Developing EcoSystem Investigation

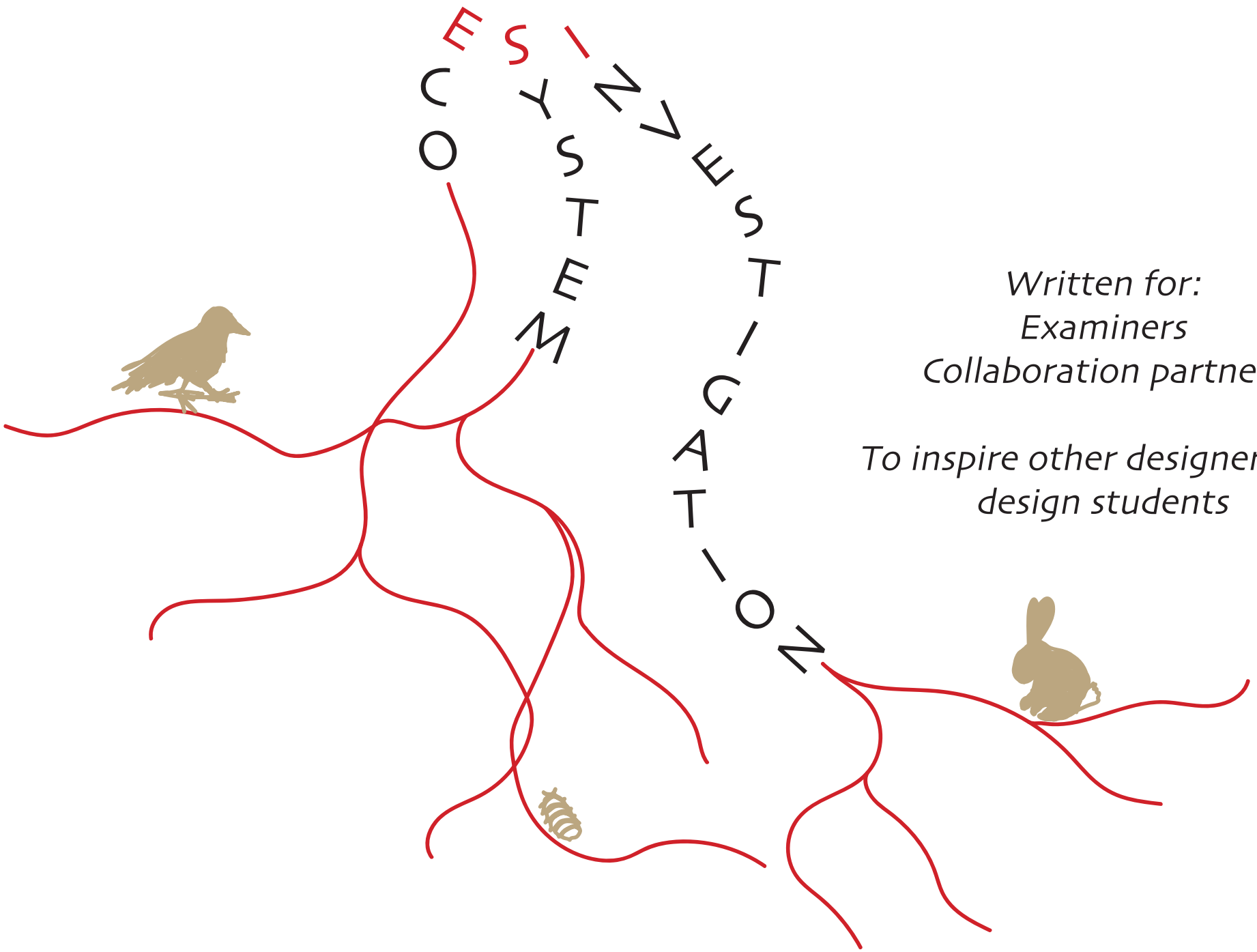
A ***Sharing Non-Human Appreciation*** Project

Report

Final Master Project by Luna Snelder
Coached by Daisy Yoo

In collaboration with:
IVN Veldhoven-Eindhoven-Vessem
Nieuw Zwanenburg
Phood Farm
Brabants Landschap

13/01/2025
Wordcount: 9612

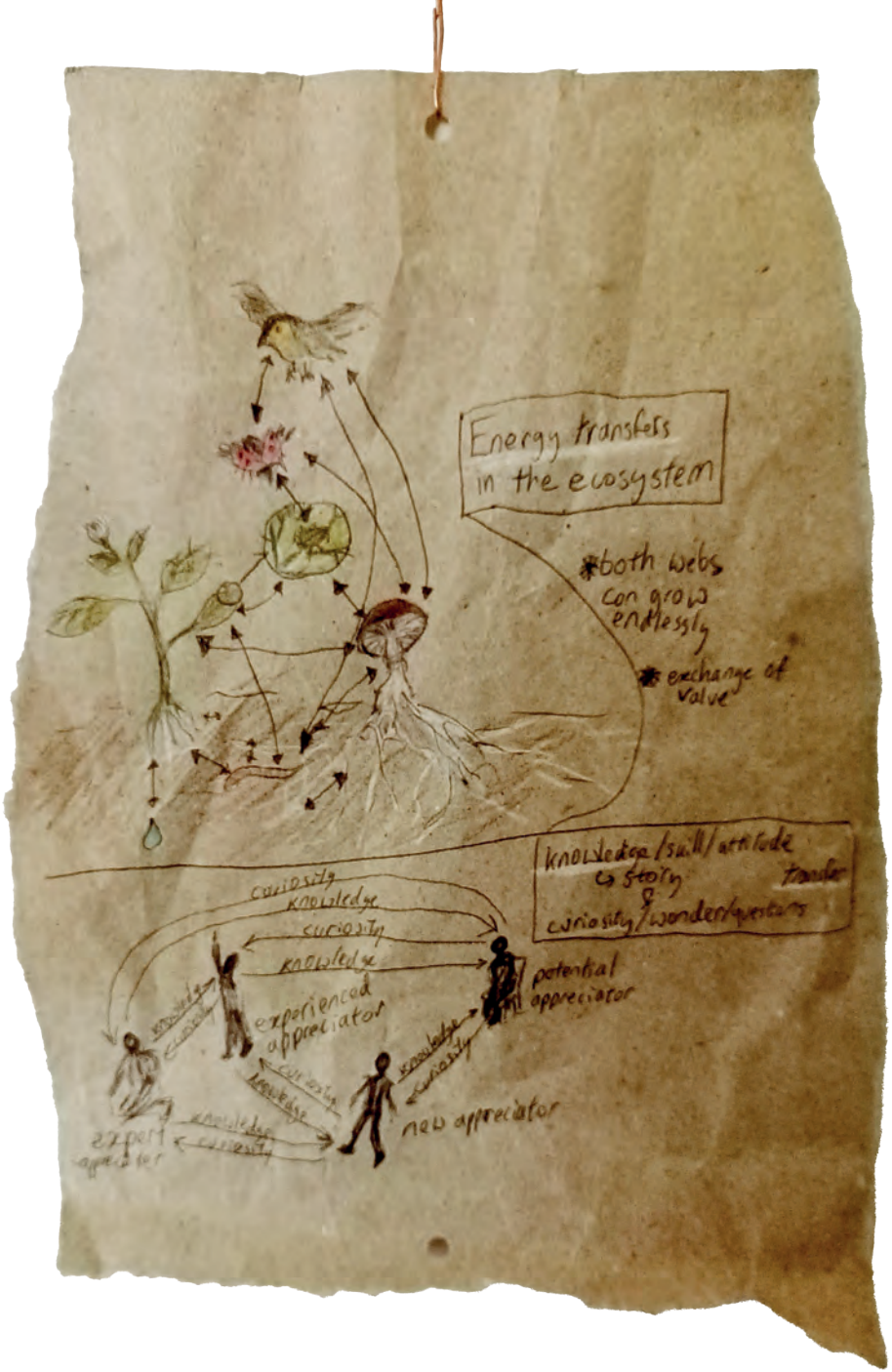


Written for:
Examiners
Collaboration partners

To inspire other designers and design students

Content

Abstract 3
Introduction 3
Disconnection 3
A Sharing Non-Human Appreciation Project 4
Developing ESI 5
Related Work 5
Pathways to a Thriving Planet 5
Making Impact 7
Environmental Education (EE) practices 8
Designing Tools for NC 8
Designing with & for Non-Humans 9
Scope 9
Communities 10
Process 12
Approach 12
Iterations 13
Design: EcoSystem Investigation 33
Initial Evaluation 34
Business 38
Discussion 38
Data 38
Nature-connectedness 38
Collaboration 38
Business & postcapitalism 39
Future Work 39
Term Explanation 40
Conclusion 40
Human Appreciation 40
References 41
Appendices 45



