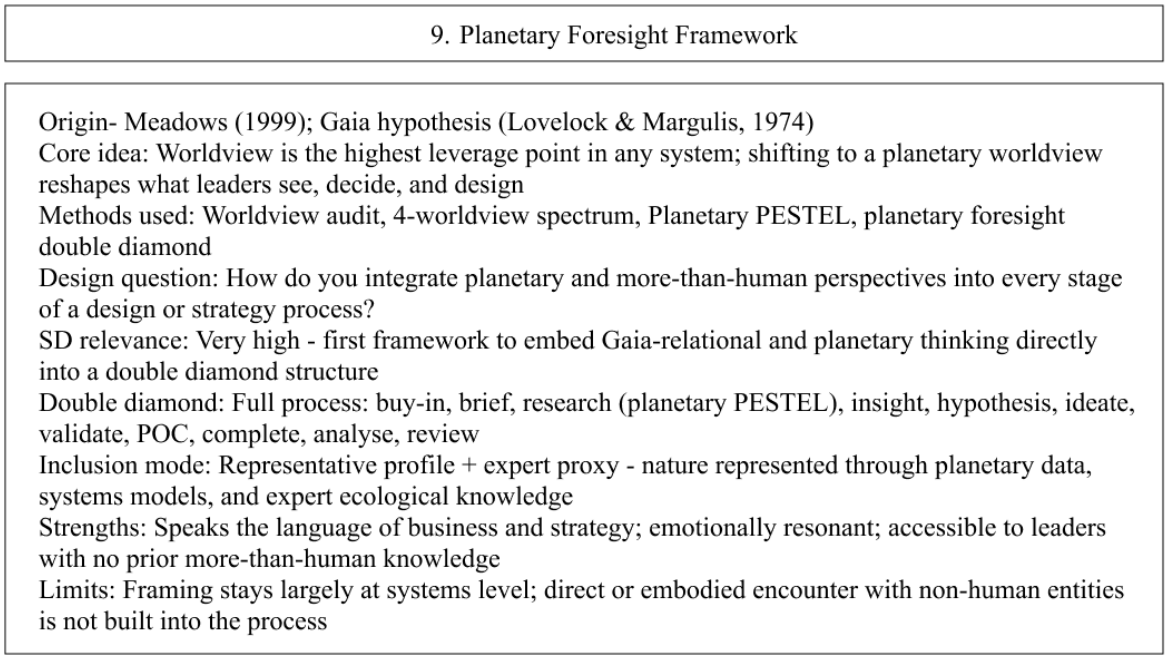


Figure 15. Workshop card: Planetary Foresight Framework

The session's resonance with participants was visible in the chat. When asked what planetary means, responses ranged from holistic ecosystem thinking and nature-centric starting point to more than global, including everything non-human. Several noted at the end that the session shifted their perspective. The framing that works in organisational contexts is not necessarily the most theoretically refined. It is the one that makes decision-makers feel that what they already sense about the world is real, and that design can respond to it.

The limit of the framework, from a MTH design perspective, is that the non-human world is present primarily as data: planetary boundaries, PESTEL signals, systems models. The embodied, relational, warm-data quality that characterized the earlier research encounters is largely absent. The framework can tell a leader that biodiversity loss is a strategic risk. What it cannot yet do is ask that leader to sit with a tree for twenty minutes and notice what changes.

Through the Veselova and Gaziulusoy (2021) lens, the Planetary Foresight Framework supports representative profile inclusion at the fullest structural scale -- embedding ecological representation into every phase of the design process. Its commercial SD transferability is the highest of all nine methods: it speaks the language of strategy, risk, and organizational decision-making. On Brand's (2018) spectrum, it positions practitioners firmly within life within Earth systems, with clear pathways toward Gaia built into the framework's fourth worldview.

5.5 Designing With - A positioning framework for ecological inclusion

The framework proposed in this thesis takes its name from a formulation that runs through the theoretical foundations of posthumanist design. To design-with, as Wakkary (2021) articulates it, is to move beyond designing for human users toward a relational practice in which humans and nonhumans are bound together materially, ethically, and existentially. It is not a technique but an orientation - a way of understanding what design is and who it is for. The framework *Designing With - A positioning framework for ecological inclusion* (see Appendix C) takes that orientation seriously and asks a practical question: given that most service designers currently operate within contexts that do not structurally support ecological inclusion, where do they actually start? The answer this framework proposes is a position. Before a designer can choose how to include BH stakeholders, they need to understand three things: whether their project has ecological stakes worth attending to, where they personally stand in relation to the living world, and what their organizational context will realistically allow. Only when those three things are understood does method selection become meaningful. Choosing a method without knowing your position is like choosing a route without knowing where you are. This logic is grounded directly in the research that produced this thesis. The survey data showed that awareness of MTH design is not the problem - twelve out of twenty respondents were

familiar or very familiar with BH concepts. The problem is the already mentioned gap between awareness and action, and that gap is structural rather than individual. Barriers cited by respondents were overwhelmingly positional: time and budget constraints, client expectations, lack of ecological knowledge, and the absence of legitimate space within conventional briefs to introduce considerations that were not already there. Interviewee C in the interview named the same barriers from a practitioner-researcher position, adding that the emotional labour of working against professional norms is itself a barrier that methods alone cannot address. Interviewee A described the economic logic of design as the dominant constraint - ecological considerations simply do not appear in the frameworks that govern most project decisions. Interviewee A described the difficulty of introducing relational thinking into organizations built around transactional logic. What this research consistently revealed is that the entry point to MTH design is not a workshop method or a stakeholder tool. It is a question of position - ecological, professional, and personal. Designing With is built around that finding.

5.5.1 Theoretical grounding

The framework draws on three distinct theoretical threads, each addressing a different dimension of the problem.

The first is Meadows' (1999) leverage points framework, applied by Fcilitator's K in the planetary futures context and developed extensively in Veselova and Gaziulusoy's (2021) work on systemic MTH design. Meadows argues that worldview - the mindsets and paradigms out of which a system arises - is the highest leverage point in any system. It is the hardest to change and the most consequential when it does change. This thesis takes that argument seriously in a specific way: rather than assuming designers need to change their worldview before they can act, the framework maps where designers currently are and identifies what they can do from that position. The goal is to make incremental movement possible from wherever someone is starting.

The second thread is Veselova and Gaziulusoy's (2021) typology of natural nonhuman stakeholders and their three modes of inclusion - direct participation, expert proxy, and representative profile. These three modes are not equally accessible to all designers in all

contexts. Direct participation requires the deepest relational knowledge and the most open project conditions. Representative profile requires the least - it can be built from secondary research and expert consultation. The framework uses these three modes as the architecture of its method selector, matching inclusion depth to the realistic conditions of each project.

The third thread is the consistent empirical finding across all six research encounters that accessibility and engagement are shaped more by framing than by content. The session that generated the highest participation across all six workshops was Facilitator's J care-full futures session - which never once used the words MTH, posthumanist, or ecological inclusion (Vasileva, 2026). The session that generated the most consistent dropout was the tidalectic drawing method - which required both specialist framing and sustained facilitation to work (Inglezaki et al., 2025). This does not mean that specialist methods are less valuable, it means that the entry point matters enormously, and that the language and framing chosen at the beginning of a process determines who can participate and how far the process can go.

The framework analysis examined two bodies of existing work systematically: the theoretical frameworks established in the literature review (see Table 10), and the nine concept cards derived from the six participatory observation sessions (see Table 11). Each was assessed against four criteria derived from the research questions and the theoretical lens: whether it helps identify ecological stakes in a specific project; whether it supports the designer in understanding their own relational position; whether it recommends methods appropriate to different project conditions; and whether it operates within the time and resource constraints of commercial practice.

These four criteria were developed through the abductive process described in section 4.2 - emerging from the combination of the research questions, the theoretical lens, and what the survey and interview data identified as the most consequential gaps practitioners face. The assessment followed Ritchie and Spencer's (1994) framework analysis approach: familiarisation, identification of a thematic framework, indexing, charting, and interpretation. Each framework and card was rated present, partial, or absent for each criterion through iterative reading and comparison.

Table 10. Framework analysis - theoretical frameworks from literature review

Framework	Source	Identifies ecological stakes	Supports designer positioning	Recommends methods for conditions	Works within commercial constraints
Systemic typology and inclusion modes	Veselova & Gaziulusoy, 2021	Present	Absent	Partial	Partial
Four questions for systemic MTH design	Poikolainen Rosén et al., 2022	Present	Absent	Absent	Partial
Leverage points framework	Meadows, 1999	Partial	Absent	Absent	Partial
Posthumanist design	Wakkary, 2021	Partial	Absent	Absent	Absent
Co-emerging futures	Brand, 2018	Partial	Partial	Absent	Absent

The theoretical frameworks established in the literature review were assessed first, identifying what existing scholarly contributions offer practitioners and where they fall short (Table 10). The nine concept cards derived from the six participatory observation sessions were then assessed using the same criteria, examining whether the methods encountered in practice fill the gaps that theory leaves open (Table 11)

Table 11. Framework analysis - nine concept cards from participatory observation

Card	Method	Identifies ecological stakes	Supports designer positioning	Recommends methods for conditions	Works within commercial constraints
1	Observational drawing in nature	Present	Absent	Absent	Partial

2	Individual intervention in the Anthropocene	Present	Absent	Absent	Absent
3	Storytelling as dialogue	Partial	Absent	Absent	Partial
4	Mythopoetic spectrum	Present	Partial	Absent	Partial
5	Collective naming workshop	Partial	Absent	Absent	Absent
6	Embodied place-based intervention	Present	Absent	Absent	Absent
7	Tidalectic mapping	Present	Absent	Absent	Absent
8	Imagining care-full futures together	Partial	Absent	Absent	Present
9	Planetary Foresight Framework	Present	Absent	Present	Partial
Designing With	This thesis	Present	Present	Present	Present

Across both theoretical frameworks and practitioner methods, one absence is entirely consistent: no existing framework or method helps a designer understand their own relational position before selecting an approach. Designer positioning support is absent from every theoretical framework in Table 10 and from every concept card in Table 11. The Mythopoetic spectrum comes closest, offering partial positioning support by locating an entity on a relational distance scale, but it maps the entity's position, not the designer's. Brand's co-emerging futures framework offers partial positioning through its worldview spectrum but does not connect that positioning to method selection within a design process. The Planetary Foresight Framework is the most structurally comprehensive method encountered across all

six sessions - the only one that covers the full double diamond - but it still does not help a designer understand where they are starting from before engaging with it.

The pattern of absences across both tables directly informed the three-stage structure of *Designing With*. Stage 1 addresses the identification gap - no existing framework provides a quick, accessible, non-specialist instrument for determining whether non-human entities are relevant to a specific project. Stage 2 addresses the positioning gap - no existing framework or method helps a designer locate themselves on the worldview and context axes before choosing an approach. Stage 3 addresses the method selection gap - no existing framework connects practitioner positioning to specific method recommendations in a way that accounts for both the depth of inclusion required and the realistic constraints of the project context. *Designing With* is the instrument that makes the existing body of MTH design knowledge navigable for a practitioner who does not yet know where to start.

5.5.2 Framework structure

Designing With operates across three sequential stages, each producing a concrete output that is carried into the next stage.