Abstract

Humanity should adapt their (ab)use of Earth into a more sustainable relationship. By strengthening our connection to nature, we can improve planetary wellbeing. In this project, I designed with and for nature-related communities: A tool for enabling sharing non-human appreciation with a wider public to support strengthening humanity's nature-connectedness. EcoSystem Investigation allows guides to create interactive experiences for adults involving finding traces and analysing their relations to uncover ecosystem's entanglements and humanity's position within them.

Introduction

The climate crisis is caused by human behaviour [13, 39]. Current efforts towards sustainability are often anthropocentric and focused on single aspects of planetary health, neglecting how human behaviour influences other species [1, 41, 53, 62, 73, 80].

> *"Scientists have classed the ongoing decline in biodiversity – caused by humans – as mass extinction"* ~ Barbett et al. 2020 [5]

Human behaviour needs to change into reducing current harm, supporting ecosystem and biodiversity restoration [82]. The UN stated in their report (IPBES) that we do too little to decrease biodiversity loss and that there is a worldwide lack of motivation for nature protection [4]. The Netherlands is called champion of biodiversity loss [68], reaching a state where there will be lasting effects [4]. A recent Dutch study about nitrogen deposition shows that restoration management can even amplify negative effects for insects [76], indicating the need for preventive action. Unfortunately, the current Dutch government reduced funding, discontinued programs and moved deadlines [24], increasing the probability these world-destroying trends will continue. If human behaviour is this destruction's cause, humans should attempt to repair by changing their behaviour. Why are we demotivated to protect nature?

Disconnection

An important reason for lack of engagement in environmental conservation is disconnection from nature due to an anthropocentric perspective, urbanization, reduced consumption of natural food, spatial distance from food production, and increasing indoor entertainment technology (figure 1) [6, 33, 38, 84].

> *"There is a need for a game-changing, holistic movement to connect humanity with nature"* ~Varanasi 2020 [73]

Time to move away from our anthropocentrism towards a post-humanistic world where we no longer distinguish humanity from nature [22].

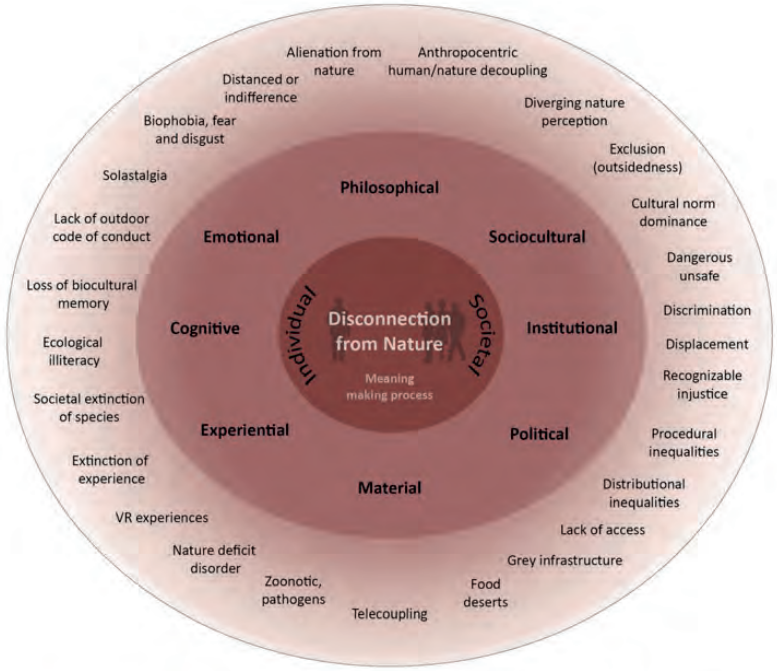


FIGURE 1 Wheel of disconnection. The figure illustrates how disconnection from nature takes place through interrelated processes of individual (Table 1) and societal (Table 2) drivers and dimensions of disconnect. These processes might result in different types of disconnection, as summarized by terms and concepts in the outer circle.

Figure 1: Wheel of disconnection [6].

Education

Education could play a role. Research confirms that education about local ecosystems and biodiversity increases awareness and can stimulate conservation behaviour [2, 10, 35, 41]. Children are often seen as the future and have great potential to connect with nature [3, 7, 33], but considering the severity of our problems, we cannot wait for these children to become proactive environmental aware adults. There is potential in children involving the adults around them, as illustrated in figures 2-4 [16]. However:

> *"There is an urgent need for more community-based, adult focused environmental education to help tip the scales towards sustainability"*
> ~ Johnson 2021 [34]

Local Communities

Børresen et al. 2023 mention the importance of a local appreciation of ecosystem services and knowledge about how people impact the ecosystem supporting these services for sustainability of resources and eventually human well-being [10]. Increasing awareness of disconnection enables scaling opportunities for individual nature connection to societal nature connection [6].

A Sharing Non-Human Appreciation Project

Based on above-mentioned information, it becomes clear that there is great potential in exploring a bottom-up pathway towards sustainability by fostering a deeper connection between humans and non-humans[1] through supporting local nature-related communities in sharing their values, knowledge and environmental experience with their members and beyond.

I refer to this process as Sharing Non-Human Appreciation[2], which emerged in my previous project (M2.1).

It offers an alternative route towards sustainability[3], based on the idea that this can be intrinsically motivated through experiences of non-human appreciation. By empowering people and communities engaging and inviting others to engage in these activities, to share this value beyond, it could start a ripple effect with the power to transform society (Making Impact).

I distinguished four types of activities that can contribute to experiencing and expressing non-human appreciation: *Noticing & Understanding, Caring for Non-Humans, Experiencing & Collecting Beauty, Being in the moment.*

Figures 2-4: Demoday pictures taken by three different people when children expressed interest in ESI. From left to right: Igor Roelofsen (Twycer), Troy Nachtigall, Anusha Ravishankar.

EcoSystem Investigation (ESI)

To enable sharing of non-human appreciation, I designed EcoSystem Investigation. A toolkit designed to engage adults less-intrusively (for non-humans) in ecosystem exploration by focusing on traces. Situated in nature-related community events (e.g. tours), it empowers experts to share their non-human appreciation (in the form of knowledge and attitude) with and beyond their community in an interactive way that emphasises ecosystem relations.

Developing ESI

I collaborated with four nature-related communities around Eindhoven to learn about their approaches and investigate opportunities for situating non-human appreciation in their practices:

- IVN Veldhoven-Eindhoven-Vessem
- Nieuw Zwanenburg
- Phood Farm
- Brabants Landschap

This report will first discuss the role of connection with nature in sustainable behaviour, scaling social innovation for impact, environmental education and design in Related Work. The Scope, Approach and a Process description in multiple iterations will follow, concluding with an extensive Design description of ESI. This report ends with a Discussion, Future Work and Conclusion. With this project I hope to inspire more designers to take this social route to a sustainable world and call for connection with nature in design action and education [75].

Related Work

Pathways to a Thriving Planet

How stimulating nature-connectedness contributes to sustainability related behaviours and attitudes, which is the end goal that I hope to contribute to, but cannot validate within given timeframe.

Environmental Psychology

Eudaimonia

Spending time in nature and engaging in conservation behaviour contributes to well-being [5, 37, 57]. Nature-connectedness should be seen as part of the standard metric for wellbeing [59]. The contribution to wellbeing can be side-effect and extra incentive for partaking in activities caring for non-humans.

Pro-Environmental Behaviour (PEB) & Others

In environmental humanities literature, various terms are used to express ecologically desirable actions, such as pro-environmental behaviour (PEB), pro-nature conservation behaviour, environmentally responsible behaviour (ERB), ecological behaviour and sustainable behaviour [5, 84]. Pro-nature conservation behaviour concerns positive actions that aim to support biodiversity and species protection [5]. Studies in environmental psychology mention the challenge of going from environmental awareness to taking actions to support the environment, also known as the Value-Action gap [5, 41, 84].

Factors causing PEB

Nature-connectedness or connectedness with nature, nature connection, nature relatedness, are names of a psychological construct that is known as the best predictor of pro-environmental behaviour and seen as a more enduring motivation for it [5, 38, 39, 84]. Nature-connectedness is a subjective sense of oneness with and appreciation of all life, encompassing cognitive, affective, learnt, experiential and personality factors [33, 38, 39, 57].

Connectedness with nature (CWN) is defined as "a stable state of consciousness comprising symbiotic cognitive, affective, and experiential attitudes and behaviours, a sustained awareness of the interrelatedness between one's self and the rest of nature" (figure 5) [84]. This resembles my definition of non-human appreciation[2]. Zylstra et al. (2014) describe committed CWN as "*the willed embodiment of cognitive, affective, experiential, and connections with spirit as parts of a behaviour set which aims to 'give back' (or 'pay it forward') through leadership in service of social-ecological communities.*" This can be seen as a solution to the earlier mentioned Value-Action gap. It is what I imagine an intrinsic motivation for "sustainable behaviour" coming from non-human appreciation can be like. It incorporates a sense of reciprocity towards earth.

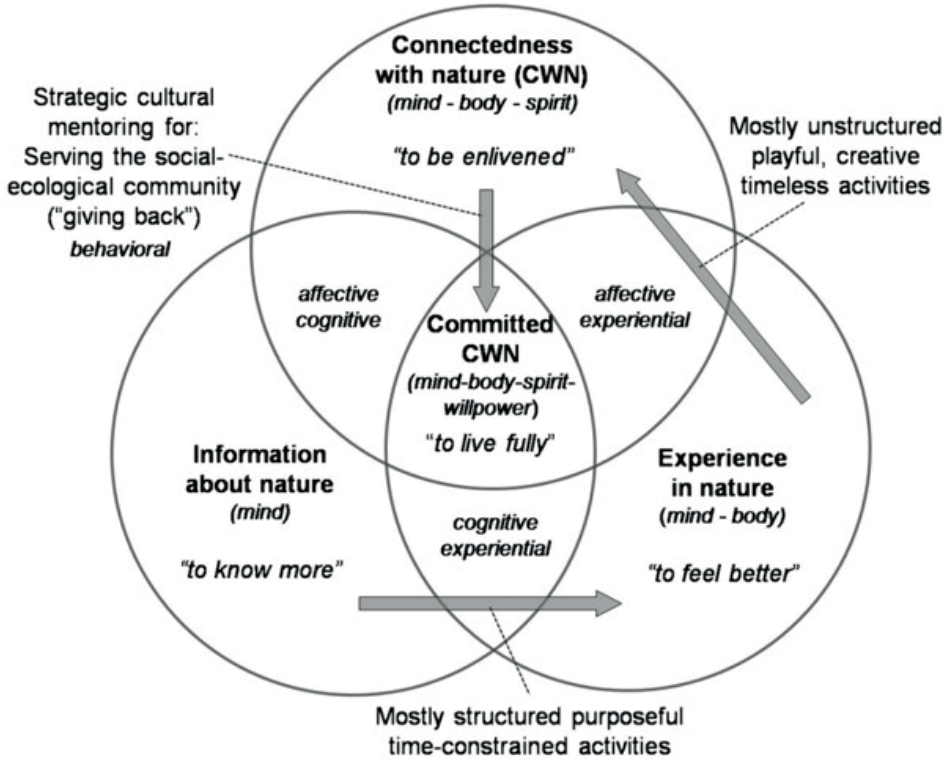


Figure 5: The path towards committed CWN [83].

Factors promoting Nature-Connectedness (NC)

Several factors contribute to nature-connectedness. One is increased contact and awareness of one's natural environment [39], especially in people's daily life through increasing natural settings or visits to such settings and simple activities (prompts) to encourage connection [59]. However, just being in nature is not effective for increasing the attitude for environmental protection [66]. Compassion and caring for nature are also contributing to nature-connectedness [5]. Moreover, for a more successful intervention it is advised to incorporate people to reflect "on the ways in which they feel like a part of and interdependent with nature" [39]. Other literature mentions the need for a conscious shift in perception, attitude and behaviour to create a cognitive shift where people intuitively feel their entanglement with all life [84], and the importance of social communities in supporting this process [6]. Citizen science and apps supporting this through identification can be seen as practical examples to foster nature-connectedness [84].

Animism & Reciprocity (radicalising NC)

Humans should not be seen as superior to other species [39], but rather as part of one interconnected world. We depend on thriving ecosystems (which are the embodiment of reciprocity [78], and according to reciprocity, we should not just take from the ecosystem services but also give back by taking the responsibility of our human role within them [7]. The act of seeing ourselves as a part of nature and treating it like we would care for ourselves can contribute to a world where people also treat each other with that same respect [73].

Animism is a way to see ourselves as part of nature. It considers all beings as persons (having a body, will, desire, feeling, rational thinking, perception and voice for expression) who all exists because of their shared world and relations [78]. Weber calls animism "the most radical form to think and enact reciprocity among beings – human and non-human persons". He explains this as accepting that "all beings cocreate a world that is continuously producing life" and that they take responsibility to sustain this cosmic fecundity. According to him, animism and reciprocity are central in indigenous cultures, where this interconnected way of thinking allows people to give, knowing that it

will flow back to them. However, this way of thinking is hardly present in our western capitalistic society. Weber states that capitalism came with colonialism due to an underlying framework of constant growth and is still harming animistic societies by only taking/ "eating":

"It transforms a world of mutual nourishment in a toxic wasteland"

Making Impact

Away from Capitalism

How can we increase our connection with nature in a capitalistic system where economic growth is more important than planetary wellbeing? According to Wizinsky in his book Design After Capitalism, it is not possible to design something making the world more egalitarian, democratic and sustainable within capitalism [79]. Therefore, he suggests postcapitalistic design, which incorporates the creation and maintenance of social power, community economies, degrowth and postcapitalist subjectivities by shifting products and services towards non-rivalry and aiming for endogenous growth. With the expansion of this postcapitalistic design practice, a network effect can increase its opportunities and transformative power [79]. This ripple effect is also something I aim at in my project with sharing non-human appreciation (Appendix A).

Scaling & Social Innovation

A resilient planet requires combining social and environmental challenges when innovating for solutions from a broader perspective (figure 6) [53].

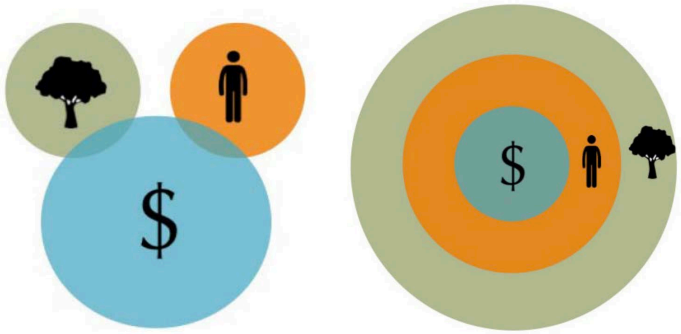


Figure 6: We need to transition from the left People Planet Profit model to the right. Illustrations by Jerker Lokrantz, Azote, for Stockholm Resilience Centre.