Stage 1: Project context assessment asks whether BH stakeholders are ecologically relevant to the project at hand (see Figure 16). It uses a branching yes/no question map with separate paths for physical and digital services, designed to surface ecological stakes without using specialist terminology. The output is a score from zero to five, corresponding to four outcomes: no non-human entities identified, peripheral (note and monitor), present (include in stakeholder map), or central (name, map, and actively represent). Any score above zero proceeds to Stage 2.

The physical and digital split is deliberate. Physical services have more immediate and visible connections to ecological systems. Digital services have ecological connections that are structurally less visible but equally real: server infrastructure, behavioral change at scale, supply chains, downstream decisions affecting land and ecology. The questions surface those connections regardless of whether the practitioner entered the process thinking ecologically.

Figure 16. *Designing With* project context assessment

The physical and digital split is deliberate. Physical services have more immediate and visible connections to ecological systems - land, water, living things, waste flows, temporal effects. Digital services have ecological connections that are structurally less visible but equally real: server infrastructure, behavioural change at scale, supply chains, downstream decisions affecting land and ecology. The questions are designed to surface those connections regardless of whether the practitioner entered the process thinking ecologically.

Stage 2: Individual relational self-assessment (see Figure 17) asks where each designer personally sits in relation to the living world and to their current project context. It operates at the individual rather than team level, because the survey data showed that ecological awareness and commitment vary significantly between practitioners in the same organisation. Two people on the same project can hold completely different worldviews, and both of those worldviews will shape what methods feel legitimate and what approaches they can credibly facilitate.

The assessment maps each designer onto a 2x2 matrix using two axes. The horizontal worldview axis moves from an extractive understanding of nature as resource to a relational understanding of nature as having its own agency and interests. The vertical context axis moves

from a fully constrained brief to a genuinely open project context. The intersection of these two axes produces one of four zones: the Converting (open context, extractive worldview), the Navigator (open context, relational worldview), the Unaware (constrained context, extractive worldview), and the Willing but Stuck (constrained context, relational worldview). Each zone has a short description that names what that position means for the designer's current project and points toward Stage 3.

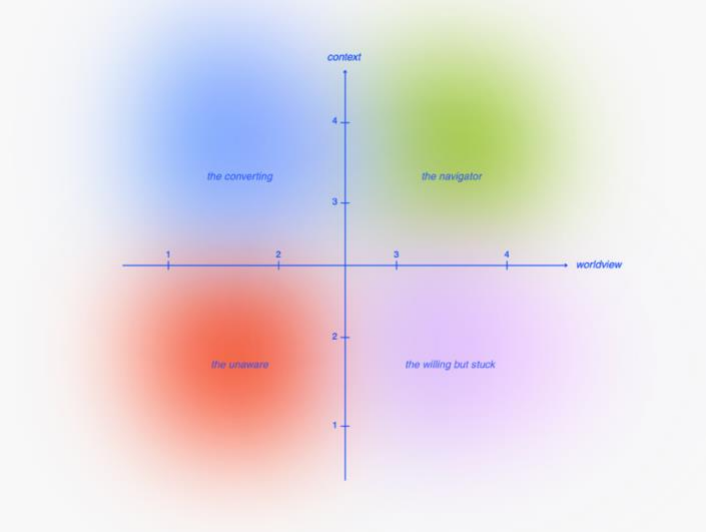


Figure 17. *Designing With* relational self-assessment

The worldview axis is grounded in Facilitator's K four worldview spectrum - from the world as machine through anthropocentric and systemic to planetary - and in the four thematic positions identified in the survey's open-text responses on the human-nature relationship: extraction, cultural critique, interdependence, and systemic inaction. The context axis is grounded directly in the barrier data from the survey and the three interviews, which consistently identified organizational permission as the primary structural constraint on ecological inclusion.

Stage 3: Method selector brings Stage 1 and Stage 2 together as a team exercise. The concentric circle matrix places each designer in their zone from Stage 2 and uses the Stage 1 score to determine depth of engagement. The circles are numbered one to five from the centre outward, corresponding to the Stage 1 score. Where a designer's zone and their circle intersect, they find

a specific method card from the eight workshop sessions documented in this thesis (see Figure 18). The number before the card name corresponds to the concept card in the set.

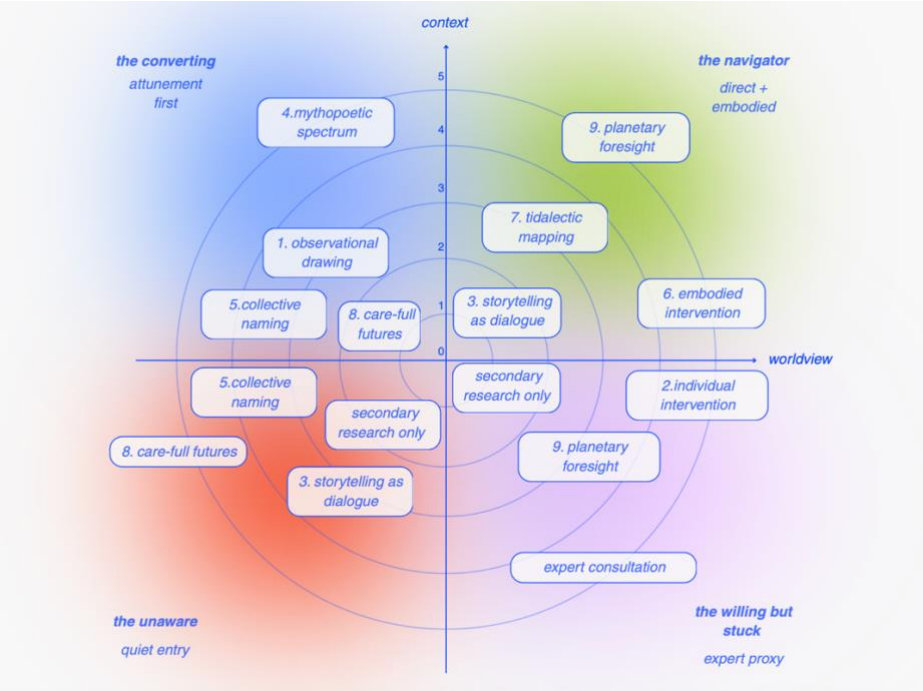


Figure 18. *Designing With* concentric circle matrix

The card mapping is structured around a logic of progressive depth within each zone. In the Converting zone, the sequence moves from care-full futures through observational drawing to collective naming - each step building more direct relational knowledge of a specific entity. In the Navigator zone, the sequence moves from storytelling as dialogue through tidalectic mapping to the mythopoetic spectrum - the richest and most embodied methods available. In the Unaware zone, the sequence moves from secondary research through storytelling as dialogue to care-full futures - starting with knowledge gathering, then gentle perception shift, then a more sustained worldview exercise. In the Willing but Stuck zone, the sequence moves from secondary research through Planetary PESTEL to expert consultation - prioritizing credibility and strategic framing within a constrained context.

The team dimension of Stage 3 is structurally important. Individual Stage 2 cards are brought together so that the team can see where each person is starting from. If team members cluster

in different zones, the discussion about which method to choose becomes more honest and more productive than if position is assumed rather than made visible. The agreed method, the card to use, the lead person, and the double diamond phase are recorded on the sheet and carried into the project.

5.5.3 Limitations of the framework

Designing With is a positioning tool, not a guarantee of genuine MTH inclusion. It creates structural conditions for ecological consideration to enter a design process -- a meaningful intervention, but not a sufficient one. Several survey respondents raised the harder question directly: include BH stakeholders for whom? Inclusion redefines what design outcomes mean rather than simply improving them. A project that prioritises the needs of a wetland ecosystem may produce outcomes that conflict with certain human needs. The framework does not resolve this tension. It names it, and points toward the methods and expertise that can help a team navigate it with more honesty than they would have without any framework at all.

Veselova (2026) argued that genuine MTH practice requires emotional intelligence as much as methodological skill -- the capacity to hold discomfort, face rejection, and continue working in a field that does not yet recognise what you are doing as entirely normal. The framework addresses the methodological dimension of that challenge. The emotional dimension is addressed in the individual self-assessment but cannot be resolved by a tool. It requires the kind of sustained engagement with the living world that Remm and Konovalov (2025) were trying to build through a full semester of practice-based work, and that Veselova herself described as requiring years of committed development outside of project pressure.

The framework is an entry point. It is designed for the designer who has never tried this before and does not know where to start. It is also designed for the designer who has tried and been shut down by a client and needs a way back in through a different door. The designer who has already done the relational and embodied work and is looking for permission to go further does not need this framework. They are already in the Navigator zone. They need the cards.

6. DISCUSSION

The four analytical themes that follow cut across the research questions rather than mapping onto them individually, because the most significant findings of this research are cross-cutting. The positioning problem addresses RQ1 and RQ2. The framing paradox addresses RQ2 and RQ3. The representation limit addresses RQ4. The structural education gap addresses RQ2 and the enabling conditions the research questions ask about. The theoretical framework identified a specific research gap: the absence of practitioner-facing tools for BH stakeholder inclusion in commercial SD contexts. The findings confirm that gap and complicate the assumption that the primary barrier is methodological. The barrier is positional, and positioning infrastructure is what the field most urgently needs.

6.1 The positioning problem

The theoretical literature has produced a sophisticated account of what ecological inclusion requires philosophically. Wakkary (2021) argues that designing-with demands a relational subjectivity in which humans and nonhumans share the centre stage. Veselova and Gaziulusoy (2021) provide a typology of stakeholders and three inclusion modes. Poikolainen Rosén et al. (2022) offer four systemic questions for MTH design practice. What this body of work does not adequately address is the prior question of how a practitioner gets to the point of using any of it.

The research consistently revealed that the gap between theoretical knowledge and practice is not conceptual. Twelve out of twenty survey respondents were already familiar with BH concepts. The gap is positional - practitioners do not know where they are starting from, what their context allows, or which available approach is appropriate. That absence of positioning infrastructure is more consequential than any individual method gap.

The autoethnographic data supports that this research did not emerge from a curriculum that covered these questions, but rather despite one. That experience triangulates directly with the survey finding that sixteen out of twenty respondents rated their design education's ecological coverage at 1 or 2 out of 5. Interviewee C named the additional dimensions: social anxiety about professional judgment, methodological uncertainty, the commercial divorce of MTH

research from economic viability, and the emotional labour of working against institutional norms. These are not barriers that posthumanist theory has engaged with seriously. They require practical and structural responses.

This finding extends Veselova and Gaziulusoy (2021) and Poikolainen Rosén et al. (2022) by addressing the gap those frameworks acknowledged but did not fill. It also extends Meadows' (1999) leverage points argument into a design context: if worldview is the highest leverage point in any system, then surfacing and working from each designer's actual worldview is more powerful than prescribing the worldview they should hold.

6.2 The framing paradox

The most unexpected finding across all six research encounters was quite simple. The session generating the highest participation and deepest engagement with non-human entities never once used the words MTH, posthumanist, multispecies, or ecological inclusion. Facilitator's J careful futures session worked precisely because it removed the specialist threshold. People who might have disengaged at posthumanist methodology engaged fully when asked: what feels broken, and what are you carrying quietly?

This sits in genuine tension with the theoretical literature. The MTH design field has invested considerably in developing rigorous vocabulary that does important conceptual work in research and theory. But when that vocabulary is placed at the door of a practitioner session, it functions as a filter - designers who already hold relational worldviews pass through. Those who most need the shift in perspective are more likely to step back.