The global environmental crisis requires interdisciplinary collaborations and the inclusion of local perspectives [19]. To make long-term impact instead of emergency mitigations, worldwide community attention is required at both governmental and grassroots level [19, 44, 53]. Building networks of local communities combined with global knowledge and ideas (cosmopolitan localism) supports social innovation in creating a more resilient society [42].

Moving from social innovation to a transformative societal impact can be achieved by scaling out, up and deep (figure 7).

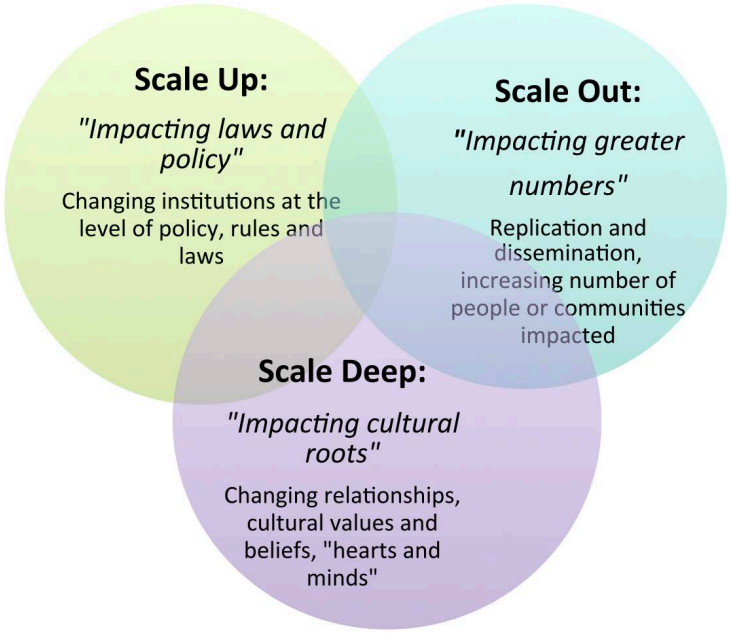


Figure 7: Scaling directions for social innovation by Ridell and Moore (2015).

The scaling out strategy "disseminate principles, with adaptation to new contexts via co-generation of knowledge" complements the postcapitalistic ideas of endogenous growth [60, 79]. This strategy fits well with the ESI project, where I took the concept of Sharing Non-Human Appreciation from my preparation project and further developed and adapted it to new contexts through a participatory design process.

Scaling up is needed for transforming failing systems into something better [60]. This idea of social innovations as bottom-up movements eventually changing policy is also described by Lara Monticelli as prefigurative politics being an innovative force to politics and how the combination is much needed for achieving societal transformation [44].

Durable change needs transformation at the level of people's values and relations, creating and amplifying stories can support this process [60]. ESI makes a first attempt at changing people's relation with nature, drawing them into the perspective of non-human actors in the ecosystem by forming mysteries around their traces. This scaling deep relates to how Weber considers decolonisation and becoming animistic as route to sustainability [78].

Environmental Education (EE) practices

Environmental education aims for "transforming people by intrinsically motivating a more equitable interplay among people and nature, rather than simply passing along knowledge about the world or bringing about prescribed extrinsically motivated actions" [50]. To do so, it combines outdoor nature exploration, information about conservation and environmental problems, and knowledge and skills to act in a supportive manner [43]. Experiential education is associated with environmental education promoting concrete, challenging and meaningful interactions in real-world settings involving senses, mind and emotion [50, 77]. Going beyond cognitive aspects is underlined in more literature [38, 43, 84], but it should not be excluded. Stimulating logical and deductive reasoning for sensemaking of surroundings is important for gaining environmental consciousness [43]. This can be raised by connecting people to their environment, encouraging care for it.

There is also criticism from a study about gardening communities: Environmental education is often based on the assumption that direct contact with nature leads to knowledge and attitudes that support pro-environmental behaviour. However, this is questionable and needs nuance [55]. The relation between humans and non-humans can be strengthened, but only the relations quality can determine whether there is increased ethical concern. Instead, the study suggests that people might gain most environmental awareness through exchanging perspectives with others while being in a natural environment and encountering situations to discuss this.

The author explains that ethical concern for non-humans can only be strengthened by increasing awareness of all life being interdependent. This relates to an environmental aspect in holistic education [50].

Designing Tools for NC

This project aimed at designing a tool for sharing non-human appreciation, which is comparable to nature connection. An example of such design is the field guide cultural probe toolkit for Inquiry based learning for children [43]. It is an environmental education toolkit encompassing a bag for carrying it into nature and concerns specific relation to space (signs demarcating stations points along the nature trail). This paper mentions the importance of balancing information about a natural environment with opportunities for direct experience of it through senses and imagination when creating cultural probes for environmental education.

Expert perspectives

GreenHat is an app with interactive map, videos of experts to stimulate expert-like observation for activating discussions about nature preservation [67]. Citizen science identification apps and platforms for educating and engaging adults can be helpful in increasing nature connection [17, 18, 28, 30, 52, 56]. There are also nature experts that offer activities and information (online). Some examples are Nature mentor [49], Yggdrasil about permaculture [81], Tristan Gooley (reading nature signs) [25], and Anne Sverdrup thygeson (biologist, books about value of nature and anecdotes with detailed description of its complex relations [69, 70]). Expert perspectives can also be transferred through expert traces, e.g. when learning in a garden [40].

Gamification & Creativity

Studies with tools for children express the importance of room for creativity and freedom of how to interact to ensure intrinsic interest in nature [3, 16]. A practice coming from this are the nature detective

related programs for children to playfully engage in noticing [15, 45–48]. Another example is the Sharing Nature website, offering activities based on FLOW method [21]: Awakening enthusiasm, focussing attention, offering direct experience, and sharing inspiration.

Personal Connection

Personal connection can increase through sharing place and personal influence in design. DIY local wildlife cameras can enhance nature-connectedness and making MTH favourable decisions [23, 74]. The Nature Collections App allows children to annotate their photos for increased curiosity and nature-based conversations [36]. Choosing the subject of observation allowed for intrinsic interest.

Tangible Memories

This is a concept from my M2.1: People keeping physical tokens to support sharing their memories of non-human encounters. An example is Nature Probes, which captures personal experiences in the natural world [9]. It supports illustrating, understanding and remembering when storytelling about these experiences.

Designing with & for Non-Humans

Methods for More-Than-Human (MTH) design inspired my approach and the design of ESI itself as tool. The still developing sensitizing and data generating methods (e.g. relational mapping) for nature-entangled design research have proven useful [72]. Besides relational mapping, spatial mapping is useful for building context and illustrating how human and non-human life affect one another [61].

Noticing & photography

Collaging a walking experience supports documenting embodied non-human encounters through photography during the walking experience and placing them together [72]. Phenology snapshots uses photography to notice non-humans or their change over time [61]. This illustrates the added value, rather than distraction photography can offer when in nature.

Imagination

A provotype is a prototype/artifact used to provoke reflection and discussion by "leaving gaps to be filled with the audience imagination" [62]. Provotypes in the form of a collaborative fictional event can be used to increase awareness and attention for the more-than-human world. ESI can be seen as a provotype. The mystery in the ESI case offers space for speculation and imagination. ESI also includes reflection of human role towards ecosystems. Other imaginative techniques are futuring, roleplay, design fictions and storytelling [1, 14, 26, 58].

Other relevant techniques concern living with non-humans, becoming aware of their rhythms and attending needs beyond yourself [1, 64, 71]. Local and expert perspectives are useful for ensuring correct non-human representation and enriching your personal knowledge [26].

Scope

The goal of this project is to design a tool for communities to share their non-human appreciation beyond the community. I focus on adults as there is less for adults to be actively involved in nature (Appendix B). Adults are mostly environmentally educated beyond formal education, which is facilitated by nature-related organisations [34].

Designing for the communities where people already are experienced non-human appreciators may seem unnecessary. However, by empowering these people to share their experiences and stories with their network, they can (indirectly) reach people that are less experienced non-human appreciators[4] and maybe have less motivation to change. I believe that the personal connection already present between people can lower the threshold to being open for an alternative perspective.

Communities

IVN Veldhoven-Eindhoven-Vessem (IVN VEV)

This community is the local branch of the national IVN nature education association, which is mostly a volunteer organisation [31]. IVN stands for institute for nature education and sustainability ("Instituut Voor Natuureducatie en duurzaamheid"). The local community consists of a board and 20 workgroups. Moments of exchange between these workgroups are limited.

IVN aims at connecting people to nature ("maar de natuur, dat zijn wij") through activities, courses, projects and campaigns. I see IVN as a driving force for increasing nature-connectedness.

In this project I collaborated with the local IVN board. My main contact is an experienced IVN member (and ex-chair). The current chair was involved throughout the semester.

Nieuw Zwanenburg (NZ)

Nieuw Zwanenburg is an independent workshop for the future ("werkatelier voor de toekomst"). It is a foundation with an equal collaboration of shared ownership between people from government, design, local environment, research/education and entrepreneurship [51].

Situated in an old farm in Oirschot, they work towards the collective mission of developing biobased infrastructure by growing fibre crops and inviting related projects to engage with their context. They see NZ as experimental example for positive change in our society. I see NZ as a practice of prefigurative politics [44], moving towards a posthuman and postcapitalist world [22, 79].

My main contact is an industrial designer and cofounder ("kwartiermaker") of NZ. Throughout the project I received input from more "kwartiermakers" and others involved in the organisation.

Phood Farm (PF)

This foundation is a social enterprise offering care for vulnerable groups in combination with facilitating a community [29].

The Phood Farm grows food through aquaponic farming and permaculture. The food is offered to community members who pay for their membership and additionally participate in gardening at the community farm (Rielse Erven) where they can harvest their own vegetables. Rielse Erven is managed by two Buitenfarm Leads. Phoodfarm also occasionally offers tours and welcomes volunteering groups. I see PF as a practice of prefigurative politics for creating a new food standard [44], and a place where they connect human and non-human wellbeing.

In this project, I worked regularly at the PF which allowed for input from community farmers and the Farm Leads.

Brabants Landschap (BL)

Brabants Landschap is a foundation that cares for the environments of the province Noord-Brabant [32]. They do this through many collaborations.

Their core tasks concern landscape, nature and architectural heritage management. They have local volunteering groups and organize guided tours for (free for their members) or for a small fee. I see BL as an organization that, besides preserving nature, encourages nature-connectedness and invests in networking and empowering more sustainable initiatives.

Throughout the semester I had several online meetings with a communication manager.

Multi-Stakeholder Design Process

Iterations

Check-In & Tangible Memories, Textures | **Traces, Maps & Detective** | **Guided Perspective** | **Towards ESI** | **Validation & Implementation**

Design Action

- Business opportunities
  - ◇ Open Source
  - ◇ DIY
  - ◇ Rent ESI
- Testing
- Future Improvements
  - ◇ Digital open archive

STAKEHOLDER INVOLVEMENT

IVN Veldhoven-Eindhoven-Vessem

Feedback meeting 17/12/2024

Plan a test in February with guides

Presentation at GMM 25/2/2025

Nieuw Zwanenburg

Pilot with experts & RWS 19/12/2024

Discuss business opportunities

Phood farm

Want to test in January/February

Brabants Landschap

Feedback meeting 16/12/2024

Want to plan a test sometime in Spring

Process

Approach

My process is a combination of first-person perspective exploration and inspiration (autoethnography), community involvement from second-person perspective (expert & user), and literature review (third-person perspective).

Participatory Design (PD)

Considering the importance of local community involvement and collaboration for social innovation, this project is approached with participatory design (PD).

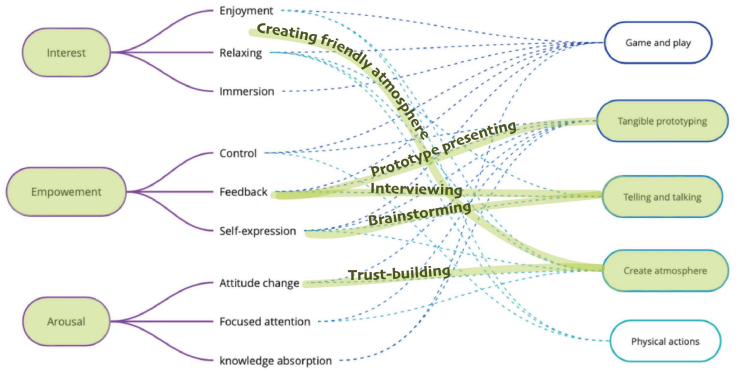
Why PD

Sharing non-human appreciation is all about nature-related communities. They should have the right to be involved and there is a lot to learn from them as designer. Participatory design allows for creating collaborative ideas that can lead to new concepts by involving different perspectives non-hierarchically [62]. The design outcome is already including stakeholder perspectives, increasing the chance of successful implementation [11].

Shared Vision

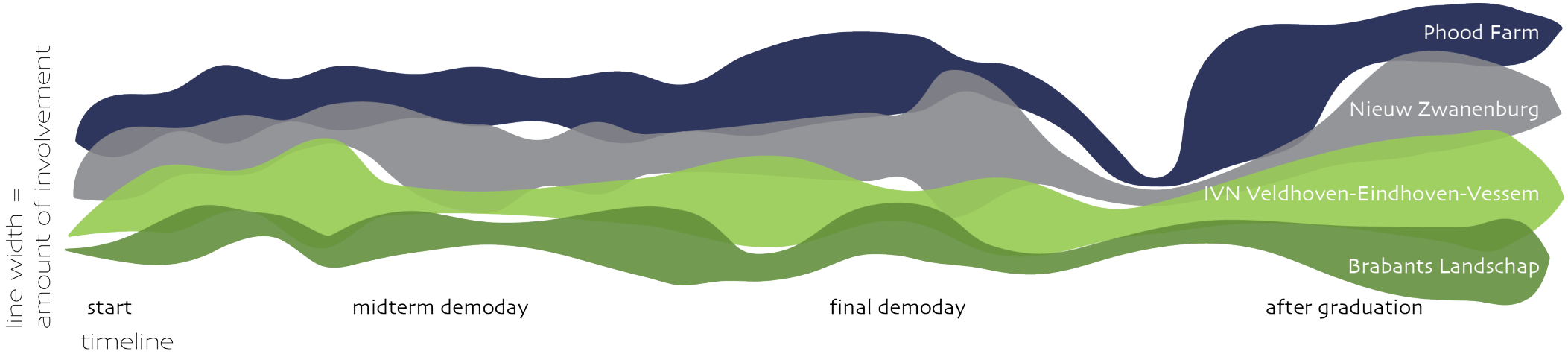
All communities were striving for conscious engagement with nature through conservation action, education, permaculture and investigating opportunities for biobased infrastructure.
A shared vision helps motivating and guiding participants [54]. Communities engaged due to relating to my goal, making interesting to partake in this project's ownership. The shared vision helped in aligning the design work with the communities, ensuring that their invested time is not lost [65].

Community Involvement



Attributes of participants engagement and the connection with engagement approaches.

Figure 8: Applied community engagement (highlighted) [83].



Several engagement approaches were used in my process (based on PD literature review (figure 8) [83]. These approaches fitted best with the community settings due to limited time and indoor space (unpractical for prototyping activities), and only involving a few people simultaneously (does not lend itself well for play).

Unique Community Contributions:

IVN Veldhoven-Eindhoven-Vessem (IVN VEV)

- Expertise about nature education.
- Inspired the process with how their guides look at nature and learn about the ecosystem through finding traces.
- Affinity map with all input in Appendix C.

Nieuw Zwanenburg (NZ)

- Expertise about interdisciplinary egalitarian collaboration, policy makers and larger scale fibre crop farming.
- Offered the opportunity to bring ESI into a professionally differing context.
- Affinity map with all input in Appendix D.