The framing paradox: the depth of specialist terminology is both the strength and the limit of MTH design discourse. This is not an argument for abandoning the theoretical vocabulary, but more for thinking carefully about where in a process that vocabulary is introduced, and for designing entry points that do not require theoretical fluency as a precondition for participation.

The carful futures finding also points toward something the literature has undervalued: emotional accessibility. Creating psychological safety before asking anything ecologically of participants produced richer outcomes than beginning with theoretical framing. That order

matters and has direct implications for how practitioner-facing tools should be designed in response to RQ4.

6.3 The representation limit

Several survey respondents raised a question this research cannot answer: include BH stakeholders for whom? All three inclusion modes in Veselova and Gaziulusoy's (2021) typology involve human designers making decisions about how to interpret and translate non-human perspectives. Even the most embodied methods documented in this research are ultimately human interpretations of nonhuman experience.

Wakkary (2021) acknowledges this as the fundamental paradox of posthumanist design: designers are humans trying to design-with a world they cannot fully know. The framework does not resolve that paradox. It tries to make practitioners honest about it by asking them to name one living thing in their project context and reflect on the limits of what they know before choosing a method of representation.

The for whom question also complicates the value claims MTH design tends to make. Seventeen out of twenty respondents believed ecological inclusion would produce better design outcomes, but one challenged this directly: better for whom? When BH stakeholders are prioritised, human outcomes may be affected. That is not a reason to avoid ecological inclusion. It is a reason to be honest that inclusion redefines what the process is for, rather than simply improving existing outcomes. *Designing With* creates conditions for those interests to be named and considered together. That is the starting point of the ethical work, not its conclusion.

6.4 The structural education gap

The autoethnographic data and survey data converge on the same conclusion. Service designers are not ecologically indifferent. They hold strong views about the extractive relationship between human activity and the natural world, want tools that do not yet exist, and are working in a discipline that has not created space for the commitments they already hold.

Sixteen out of twenty survey respondents rated their design education's sustainability coverage at 1 or 2 out of 5. Nobody rated it 4 or 5. Interviewee C argued this requires fundamental restructuring - new educators with natural science backgrounds, ecological literacy as an entrance requirement, and dedicated MTH methods courses rather than folding ecological considerations into existing project structures. The SDSI programme's mandatory sustainable transitions course addressed sustainability narrowly through European Green Deal framing without integrating it into design practice. The only course that engaged seriously with ecological relationships was an elective that most SDSI students abandoned before completing.

Designing With is a framework assuming ecological literacy, organizational freedom, and client support would serve only the Navigator zone - the small proportion of practitioners who already have the worldview and the room. A framework that maps where each practitioner actually is and identifies what is realistic from that position serves the field as it exists. Incremental normalization from realistic starting points is more likely to change the discipline than prescribing an ideal that most practitioners cannot reach from where they currently stand.

6.5 Ethical considerations and limitations

This research was conducted in accordance with the Finnish National Board on Research Integrity (TENK) guidelines for responsible conduct of research.

All survey respondents participated voluntarily with a clear description of the research purpose. No identifying information was collected. Responses are presented in aggregate and in paraphrase. The three expert interviews were conducted with informed consent and explicit agreement to use responses as primary research data.

The six research encounters were attended as open researcher participation. The dual positioning as both participant and researcher carries methodological risk: observations are shaped by the researcher's own ecological commitments and investment in the thesis argument. This is mitigated by triangulation across multiple data sources but cannot be eliminated. The autoethnographic dimension makes this positioning explicit as an ethical commitment, consistent with Haraway's (2016) concept of situated knowledges.

Several limitations require acknowledgement. The survey sample of twenty is small and self-selecting, likely overrepresenting ecological awareness relative to the broader profession. Findings are directional and thematic rather than statistically generalizable. *Designing With* is a research-grounded proposal rather than a tested instrument - it has not been used in live project contexts, and its effectiveness there is not yet known. The research draws heavily on Western posthumanist theory. A decolonial account of BH design practice that positions Indigenous knowledge as an autonomous tradition rather than a resource for Western frameworks is beyond the scope of this thesis but represents a significant gap that future research should address.

7. CONCLUSIONS

This thesis asked how SD can integrate BH stakeholders into collaborative design processes, moving toward Gaia futures. It approached that question through four research questions addressing the barriers to inclusion, current stakeholder conceptualization, and the representational tools that might make inclusion possible. The research was conducted through participant observation across six sessions, a survey of twenty practitioners and students, three expert interviews, and an autoethnographic account of the educational context in which the research was produced.

The central answer this thesis offers is both a finding and a framework. The finding is that the primary obstacle to BH inclusion in SD is not a lack of awareness, values, or even theoretical knowledge. It is the absence of a structured way for practitioners to understand their starting position and act from it realistically. The framework is Designing With: A positioning framework for ecological inclusion - a three-stage instrument that moves from project context assessment through individual relational self-assessment to team method selection.

7.1 Answering research questions

RQ1: How can service design integrate beyond-human stakeholders into collaborative design processes, moving toward Gaia futures?

SD can integrate BH stakeholders by first treating the designer's position as a design variable rather than a neutral given. Integration is not primarily a methodological problem - it is a positioning problem. The research shows that the entry point matters more than the method: when ecological framing is introduced contextually, practitioners include non-human entities readily. Moving toward Gaia futures requires design processes that start by acknowledging the relational interdependence of human and non-human systems rather than treating that interdependence as a secondary consideration. *Designing With* proposes that this shift begins with the individual designer's honest positioning before any collective method work begins.

RQ2: What barriers currently prevent service designers from integrating beyond-human stakeholders, and what values, practices, and conditions would enable this transformation?

The primary barriers are structural and positional rather than attitudinal. Time and budget constraints, client expectations, lack of ecological knowledge, and the absence of legitimate space within conventional briefs were the dominant constraints in the survey. The expert interviews revealed a further dimension not adequately addressed in the existing literature: the commercial divorce of MTH research from economic viability creates a triple burden for practitioners who must simultaneously develop the method, convince clients of its relevance, and translate it into economic language. Personal sustainability commitment was already high across the sample - the missing infrastructure is methodological and institutional, not motivational. The conditions that would enable transformation are equally structural: ecological literacy built into design education before practitioners reach the profession, organizational frameworks that treat ecological consideration as a legitimate part of the brief, and practitioner-facing tools that operate within the constraints of commercial practice rather than assuming the freedoms of academic research.

RQ3: How do service designers currently conceptualize stakeholders, and what frameworks can guide identification of relevant beyond-human stakeholders for specific project contexts?

Service designers currently hold two coexisting conceptualizations of stakeholders in roughly equal measure: a human-only framing and an entity or system framing that is conceptually open to non-human inclusion. The conceptual space for BH inclusion already exists in the field. What does not exist is the practice of acting on it - not one respondent mentioned ecological criteria in their prioritization logic when answering unprompted. The urban park scenario revealed that this gap is perceptual - when ecological framing made inclusion feel contextually appropriate, practitioners selected non-human entities at near-equal rates to human stakeholders, with several adding write-in entities not included in the original options. The barrier is an absence of perceptual habits that make non-charismatic or invisible entities legible as stakeholders. Stage 1 of *Designing With* directly addresses this by introducing

ecological questions before the stakeholder map is constructed, as a structural prompt rather than a philosophical proposition.

RQ4: What representational approaches and tools might enable service designers to include beyond-human perspectives in design processes?

Workshop sessions produced a curated repertoire of methods ranging from low-friction accessible approaches through expert proxy and representative profile methods to demanding embodied practices. The most significant finding for the field is that the session generating the highest participation and depth of engagement across all six research encounters never used specialist ecological terminology. Framing and accessibility at the entry point shape who can participate and how far the process can go - as much as, and sometimes more than, the methodological sophistication of the tool itself. This suggests that the design of practitioner-facing tools for BH inclusion needs to attend as carefully to the language of entry as to the depth of method. The framework's method selector connects each concept card to specific positional conditions, making method choice accountable to the designer's actual starting position rather than to an idealized version of what MTH design should look like.

7.2 Contributions

Beyond answering these RQ, this thesis makes three distinct contributions. The first is empirical. The survey and interview data produce the first systematic account of how SD students and practitioners currently conceptualize stakeholders, what barriers they face in ecological inclusion, and what tools they want. This data did not previously exist in a SD context. It grounds the framework in practitioner reality rather than academic aspiration.

The second is methodological. The curated set of eight concept cards, each grounded in a documented research encounter and mapped to Veselova and Gaziulusoy's (2021) inclusion modes and the double diamond, provides a structured bridge between MTH design research and SD practice. Each card is citable, attributable, and directly usable by a practitioner without requiring familiarity with the theoretical literature from which it derives.

The third is the framework itself. Designing With is, to the knowledge of this researcher, the first positioning framework designed specifically for service designers attempting BH inclusion in commercial project contexts. It addresses the gap between theoretical method catalogues and the practical question of where to start from where you actually are.

7.3 Areas for future research

This research opens several directions that it cannot itself pursue. The most immediate is empirical validation of the framework in live project contexts. Designing With is a research-grounded proposal rather than a tested instrument. Practitioners need to use it, fail with it, adapt it, and report back. That iterative refinement is essential before the framework can be offered as a reliable professional tool rather than a theoretical contribution.

The second direction concerns the educational dimension. Collogues parallel thesis research on pedagogical frameworks for BH inclusion in SD education addresses what this thesis does not: how the field prepares practitioners before they reach professional practice. The two research projects are complementary, and their findings should be read together.

The third direction concerns the commercial translation problem that all three interview subjects identified. How does ecological inclusion connect to business value in ways that clients and organisations already care about? This is not a question that posthumanist design theory has adequately engaged with, and it will not be resolved by better methods alone. It requires sustained dialogue between design researchers and the business and finance communities that are independently arriving at nature-positive frameworks, as Veselova (2026) observed in the World Economic Forum and insurance sector contexts.

The fourth direction is the most speculative but perhaps the most important. This research is grounded in the experiences of a small, self-selecting, predominantly European sample. The MTH design literature draws heavily on Western posthumanist theory while simultaneously engaging with Indigenous ecological knowledge as a reference point for relational ontologies. A genuinely decolonial account of BH design practice - one that does not position Indigenous knowledge as a resource for Western design frameworks to draw on but as a distinct and

autonomous tradition with its own integrity - requires research that this thesis can only gesture toward.

As closing remark, I want to note that this research began with a question about methodology and ended with a question about worldview. That trajectory emerged from the data - the survey respondents who described their relationship to the natural world as exploitative, catastrophic, and parasitic were not describing a methodological problem. They were describing a crisis of orientation - a discipline that has become so thoroughly committed to human progress that it has lost the capacity to see what that progress is costing.

Designing With is a small structural intervention in that larger problem. It cannot change what SD is for, but it can create conditions for individual practitioners, in individual projects, to ask a question that the discipline has not yet learned to ask as standard: who or what else is affected here, and what do they need?

That question, asked consistently enough, changes what design produces. It might be a slow change, but it is a change.

REFERENCES

Abson, D. J., Fischer, J., Leventon, J., Newig, J., Schomerus, T., Vilsmaier, U., von Wehrden, H., Abernethy, P., Ives, C. D., Jager, N. W., & Lang, D. J. (2017). Leverage points for sustainability transformation. Ambio, 46(1), 30–39. https://doi.org/10.1007/s13280-016-0800-y

Barad, K. (2007). Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning. Duke University Press.