Phood Farm (PF)

- Expertise about permaculture and creating a balanced ecosystem.
- Inspired the Crime Scene idea with how they attempt to handle plagues.
- Non-human appreciation input: community farmers' motivation, experience sharing, wish to learn, and appreciation of the local environment and work.
- Affinity map with all input in Appendix E.

Brabants Landschap (BL)

- Advice about project framing, target audience and storytelling.
- Offered insight in ongoing related practices.
- Affinity map with all input in Appendix F.

Iterations

Check-In

Start Collaboration

To arrange collaboration, I reached out to thirteen organisations via email, including a link to my M2.1 project and information about what to expect (Appendix G). I eventually planned initial meetings with four, to discuss how this collaboration could be valuable for both parties. An overview of the value exchanged between me and each community can be found in Appendix H.

Continuing M2.1

Unexpected non-human collectors: Wearables mimicking fur to catch (pieces of) non-humans while walking to be later surprised and learn more about the non-humans living in the area (figure 9).

Gardening kneepad cover: Combines the four activity types of non-human appreciation in a set of activities placed on the cover (figure 10).

I brought the prototypes of my M2.1 to initial meetings, which helped further clarifying my purpose, but also imagining possibilities, which helped in creating choices [11]. An extra was the feedback from different perspectives.

Figure 9: One of the Unexpected Non-Human Collectors.

Figure 10: Front of Gardening Kneepad Cover.

IVN Veldhoven-Eindhoven-Vessem

1/8/2024, First call with main contact:

- Further project and goal explanation
- Information about the organisation structure and collaboration possibilities.
- Plan appointment.

Insight: The participation of work groups is difficult, but expert involvement is possible.

4/9/2024, First meeting with main contact, Veldhoven:

- As inspiration, 52 weken duurzaam cardset to further define sustainability actions.
- Thorough overview of IVN organization and activities to identify possibilities for including this project. The guided tours would fit best.
- Resources and techniques used (books, Obsidentify (identification app) and picking up non-humans for educational purposes).
- Whether a smartphone is distracting from nature or supporting interaction with it and how photography can help to notice more through focused attention.
- The balance between education and preservation. E.g. the location of rare species remains secret.
- Planning, concerning a next meeting, a referral to the chair who is also an experienced guide for the upcoming public walk, possibilities to present the project result during the general members meeting (ALV in Dutch).

Insight: Sometimes it is "better" to somewhat disturb non-humans in a careful manner as guide for teaching. When are not aware, they cannot care (figure 11).

Initial Inspiration

I made a 52 weken duurzaam benchmark (Appendix I). It illustrates a wide range of possibilities to support sustainability. Nature-related ideas are in smaller amount. All is playfully presented as potential entertainment/ engagement for children.

In the Dille & Kamille benchmark (Appendix J), nature articles for adults focus on caregiving and for children on exploration.

In an analysis of video inspiration (Appendix K), I gained several insights: The support of visual storytelling, senses and challenges in an engaging learning experience. Techniques for capturing aspects of nature. How social media can play a role in sharing non-human appreciation.

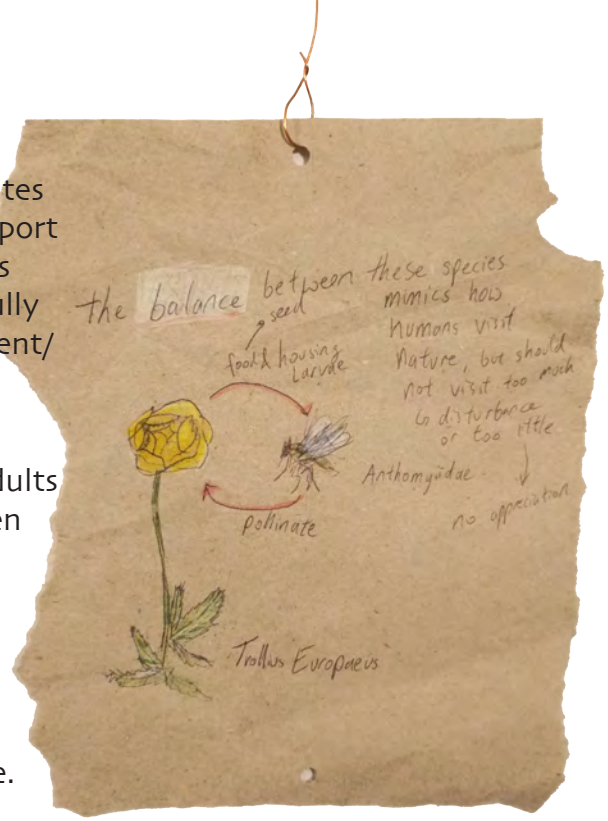


Figure 11: Balance metaphor based on IVN insight and Terra Insecta [70].

12/9/2024, First meeting with chair, Veldhoven:

- Guiding practices and tools used in them, e.g. laminated maps and historical pictures.
- The kind of public participating, their take aways and the role of photography and identification apps.
- The potential of designs like the Unexpected Non-Human Collectors and how they could be situated in guided tours.
- The plan to participate and possibly test my first iteration in a guided tour (6/10/2024).

Insight: Storytelling and personal appreciation as guide are important for making the information memorable.

Nieuw Zwanenburg

20/8/2024, First call with main contact:

- Project's purpose.
- Enthusiasm about vision alignment.
- Possibilities for collaboration & plan appointment.

Insight: Vision and organisation mentality are important for finding collaboration partners that diverge from obvious choices.

3/9/2024, First meeting with main contact, Oirschot:

- Tour on farm (crops, buildings).
- Explanation of NZ's activities, goals and organisation structure.
- Potential project contexts and directions at NZ.
- M2.1 prototypes aesthetic appreciation.
- Communication & next steps agreement.
- Ecosystem exploration (taking pictures of what attracts my attention) (figure 12)

Insight: NZ offers much freedom in project direction. The organised events offer opportunity for external (government related) people to learn about the local ecosystem, forming a potential path for scaling up [60].

Figure 12: Pioneering species taking over a structure at Nieuw Zwanenburg.

9/9/2024, call with main contact:

- Proposal to involve NZ mostly in second iteration.
- Plan to present my midterm direction to their team.
- Focus on local ecosystem, events & plan to meet farmers.

Phood Farm

19/8/2024, initial mail contact:

- Interest from team.
- Proposal to become community farmer and collect input while working with other community farmers.

5/9/2024: Trial morning, Eindhoven:

- Meet one Buitenfarm Lead.
- Learn about their practice and values.
- Help harvesting.
- Meet other community farmers and talk about their experience.

Insight: Working at PF contributes to mental health. Permaculture requires a balanced ecosystem, which eventually decreases the amount of needed work, but this is not yet achieved at Rielse Erven. Many working community members are needed.

Brabants Landschap

11/9/2024, call with main contact:

- Interest in alternative approach of this project.
- Potential involvement through connection to volunteergroups, expert advice from main contact, opportunity of Groen Traineeship.
- Suggestion to involve BL more after midterm & plan online meeting.

Insight: BL offers a more zoomed-out perspective on my project.

First Focus

Initial aim at IVN, nature education is very related to my goal, making it interesting to learn from IVN through more extensive collaboration.

Iterate on possibilities to capture from nature (tangible memories) in a less intrusive manner.

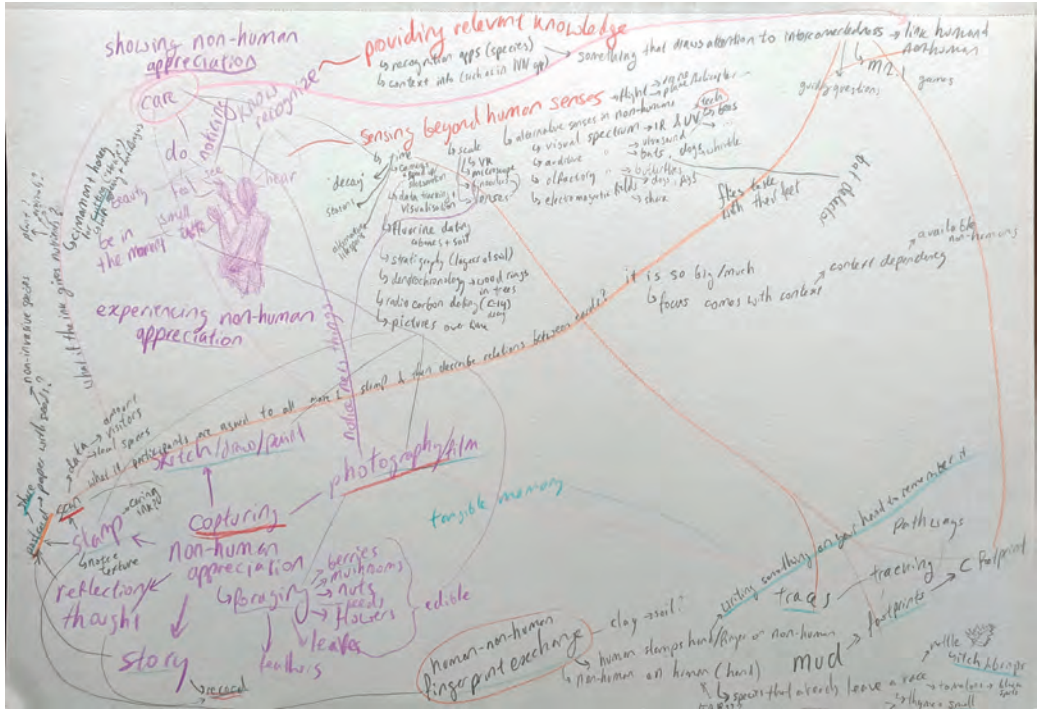
Iteration 1: Tangible Memories & Textures

Inspiration: Textures at Grote Beek

This iteration starts with inspiration from textures in nature during an exploratory walk at Landgoed De Grote Beek (where the IVN guided tour will be). The IVN App offers an interactive map with text and pictures relating to specific elements in the walk. I notice that I check my phone often to not miss information, interrupting my immersive experience. During the walk I see various non-humans, textures and notice the season with all the seeds (figures 13-16).

Figures 13-16: Non-human textures at Grote Beek.

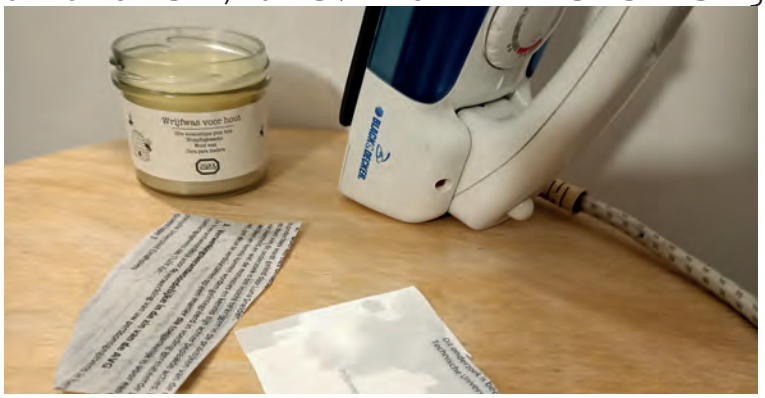
Initial Mindmap



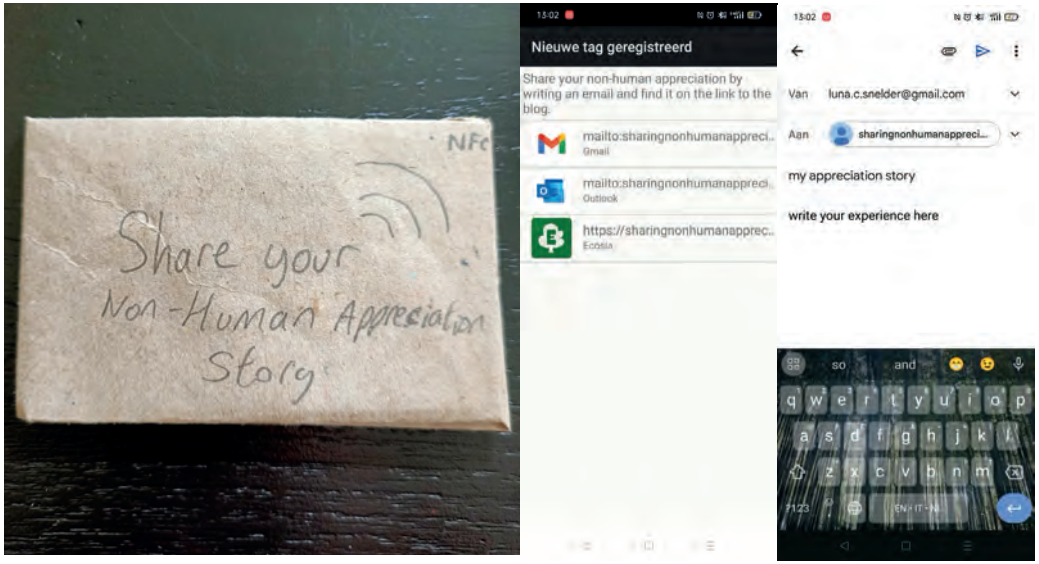
Insight: many different directions, potential of print of non-human as tangible memory and comparison to human footprint & ecological footprint.

Experiments: Sharing

Beeswax covered paper as alternative to laminating. This works! -> useful for cards, but takes more time than laminating.

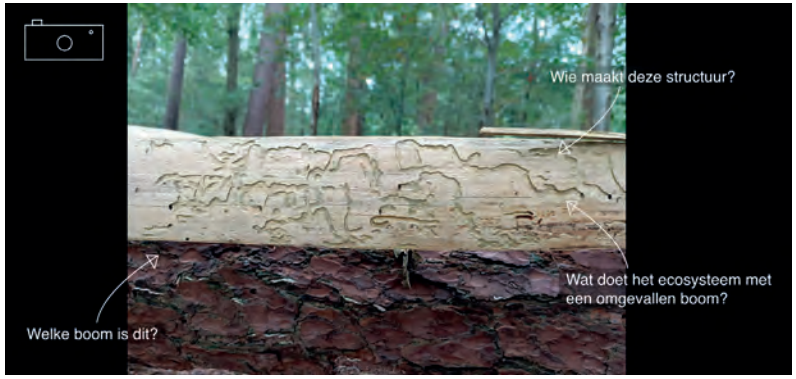


NFC tag to scan with phone. Sharing Non-Human Appreciation platform for stories (importance of stories).



What happens with it after people post a story? Not using my strengths as designer and the sustainability of electronics is only early in development (see Appendix X for further technological benchmark).

Adobe Xd mockup of relational identification app (as there are little relations in current apps). Link to prototype: https://xd.adobe.com/view/f0aa98a9-5818-4db0-876e-92c9c220d280-a5f9/?fullscreen&hints=on



It could be very complex to realise this for all possible relations but might be interesting to come back to later.

Using AI to create a story about non-human based on a fixed prompt structure (Appendix L). This can be tedious, not very engaging with actual nature.

Experiments: Visual Capturing

Capturing tangible memories & textures (aesthetics driven explorations that allow for quick captures, relatively superficial and not encouraging deeper relations with non-humans).