Bar-On, Y. M., Phillips, R., & Milo, R. (2018). The biomass distribution on Earth. Proceedings of the National Academy of Sciences, 115(25), 6506–6511. https://doi.org/10.1073/pnas.1711842115

Bennett, J. (2010). Vibrant matter: A political ecology of things. Duke University Press.

Bhaskar, R. (1975). A realist theory of science. Leeds Books.

Björgvinsson, E., Ehn, P., & Hillgren, P.-A. (2012). Agonistic participatory design: Working with marginalised social movements. CoDesign, 8(2–3), 127–144. https://doi.org/10.1080/15710882.2012.672577

Blaikie, N. (2010). Designing social research (2nd ed.). Polity Press.

Borgers, A., van Daalen, D., & Timmermans, H. (2000). Scenario-based research into the use of simulation models for land use and transportation planning. Transportation Research Record, 1722(1), 1–7.

Braidotti, R. (2013). The posthuman. Polity Press.

Brand, R. (2018). Co-emerging futures: A new model for understanding unfolding change. Philips Design.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Bratteteig, T., & Wagner, I. (2012). Disentangling power and decision-making in participatory design. In Proceedings of the 12th Participatory Design Conference: Research Papers (Vol. 1, pp. 41–50). ACM. https://doi.org/10.1145/2347635.2347642

Brennan, A., & Lo, Y.-S. (2016). Environmental ethics. In E. N. Zalta (Ed.), The Stanford encyclopedia of philosophy (Winter 2016 ed.). Stanford University. https://plato.stanford.edu/archives/win2016/entries/ethics-environmental/

Boylan, M. (2013). Environmental ethics (2nd ed.). Wiley-Blackwell.

Ceballos, G., Ehrlich, P. R., & Dirzo, R. (2017). Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines. Proceedings of the National Academy of Sciences, 114(30), E6089–E6096. https://doi.org/10.1073/pnas.1704949114

Ceschin, F., & Gaziulusoy, I. (2020). Design for sustainability: A multi-level framework from products to socio-technical systems. Routledge.

Chang, H. (2008). Autoethnography as method. Left Coast Press.

Clarke, V., Braun, V., & Hayfield, N. (2015). Thematic analysis. In J. A. Smith (Ed.), Qualitative psychology: A practical guide to research methods (3rd ed., pp. 222–248). SAGE.

Colléony, A., Clayton, S., Couvet, D., Saint Jalme, M., & Prevot, A. C. (2017). Human preferences for species conservation: Animal charisma trumps endangered status. Biological Conservation, 206, 263–269. https://doi.org/10.1016/j.biocon.2016.11.035

Cross, N. (2011). Design thinking: Understanding how designers think and work. Berg.

Despret, V. (2016). What would animals say if we asked the right questions? University of Minnesota Press.

Denzin, N. K., & Lincoln, Y. S. (2011). The SAGE handbook of qualitative research (4th ed.). SAGE Publications.

DiSalvo, C., Sengers, P., & Brynjarsdóttir, H. (2010). Mapping the landscape of sustainable HCI. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (pp. 1975–1984). ACM. https://doi.org/10.1145/1753326.1753625

Ellis, C., Adams, T. E., & Bochner, A. P. (2011). Autoethnography: An overview. Forum: Qualitative Social Research, 12(1), Article 10. https://doi.org/10.17169/fqs-12.1.1589

European Parliament. (2025). Circular economy. https://environment.ec.europa.eu/strategy/circular-economy_en

Ehn, P. (1988). Work-oriented design of computer artifacts. Arbetslivscentrum.

Flint, C. G., Kunze, I., Muhar, A., Yoshida, Y., & Penker, M. (2013). Exploring empirical typologies of human–nature relationships and linkages to the ecosystem services concept. Landscape and Urban Planning, 120, 208–217. https://doi.org/10.1016/j.landurbplan.2013.09.002

Frayling, C. (1993). Research in art and design. Royal College of Art Research Papers, 1(1), 1–5.

Freeman, R. E. (1984). Strategic management: A stakeholder approach. Pitman.

Fry, T. (2008). Design futuring: Sustainability, ethics and new practice. Berg.

Fuad-Luke, A. (2009). Design activism: Beautiful strangeness for a sustainable world. Earthscan.

Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. Educational Evaluation and Policy Analysis, 11(3), 255–274. https://doi.org/10.3102/01623737011003255

Grillaert, J., & Camenzind, R. (2016). Consent to participate in animal-computer interaction. In Proceedings of the Third International Conference on Animal-Computer Interaction (Article 6). ACM. https://doi.org/10.1145/2995257.2995394

Hallmann, C. A., Sorg, M., Jongejans, E., Siepel, H., Hofland, N., Schwan, H., Stenmans, W., Müller, A., Sumser, H., Hörren, T., Goulson, D., & de Kroon, H. (2017). More than 75 percent decline over 27 years in total flying insect biomass in protected areas. PLoS ONE, 12(10), e0185809. https://doi.org/10.1371/journal.pone.0185809

Hammersley, M., & Atkinson, P. (2007). Ethnography: Principles in practice (3rd ed.). Routledge.

Haraway, D. J. (2016). Staying with the trouble: Making kin in the Chthulucene. Duke University Press.

Haraway, D. J. (1988). Situated knowledges: The science question in feminism and the privilege of partial perspective. Feminist Studies, 14(3), 575–599. https://doi.org/10.2307/3178066

Haraway, D. J. (2003). The companion species manifesto: Dogs, people, and significant otherness. Prickly Paradigm Press.

Harder, M. K., Burford, G., & Hoover, E. (2013). What is participation? Design leads the way to a cross-disciplinary framework. Design Issues, 29(4), 41–57. https://doi.org/10.1162/DESI_a_00229

Hamed, S. S. (2026). The future is planetary [Webinar]. Planet Diplomats.

Hayles, N. K. (1999). How we became posthuman: Virtual bodies in cybernetics, literature, and informatics. University of Chicago Press.

Hirskyj-Douglas, I., & Read, J. C. (2014). Playing with behaviour: Interaction with animals through a tangible interface. In CHI '14 Extended Abstracts on Human Factors in Computing Systems (pp. 2421–2426). ACM. https://doi.org/10.1145/2559206.2581135

Hughes, T. P., Barnes, M. L., Bellwood, D. R., Cinner, J. E., Cumming, G. S., Jackson, J. B. C., Kleypas, J., van de Leemput, I. A., Lough, J. M., Morrison, T. H., Palumbi, S. R., van Nes, E. H., & Scheffer, M. (2017). Coral reefs in the Anthropocene. Nature, 546(7656), 82–90. https://doi.org/10.1038/nature22901

Hughes, T. P., Anderson, K. D., Connolly, S. R., Heron, S. F., Kerry, J. T., Lough, J. M., Baird, A. H., Baum, J. K., Berumen, M. L., Bridge, T. C., Claar, D. C., Eakin, C. M., Gilmour, J. P., Graham, N. A. J., Harrison, H., Hobbs, J.-P. A., Hoey, A. S., Hoogenboom, M., Lowe, R. J., ... Wilson, S. K. (2018). Spatial and temporal patterns of mass bleaching of corals in the Anthropocene. Science, 359(6371), 80–83. https://doi.org/10.1126/science.aan8048

Hohm, I., O'Shea, B. A., & Schaller, M. (2024). Do moral values change with the seasons? Proceedings of the National Academy of Sciences, 121(33), e2313428121. https://doi.org/10.1073/pnas.2313428121

Inglezaki, K., Pestana, M., & Nunes, N. J. (2025). A tidalectic reading of landscapes: Multispecies peripatetic ethnography as a method for knowing landscapes. In Proceedings of the 2025 ACM Designing Interactive Systems Conference (pp. 317–330). ACM. https://doi.org/10.1145/3715336.3735444

IPBES. (2019). Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (E. S. Brondizio, J. Settele, S. Díaz, & H. T. Ngo, Eds.). IPBES Secretariat.

IPCC. (2018). Global warming of 1.5°C: An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas

emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (V. Masson-Delmotte, P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P. R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, & T. Waterfield, Eds.). Cambridge University Press.

IUCN. (1991). Caring for the Earth: A strategy for sustainable living. International Union for Conservation of Nature.

Ives, C. D., Giusti, M., Fischer, J., Abson, D. J., Klaniecki, K., Dorninger, C., Laudan, J., Barthel, S., Abernethy, P., Martín-López, B., Raymond, C. M., Kendal, D., & von Wehrden, H. (2017). Human–nature connection: A multidisciplinary review. Current Opinion in Environmental Sustainability, 26–27, 106–113. https://doi.org/10.1016/j.cosust.2017.05.005

Jena, A. (2024). Role of ethics in nature-human relationship: A pragmatic approach. In A. Bhattacharya & S. Sengupta (Eds.), Environmental ethics and biodiversity (pp. 159–172). Springer.

Kirksey, S. E., & Helmreich, S. (2010). The emergence of multispecies ethnography. Cultural Anthropology, 25(4), 545–576. https://doi.org/10.1111/j.1548-1360.2010.01069.x

Latour, B. (1993). We have never been modern. Harvard University Press.

Latour, B. (2004). Politics of nature: How to bring the sciences into democracy. Harvard University Press.

Latour, B. (2005). Reassembling the social: An introduction to actor-network-theory. Oxford University Press.

Lee, Y. (2008). Design participation tactics: The challenges and new roles for designers in the co-design process. CoDesign, 4(1), 31–50. https://doi.org/10.1080/15710880701875613

Leopold, A. (1949). A Sand County almanac. Oxford University Press.

Lovelock, J. (1972). Gaia as seen through the atmosphere. Atmospheric Environment, 6(8), 579–580. https://doi.org/10.1016/0004-6981(72)90076-5

Lovelock, J. E., & Margulis, L. (1974). Atmospheric homeostasis by and for the biosphere: The Gaia hypothesis. Tellus, 26(1–2), 2–10. https://doi.org/10.1111/j.2153-3490.1974.tb01946.x

Mancini, C. (2011). Animal-computer interaction: A manifesto. interactions, 18(4), 69–73. https://doi.org/10.1145/1978822.1978836

Mancini, C., van der Linden, J., Bryan, J., & Stuart, A. (2012). Exploring interspecies sensemaking: Dog tracking semiotics and multispecies ethnography. In Proceedings of the 2012 ACM Conference on Ubiquitous Computing (pp. 143–152). ACM. https://doi.org/10.1145/2370216.2370239

Meadows, D. H. (1999). Leverage points: Places to intervene in a system. The Sustainability Institute.

Miller, T. R. (2013). Constructing sustainability science: Emerging perspectives and research trajectories. Sustainability Science, 8(2), 279–293. https://doi.org/10.1007/s11625-012-0180-6

Muhar, A., & Böck, K. (2018). Nature-based solutions. In L. K. Stoll-Kleemann & T. J. O'Riordan (Eds.), Routledge handbook of biodiversity and the law (pp. 317–333). Routledge.

Muhar, A., Raymond, C. M., van den Born, R. J. G., Bauer, N., Böck, K., Braito, M., Buijs, A., Flint, C., de Groot, W. T., Ives, C. D., Mitrofanenko, T., Plieninger, T., Tucker, C.,

& van Riper, C. J. (2018). A model integrating social-cultural concepts of nature into frameworks of interaction between social and natural systems. Journal of Environmental Planning and Management, 61(5–6), 756–777. https://doi.org/10.1080/09640568.2017.1327424

Naess, A. (1973). The shallow and the deep, long-range ecology movement: A summary. Inquiry, 16(1–4), 95–100. https://doi.org/10.1080/00201747308601682

Neumayer, E. (2003). Weak versus strong sustainability: Exploring the limits of two opposing paradigms (2nd ed.). Edward Elgar.

Norman, D. A. (2013). The design of everyday things (Revised and expanded ed.). Basic Books. (Original work published 1988)

O'Brien, K., & Sygna, L. (2013). Responding to climate change: The three spheres of transformation. In Proceedings of Transformation in a Changing Climate (pp. 16–23). University of Oslo.

Ogden, L. A., Hall, B., & Tanita, K. (2013). Animals, plants, people, and things: A review of multispecies ethnography. Environment and Society, 4(1), 5–24. https://doi.org/10.3167/ares.2013.040102

Papanek, V. (1971). Design for the real world: Human ecology and social change. Pantheon Books.

Patton, M. Q. (2002). Qualitative research and evaluation methods (3rd ed.). SAGE Publications.

Peirce, C. S. (1903). Pragmatism as a principle and method of right thinking: The 1903 Harvard lectures on pragmatism. State University of New York Press.

Puig de la Bellacasa, M. (2012). 'Nothing comes without its world': Thinking with care. The Sociological Review, 60(2), 197–216. https://doi.org/10.1111/j.1467-954X.2012.02070.x

Puig de la Bellacasa, M. (2017). Matters of care: Speculative ethics in more than human worlds. University of Minnesota Press.

Poikolainen Rosén, E., Tarkka, M., & Kääriäinen, P. (2022). Four questions for systemic more-than-human-centered design in practice. FormAkademisk—Forskningstidsskrift for Design og Designdidaktikk, 15(4), Article 1. https://doi.org/10.7577/formakademisk.4896

Potts, S. G., Biesmeijer, J. C., Kremen, C., Neumann, P., Schweiger, O., & Kunin, W. E. (2010). Global pollinator declines: Trends, impacts and drivers. Trends in Ecology & Evolution, 25(6), 345–353. https://doi.org/10.1016/j.tree.2010.01.007

Raymond, C. M., Frantzeskaki, N., Kabisch, N., Berry, P., Breil, M., Nita, M. R., Geneletti, D., & Calfapietra, C. (2017). A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas. Environmental Science & Policy, 77, 15–24. https://doi.org/10.1016/j.envsci.2017.07.008

Ritchie, J., & Spencer, L. (1994). Qualitative data analysis for applied policy research. In A. Bryman & R. G. Burgess (Eds.), Analysing qualitative data (pp. 173–194). Routledge.

Remm, J., & Konovalov, M. (2025). Gardening cards [Method cards]. Artists and Designers as Researchers, Re-thinkers and Partners with Nature in the Context of Degrowth project, Estonian Academy of Arts.

Robinson, C., Mancini, C., van der Linden, J., Guest, C., & Harris, R. (2014). Canine-centered interface design: Supporting the work of diabetes alert dogs. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (pp. 3757–3766). ACM. https://doi.org/10.1145/2556288.2557396

Rupprecht, C. D. D., Vervoort, J., Berthelsen, C., Mangnus, A., Osborne, N., Thompson, K., Urushima, A. Y. F., Kóvskaia, M., Spiegelberg, M., Cristiano, S., Springett, J., Marschütz, B., Flies, E. J., McGreevy, S. R., Droz, L., Breed, M. F., Gan, J., Shinkai,

R., & Wang, C. (2020). Multispecies sustainability. Global Sustainability, 3, e34. https://doi.org/10.1017/sus.2020.28

Sanders, E. B.-N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. CoDesign, 4(1), 5–18. https://doi.org/10.1080/15710880701875068

Sandler, R. L. (2018). Environmental ethics: Theory in practice. Oxford University Press.

Saunders, M., Lewis, P., & Thornhill, A. (2019). Research methods for business students (8th ed.). Pearson Education.

Schuler, D., & Namioka, A. (Eds.). (1993). Participatory design: Principles and practices. CRC Press.

Schön, D. A. (1983). The reflective practitioner: How professionals think in action. Basic Books.

Singer, P. (1975). Animal liberation: A new ethics for our treatment of animals. HarperCollins.

Steen, M. (2013). Co-design as a process of joint inquiry and imagination. Design Issues, 29(2), 16–28. https://doi.org/10.1162/DESI_a_00207

Stickdorn, M., Hormess, M. E., Lawrence, A., & Schneider, J. (2018). This is service design doing: Applying service design thinking in the real world. O'Reilly Media.

Stockholm Resilience Centre. (2025). Planetary boundaries. https://www.stockholmresilience.org/research/planetary-boundaries.html

Taylor, P. W. (1986). Respect for nature: A theory of environmental ethics. Princeton University Press.

TENK. (2023). The Finnish Code of Conduct for Research Integrity and Procedures for Handling Alleged Violations of Research Integrity in Finland. Finnish National Board on Research Integrity. https://tenk.fi/en/research-integrity

Tomitsch, M., Frederiks, E., Frawley, J., & Gaughwin, D. (2021). Non-human personas: Including nature in the participatory design of smart cities. She Ji: The Journal of Design, Economics, and Innovation, 7(2), 207–230. https://doi.org/10.1016/j.sheji.2021.02.001

Tomlinson, B., Blevis, E., Nardi, B., Patterson, D. J., Silberman, M. S., & Pan, Y. (2013). Collapse informatics and practice: Theory, method, and design. ACM Transactions on Computer-Human Interaction, 20(4), Article 24. https://doi.org/10.1145/2493431

Tsing, A. L. (2015). The mushroom at the end of the world: On the possibility of life in capitalist ruins. Princeton University Press.

Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. British Journal of Management, 14(3), 207–222. https://doi.org/10.1111/1467-8551.00375

UNEP. (2024). Emissions gap report 2024. United Nations Environment Programme.

Veselova, E., & Gaziulusoy, İ. (2021). When a tree is also a multispecies collective, a photosynthesis process and a carbon cycle: A systemic typology of natural nonhuman stakeholders when designing for sustainability. In J.C. Dielh, N. Tromp & M. van der Bijl-Brouwen (Eds.), Proceedings of Relating Systems Thinking and Design (RSD10) Symposium. 2–6 November 2021, Delft, the Netherlands.

Veselova, E., & Gaziulusoy, İ. (2022). Bioinclusive collaborative and participatory design: A conceptual framework and a research agenda. Design and Culture. 14(2), 149-183. https://doi.org/10.1080/17547075.2021.2019455.

Veselova, E. (2023). Designing with Nature for Sustainability [Doctoral dissertation, Aalto University]. Aalto University publication archive.

Wakkary, R. (2021). Things we could design: For more than human-centered worlds. MIT Press.

Watson, J. E. M., Shanahan, D. F., Di Marco, M., Allan, J., Laurance, W. F., Sanderson, E. W., Mackey, B., & Venter, O. (2016). Catastrophic declines in wilderness areas undermine global environment targets. Current Biology, 26(21), 2929–2934. https://doi.org/10.1016/j.cub.2016.08.049

WCED. (1987). Our common future. Oxford University Press.

Willis, A., Hildmann, J., Verhoeven, A., & Affifi, R. (2022). Shifting the narrative: Final report. British Academy. https://www.thebritishacademy.ac.uk/documents/4313/Shifting_the_Narrative_Final_Report_for_Shared_Understandings_1.pdf

Wolfe, C. (2010). What is posthumanism? University of Minnesota Press.

WWF. (2020). Living Planet Report 2020: Bending the curve of biodiversity loss (R. E. A. Almond, M. Grooten, & T. Petersen, Eds.). World Wildlife Fund.

Zeagler, C., Zuerndorfer, J., Lau, A., Freil, L., Gilliland, S., Winters, T., & Rozga, A. (2016). Canine computer interaction: Towards designing a touchscreen interface for working dogs. In Proceedings of the Third International Conference on Animal-Computer Interaction (Article 2). ACM. https://doi.org/10.1145/2995257.2995384

Zylstra, M. J., Knight, A. T., Esler, K. J., & Le Grange, L. L. L. (2014). Connectedness as a core conservation concern: An interdisciplinary review of theory and a call for practice. Springer Science Reviews, 2(1), 119–143. https://doi.org/10.1007/s40362-014-0021-3

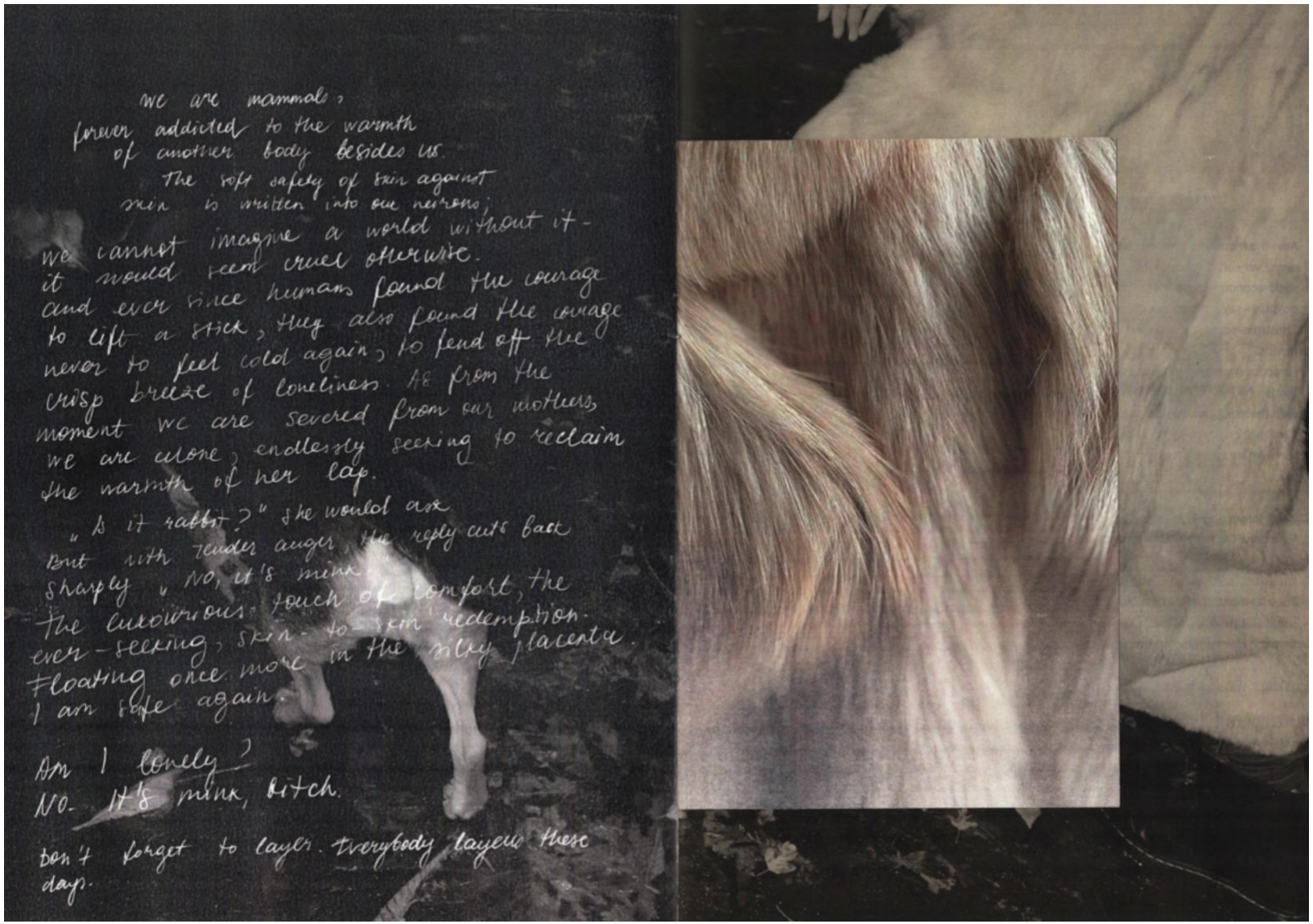
APPENDICES

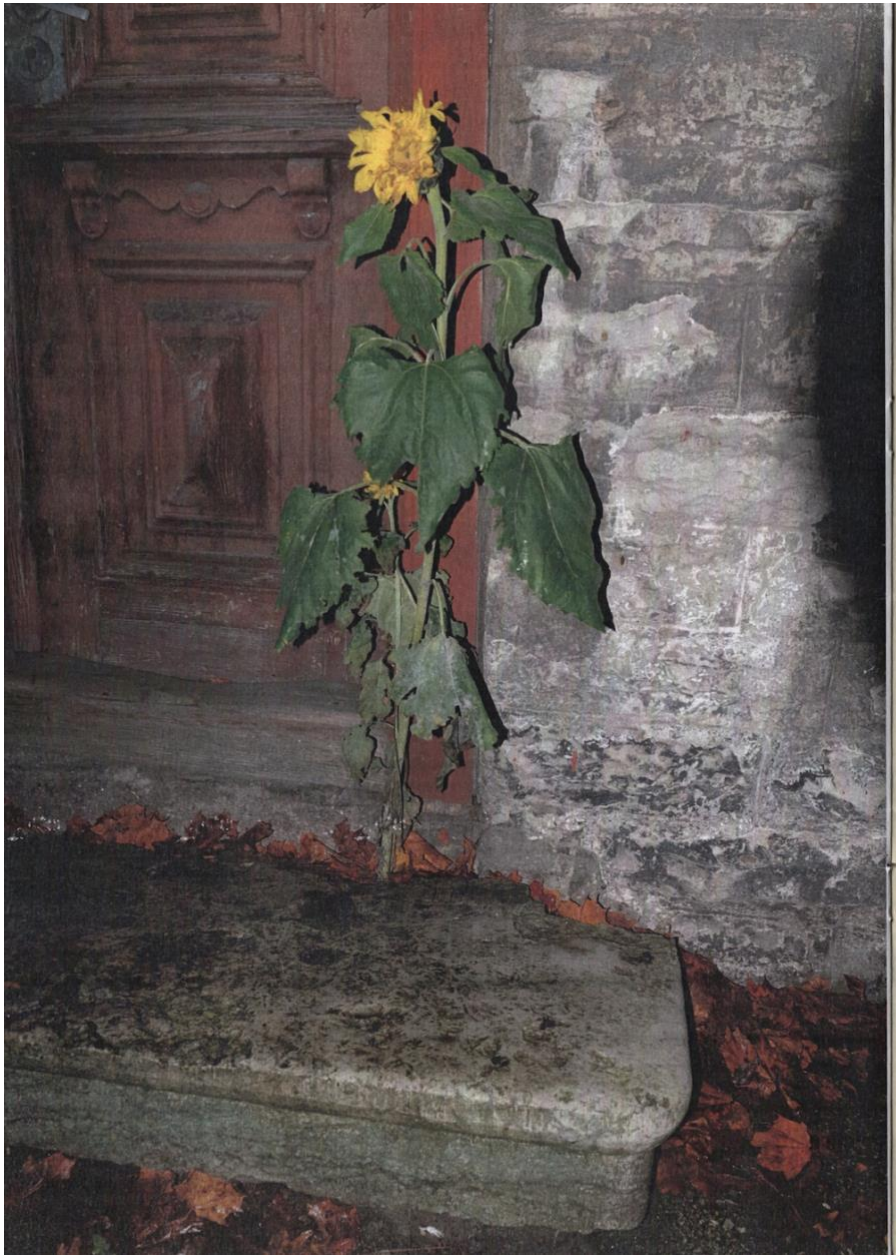
Appendix A: Booklet “Co-creation with nature”

Appendix B: NSU Eco+Mythology winter symposium schedule

Appendix C: *Designing With* - A positioning framework for ecological inclusion

Appendix A: Booklet “Co-creation with nature”


we are mammals,
forever addicted to the warmth
of another body besides us.
The soft safety of skin against
skin is written into our neurons;
we cannot imagine a world without it -
it would seem cruel otherwise.
And ever since humans found the courage
to lift a stick, they also found the courage
never to feel cold again, to fend off the
crisp breeze of loneliness. As from the
moment we are severed from our mothers,
we are alone, endlessly seeking to reclaim
the warmth of her lap.
"Is it rabbit?" she would ask
But with tender anger, the reply cuts back
sharply "No, it's mink."
The luxurious touch of comfort, the
ever-seeking, skin-to-skin redemption.
Floating once more in the silky placenta.
I am safe again.
Am I lonely?
NO. It's mink, bitch.
Don't forget to layer. Everybody layers these
days.

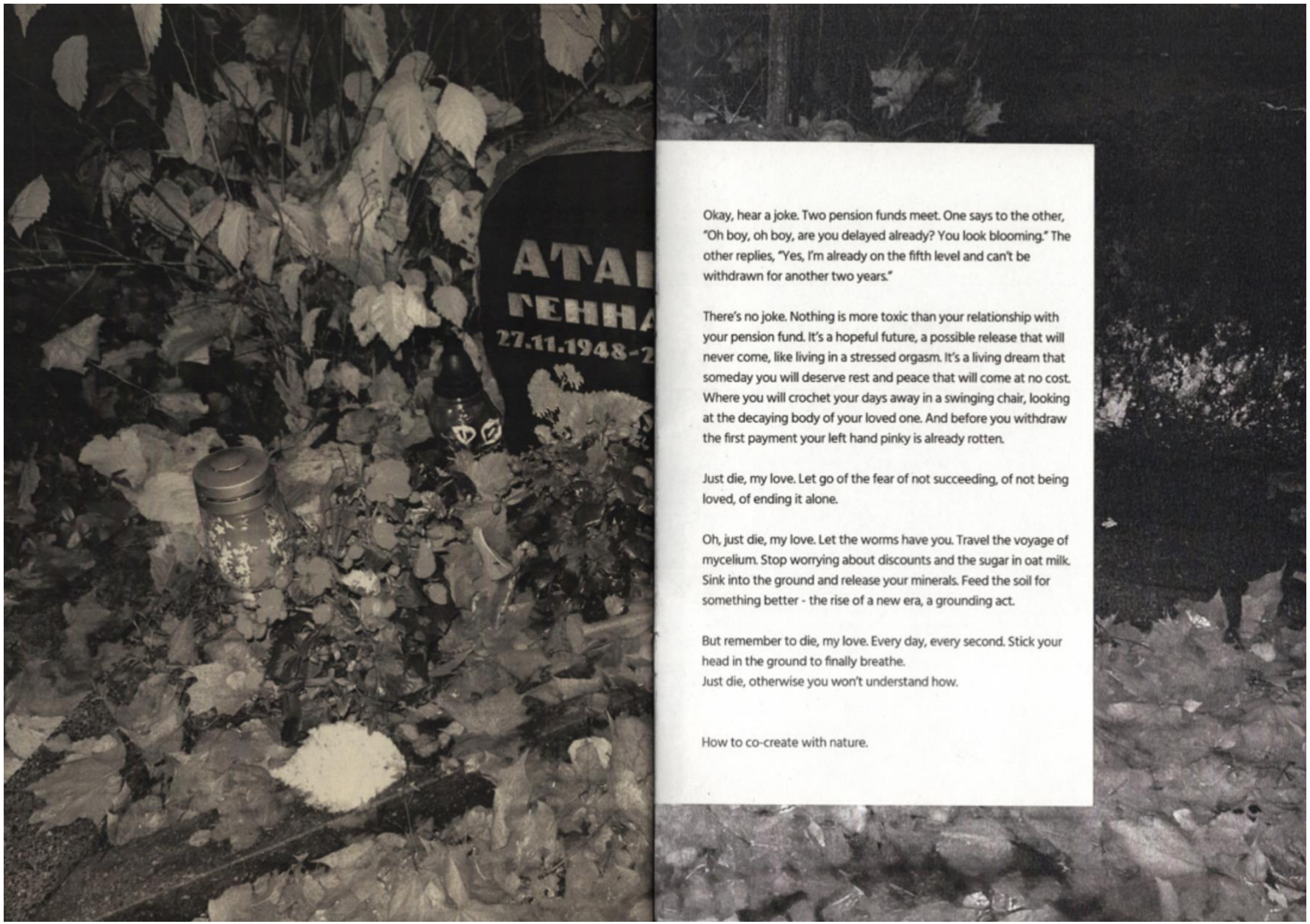


Gentrification is an enormous problem here. Tjotja Ludmila is splashed by burgundy colored tesla with plate number 777-VJJ, and our neoliberal white gods are spectacularly bad at steering the ship toward any desired horizon. They're blinded by their profit margins and right-wing dinner parties. Capitaloscene looks terrifying on paper, yet somehow we're thoroughly enjoying the ride.

My dog has an eco-friendly, ethically sourced, female-founder-created leash — and he hates it.
He just wants to sniff another dog's butt, but apparently that's not very heteronormative.

But then little birds in adidas tracksuits sit on your front steps, eating semkas and accidentally planting seeds for a better future.

Maybe downhill is the uphill.



Okay, hear a joke. Two pension funds meet. One says to the other, "Oh boy, oh boy, are you delayed already? You look blooming." The other replies, "Yes, I'm already on the fifth level and can't be withdrawn for another two years."

There's no joke. Nothing is more toxic than your relationship with your pension fund. It's a hopeful future, a possible release that will never come, like living in a stressed orgasm. It's a living dream that someday you will deserve rest and peace that will come at no cost. Where you will crochet your days away in a swinging chair, looking at the decaying body of your loved one. And before you withdraw the first payment your left hand pinky is already rotten.

Just die, my love. Let go of the fear of not succeeding, of not being loved, of ending it alone.

Oh, just die, my love. Let the worms have you. Travel the voyage of mycelium. Stop worrying about discounts and the sugar in oat milk. Sink into the ground and release your minerals. Feed the soil for something better - the rise of a new era, a grounding act.

But remember to die, my love. Every day, every second. Stick your head in the ground to finally breathe.
Just die, otherwise you won't understand how.

How to co-create with nature.

Appendix B: NSU Eco+Mythology winter symposium schedule

COLOR CODES

- Blue: interactive sessions by the coordinators, often with MiroBoard (cauldron) or time to ask them questions
- Orange: Presentations, readings, book club talks,
- Pink: art and interactive sessions
- Green: outdoorsy activities

Timeslot CEST	Saturday 17 January	Sunday 18 January
09.00-09.30	Wendy Wuyts: Welcome / stone/soil soup story	Vitalija Povilaityte-Petri: welcome
09.30-10.00	Wendy Wuyts: Eglė's Ecomythology: Restor(y)ing the Baltic Sea	Irena Chawrilska x Rick Dolphijn: Swamp-Thinking: Story-Scapes on Darkness and Decay.
10.00-10.30	Alette Willis: Storytelling as dialogue	
10.30-11.00		Magdalena Tabernacka: Mediating entities in the non-human world around us
11.00-12.00	Photovoice	Photovoice
12.00-13.00	Lunch break, zoom space is open	Lunch break, zoom space is open
13.00-14.00	Liene Jurgelane, Una Thorlaksdottir, Yingying He: Tuning into Birch Time: Relational Encounters with Land, Culture, and Story	Corrie Tan: The art critic as banyan: reimagining parasitic artistic practices
14.00-15.00	Long break, or time to explore and stir the cauldron	Long break, or time to add your ingredients to the cauldron
15.00.15.30	elin kelsey and Esmé Johnson: 'Me as We'	Vitalija Povilaityte-Petri: discussion of photovoice >> Wendy Wuyts: Intro Summer symposium
15.30-16.30		Kārlis Lakševics: Keynote about a possible Eco-mythology and transformative practices with/in the more than human Latvia
16.30-17.30	Sage Borgmäster's book talk : Eco-Feminist Myth-Making with Estés and Blackie	Wendy Wuyts: Dreaming an ecomythology for the Nordic and Baltic region
17.30-19.00	Dinner and time to prepare next session >>	
19.00-21.00	Lisa Sattell (assisted by Wendy Wuyts): Writing with Medusa Head Cactus (mythopoetic plant) session	

Appendix C: Designing With - A positioning framework for ecological inclusion

Stage 1

Task: Start at the top. Decide whether your service is primarily physical or digital and follow that branch. Work through each question in order. For every question, tick either the YES or NO box - do not skip any. When you reach the bottom, count your YES answers and write the total in the box.

Is your service physical or digital?

PHYSICAL

yes		no
☐	Does this project take place in or affect a physical space?	☐
☐	Will it change how land, water, or living things are used?	☐
☐	Does it produce waste, emissions, or material outputs?	☐
☐	Will its effects outlast the project timeline?	☐
☐	Are there living things here with no voice in this process?	☐

DIGITAL

yes		no
☐	Does this service run on physical hardware or infrastructure?	☐
☐	Will it change how people behave in physical spaces?	☐
☐	Does it connect to supply chains, manufacturing, or material goods?	☐
☐	Does it influence decisions that affect land or ecology?	☐
☐	Will it scale to affect large numbers of people or places over time?	☐

Count your ***YES*** answers

yes = ☐

0	1	2-3	4-5
No non-human entities identified *Revisit if project scope changes*	**Peripheral** *Note it*	**Present** *Include*	**Central** *Prioritise*

proceed to Stage 2 →

Stage 2

Task 1:
Read the four statements below. Circle the one that most honestly describes how you think about nature in your daily work. Answer for your current self, not the designer you want to be.

1. *Nature is the environment in which we operate. It is a resource and a context for human activity.*
2. *Nature is something we depend on and should protect, but human needs come first in most decisions.*
3. *Humans are part of nature. Our work should operate within ecological limits.*
4. *Nature has its own agency and interests. Our role is to design in response to that, not just alongside it.*

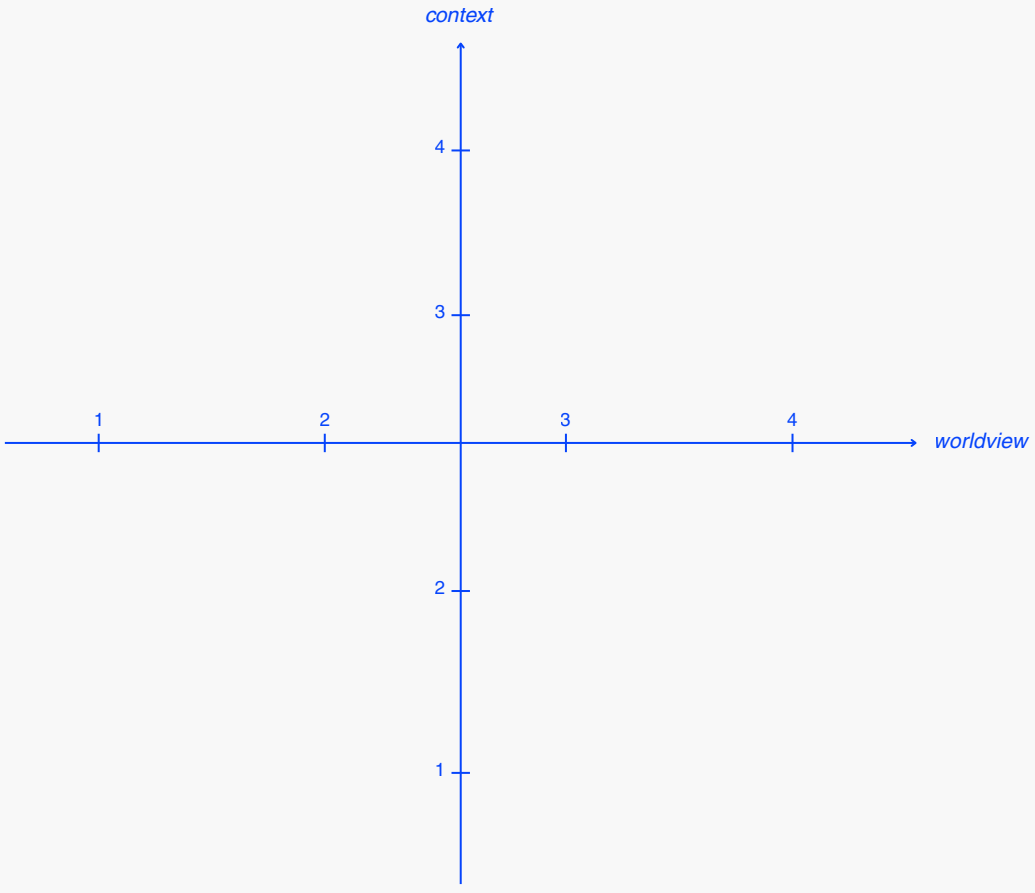
Mark your answer on the horizontal (worldview) axis.

Task 2:
Read the four statements below. Circle the one that most honestly describes your current project situation.

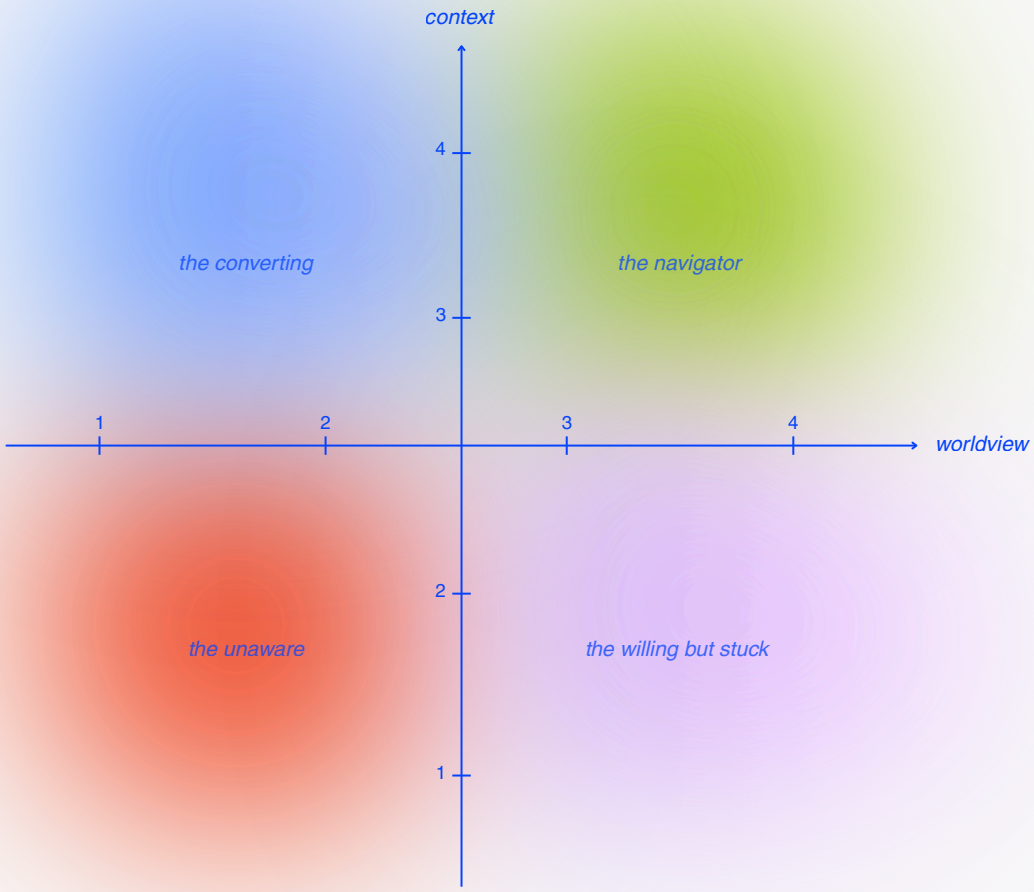
1. *The brief is fully fixed. The scope, timeline, and deliverables are defined before I arrive. There is no legitimate space to introduce considerations that were not already there.*
2. *There is minimal flexibility. I could quietly note ecological considerations in my research or documentation, but I could not introduce them formally without significant pushback.*
3. *There is some room. The client or team would be open to broader perspectives if I framed them in terms they already care about - risk, reputation, long-term value, or regulatory pressure.*
4. *There is genuine openness. Ecological and systemic considerations are either already part of the brief, or I have enough trust and seniority in this project to introduce them without justification.*

Mark your answer on the vertical (context) axis.

Task 3:
Use your two answers to locate yourself on the matrix. Your worldview answer places you left or right. Your organisational room answer places you up or down. Where the two intersect is your zone.
Read your zone description. It tells you what your current position means for this project and points you toward the right starting approach in Stage 3.



read the description →



The Willing but Stuck
(Relational worldview, constrained context)

You see the ecological stakes but cannot act on them openly in this project. Work within the constraints - use secondary research, name non-human entities quietly in your stakeholder map, frame ecological considerations in language the client already uses. You are planting seeds. That still counts.

The Navigator
(Relational worldview, open context)

You have both the worldview and the room. The full method range is available to you. The main risk is moving too fast - check your knowledge of the specific entity before choosing a method. Attunement before representation, always.

The Unaware
(Extractive worldview, constrained context)

Nature is currently background in your work. You do not need to start with theory. Start with one question: who or what else is affected here that has no seat at the table? A single observation, a brief outdoor exercise, or a care-full futures prompt can shift perception without requiring any specialist framing.

The Converting
(Extractive worldview, open context)

You have organisational room but your worldview has not yet caught up. The risk is that ecological considerations enter the project as data - metrics, compliance, green framing - without genuine relational depth. Use the room you have to build attunement first, before you introduce methods to others.

Stage 3

Complete as a team after all individual Stage 2 cards are filled in..

Task 1:
Take your score from Stage 1 and write it in down below. Find the matching circle on the matrix - the circles are numbered 1 to 5 from the centre outward.

Stage 1 score: _____

Task 2:
Take your zone from Stage 2. Find it in one of the four corners of the matrix - the converting, the navigator, the unaware, or the willing but stuck.

Stage 2 zone: _____

Task 3:
Where your circle and your zone meet, you will find a method card. That is your recommended starting point. The number before the card name corresponds to the concept card in your set.

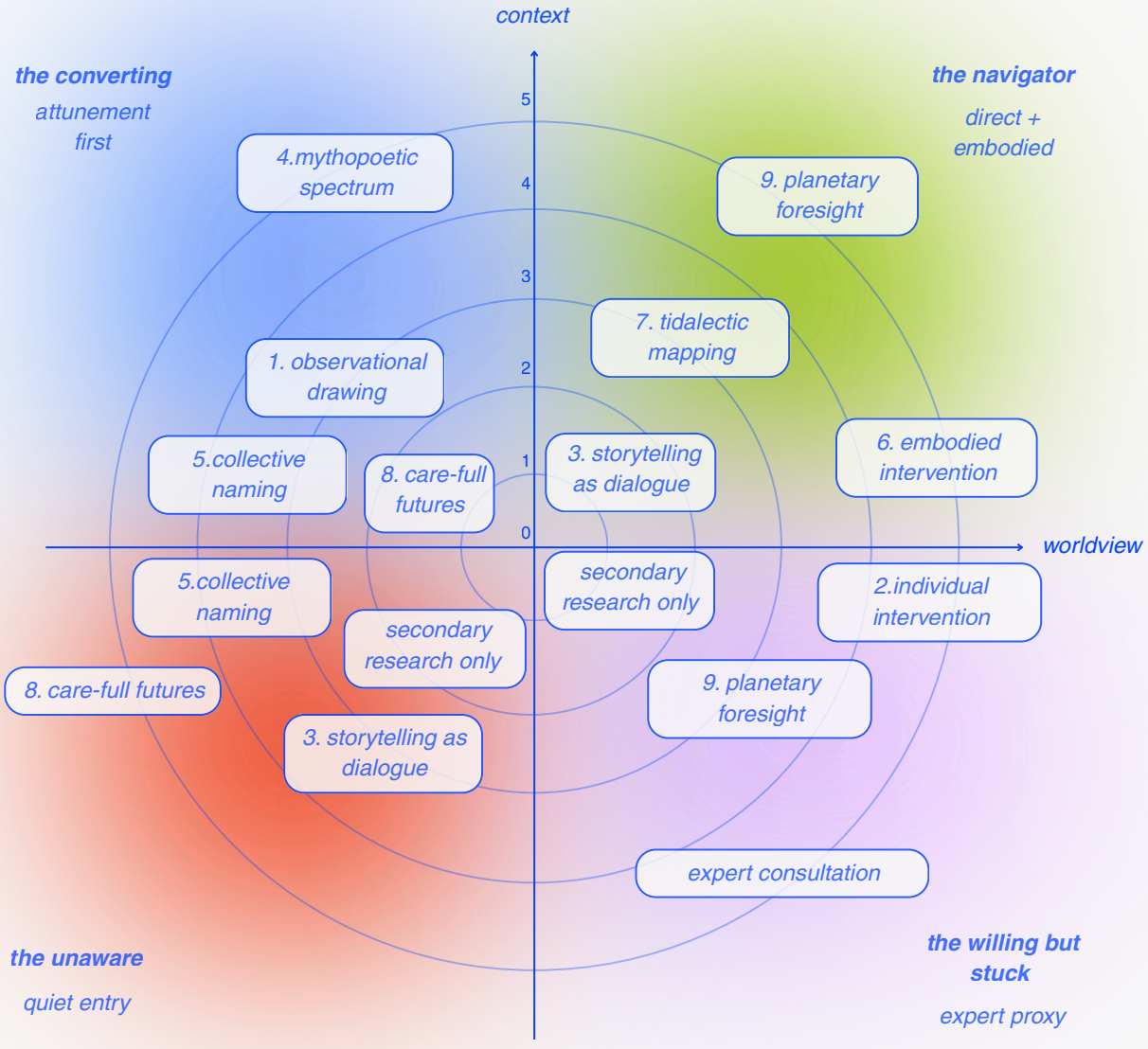
Task 4:
As a team, compare your individual cards. If team members land in different zones or on different circles, discuss which starting point makes most sense for this project given the Stage 1 outcome.

Agreed method for this project: _____

When in the double diamond: _____

Card to use: _____

Who leads it: _____



read the concepts →

Concepts

1. Observational drawing in nature

Origin: practice-based research, post-growth design, interspecies co-creation
Core idea: Drawing as attunement: zoom from full plant to specific detail to relational network around it
Methods used: Outdoor sketch session: full plant, close detail, relational map of what happens around the plant; group reflection discussion
Design question: How does close observation of a non-human entity shift how a designer perceives it as a stakeholder?
SD relevance: Low-barrier field method; applicable in any local outdoor context, no remote nature access needed
Double diamond: Discover - embodied stakeholder observation before problem framing; builds relational attunement
Inclusion mode: Direct participation - bodily, sensory encounter with the entity in its own environment
Strengths: No artistic skills required; shifts perception rapidly; works in urban parks and everyday settings
Limits: Personal output is hard to translate into design deliverables without further scaffolding

2. Individual intervention in the Anthropocene

Origin: degrowth theory, Haraway (2016)
Core idea: Participant creates an artifact or experience that intervenes in human-centric Anthropocene patterns
Methods used: Artifact or experience design grounded in Anthropocene, degrowth, and post-growth theory
Design question: What small intervention disrupts human-centric assumptions and opens space for co-creation with nature?
SD relevance: Medium - bridges artistic and design sensibilities toward relational, speculative action
Double diamond: Develop + Deliver - speculative prototyping of relational interventions; testing assumptions in practice
Inclusion mode: Direct + representative profile - participants choose their own mode of encounter and representation
Strengths: Open-ended; accommodates multiple disciplines; produces tangible and reflective output
Limits: High dropout when artistic framing dominates; non-artists feel excluded without design scaffolding

3. Storytelling as dialogue

Origin: British Academy research with 56 performance storytellers, UK
Core idea: Story, experience, and dialogue form a triangle - meaning emerges in the reflective space after the story
Methods used: Robin and tree story, individual reflection, structured group dialogue
Design question: Can non-human narrative actors generate empathic conditions for ecological engagement?
SD relevance: Tested, scalable method for relational meaning-making across mixed stakeholder groups
Double diamond: Discover + Define - value surfacing, framing shared ecological stakes before problem definition
Inclusion mode: Representative profile - non-human actors represented through fictional narrative characters
Strengths: Emotionally generative, accessible, no prior theoretical fluency required
Limits: Anthropomorphism risk; analytical participants may resist immersion

4. Mythopoetic spectrum

Origin: mythopoetic spectrum
Core idea: Spectrum maps relational distance to nonhumans from resource (0) to cosmogenic (8)
Methods used: 20-min silent writing with Medusa head cactus
Design question: Where does a community or organisation sit in relation to its more-than-human world?
SD relevance: Spectrum functions as a diagnostic mapping tool for communities and organisations
Double diamond: Discover - relational distance audit and stakeholder mapping before problem framing
Inclusion mode: Direct +representative profile - embodied attunement to the entity; point of view taken from the possible spectrum
Strengths: Place-specific, accessible without prior ecological or theoretical fluency
Limits: Spectrum degrees culturally relative; harder to apply in highly industrialised contexts

5. Collective naming workshop

Origin: affect theory, ecofeminist pedagogy
Core idea: Making absent more-than-human bodies felt without collapsing the encounter into explanation
Methods used: Birthday split naming task, combinatory pairings, design gesture development
Design question posed: What gesture could make this erased relation present enough to be sensed and acted upon?
SD relevance: Low-threshold entry point into more-than-human co-design; no theoretical fluency required
Double diamond phase: Discover + Develop - opening relational imagination; generating speculative design gestures
Inclusion mode: Representative profile - participants imagine and name erased entities, building collective proxy knowledge
Strengths: Fast, generative, bypasses self-censorship; transferable to organizational workshop formats
Limits: Affective theory layer not yet translatable into organizational instruments; ~40% drop-off in pairing task

6. Embodied place-based intervention

Origin: Bird Rose, D. (2011) - social death
Core idea: Nonhumans rendered invisible by power; design reverses erasure through embodied, public, place-based action
Methods used: Archival research, bodily attunement, performative procession, watery telling-in-action
Design question: How do you re-presence a socially dead more-than-human body in urban space over time?
SD relevance: Proof of concept for more-than-human design in disenchanted urban and organisational landscapes
Double diamond: Define + Deliver - framing the design problem; implementing relational interventions in context
Inclusion mode: Direct + expert proxy - bodily encounter with the entity; archival and local knowledge as proxy
Strengths: Generates community engagement without requiring theoretical buy-in; scalable across sessions
Limits: Resource-intensive; requires sustained multi-session commitment and place-based access

7. Tidalectic mapping

Origin: multispecies ethnography, critical cartography, tidalectics (Brathwaite, 2018)
Core idea:Circular temporal maps reveal how non-human rhythms shape ecological relations across time
Methods used: 5-step exercise: temporal attunement, life cycle mapping, perspective shift sketch, temporal layering, tidalectic composition
Design question: How do non-human temporal rhythms create interaction points that design can respond to?
SD relevance: Maps seasonal cycles, movement patterns, and ecological rhythms as touchpoints for service design
Double diamond: Discover - deep stakeholder research; maps needs across time before problem framing begins
Inclusion mode: Expert proxy + representative profile - expert inclusion with knowledge possible, researcher/designer interprets rhythms through field knowledge and observation
Strengths: Holistic temporal overview; surfaces hidden interaction points; directly applicable to urban and ecological design
Limits: High complexity; ~25% participant engagement without facilitation; requires prior attunement to entity in question

8. Imagining care-full futures together

Origin: care ethics, futures thinking, collective agency; influenced by composting metaphor (Haraway, 2016)
Core idea: Five-stage process moves from naming present tensions to imagining and activating care-grounded futures
Methods used: Field of care, rooting frame, composting frame, imagination field (future snapshot 2045), emergent field, activation
Design question: What futures grounded in care and reciprocity are trying to emerge, and how do we rehearse them now?
SD relevance: High - accessible futures co-creation method; works without specialist framing or prior theoretical knowledge
Double diamond: Discover + Define - surfacing systemic tensions and values before moving into futures imagination and activation
Inclusion mode; Representative profile - imagination field invites participants to speak as river, bee, child, or future self
Strengths: provides highest engagement of all sessions; avoids specialist language; emotionally safe entry point
Limits: beyond-human inclusion is implicit rather than named; perspective-taking is optional, not structurally required

9. Planetary Foresight Framework

Origin: Meadows (1999); Gaia hypothesis (Lovelock & Margulis, 1974)
Core idea: Worldview is the highest leverage point in any system; shifting to a planetary worldview reshapes what leaders see, decide, and design
Methods used: Worldview audit, 4-worldview spectrum, Planetary PESTEL, planetary foresight double diamond
Design question: How do you integrate planetary and more-than-human perspectives into every stage of a design process?
SD relevance: Very high - first framework to embed Gaia-relational and planetary thinking directly into a double diamond structure
Double diamond: Full process: buy-in, brief, research (planetary PESTEL), insight, hypothesis, ideate, validate, POC, complete, analyse, review
Inclusion mode: Representative profile + expert proxy - nature represented through planetary data, systems models, and expert ecological knowledge
Strengths: Speaks the language of business and strategy; emotionally resonant; accessible to leaders with no prior more-than-human knowledge
Limits: Framing stays largely at systems level; direct or embodied encounter with non-human entities is not built into the process