Stamping (could be used for post cards)

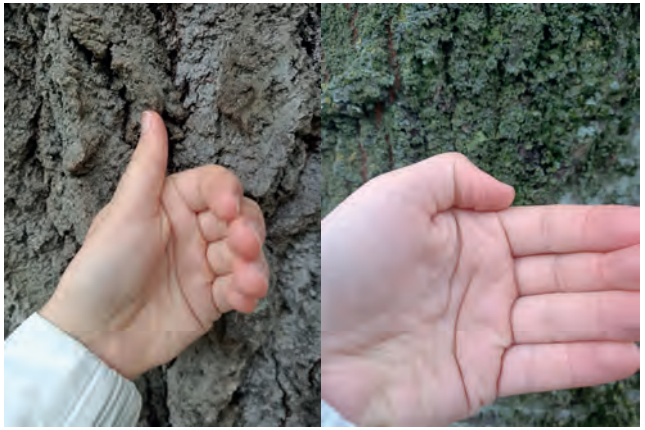
Ink (not eco-friendly)

Mud (less permanent)

Tea (little contrast)

Treebark texture captures

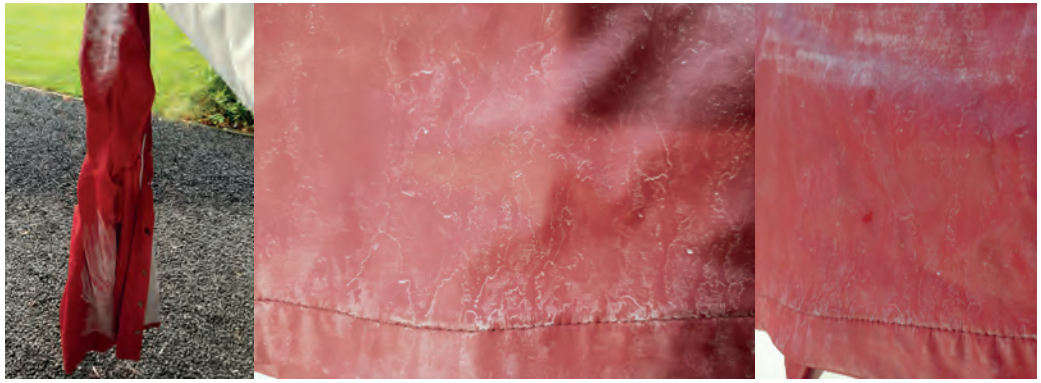
Rubbings (fabric and paper)



Mimicking treebark with hand wrinkles (treebark can become more textured as trees grow older, resembling skin).

Beewraps for treebark

Rain traces in chalk (making patterns)

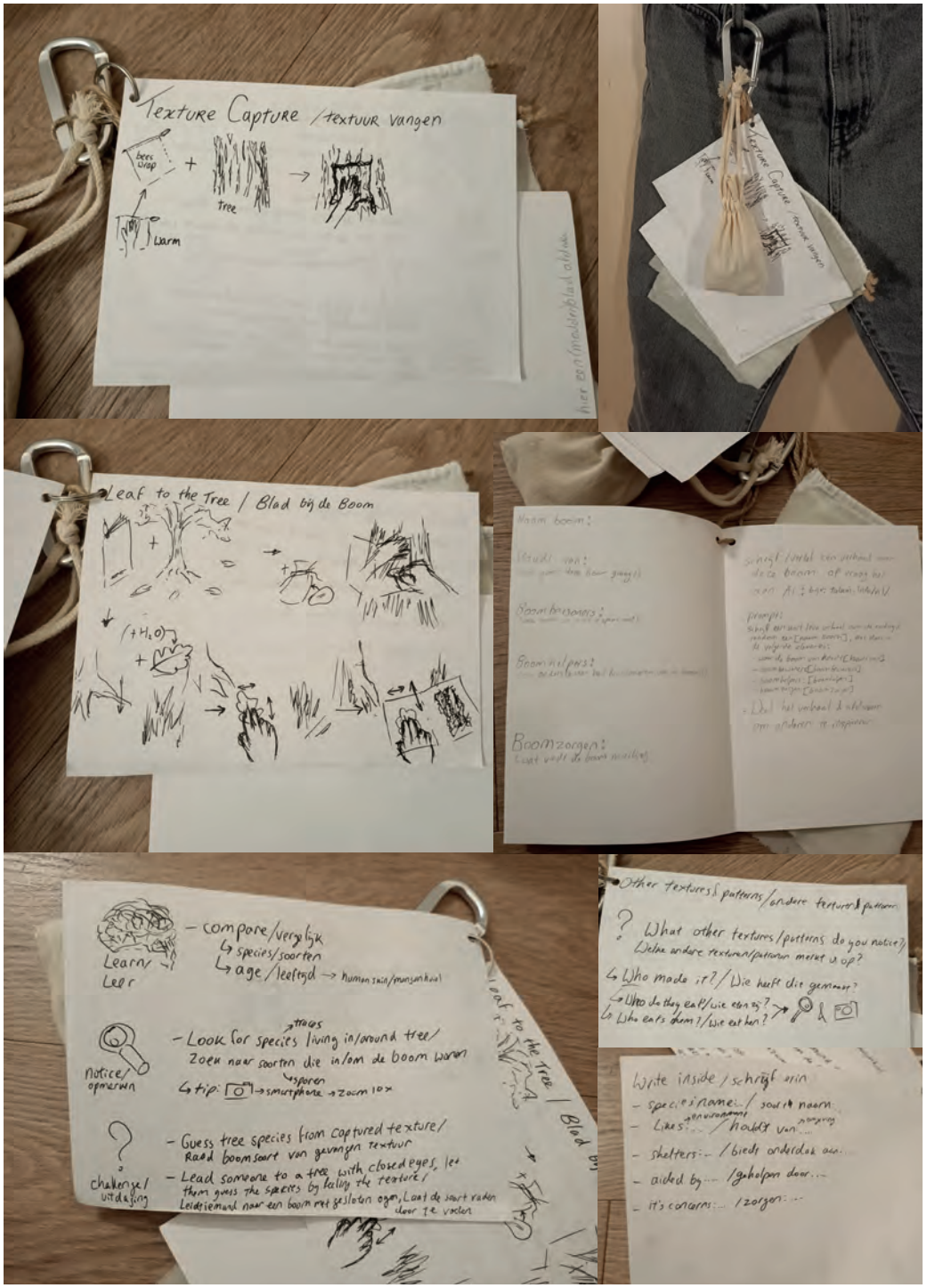


Touch exposure glove

(dirt on hands during gardening, what are you uncomfortable touching?). Not very practical, too little difference in experiences offered.

Concept: Texture Activity Set (TAS)

- Texture capture to compare bark structures
- Leaf to the tree to link leaf stamp to tree rubbing with further investigative questions & AI prompt for story in booklet
- Other textures: investigative questions



IVN Veldhoven-Eindhoven-Vessem

17/9/2024, Presentation for board (Appendix M), Veldhoven:

- Present project goal & reason for collaboration with IVN
- Present Initial experiments & M2.1 prototypes, context tours
- Curiosity response & Methods they use: White cloth under a tree, Obsidentify Looking back at the taken pictures with a group

24/9/2024, Brainstorm with main contact (Appendix N), Veldhoven:

- Show initial brainstorm concepts & discuss and ideate further
- Ecology focus requires knowledge, use repetition, starting from what people know
- Children & adults, how to engage & importance of curiosity

Insight: Children's activities can work well with adults, but they are more reserved and show less enthusiasm or curiosity.

3/10/2024, Prewalk with guides (chair and board member), Eindhoven:

- Feedback Texture activity set:Nice idea to link tree to leaves. Recognizing a tree from bark is difficult, texture capture is not accurate enough. The design would be nice for children or in a tree-focused walk, but adults are more passive and want to walk, while this requires more stationary work. Extra guide effort and money needed to prepare for activities.
- Prewalk & guiding practices observed & contextual inquiry: Exchange knowledge and stories during the prewalk. Use Obsidentify for fungi, as that is not their specialisation. Recognize trees by looking down instead of up to see leaves and seeds and feeling their needles on branches.

Insight: Potential of taking pictures as more adult-friendly quick captures & taking guide-like perspective by deducing information from what you see.

Figure 17: IVN guided tour data.

IVN Veldhoven-Eindhoven-Vessem

6/10/2024, IVN VEV guided tour (figure 17), Eindhoven:

- Observation & contextual inquiry (analysis in Appendix O):
- Background & reason for participation
- Sharing about this experience with personal network
- Interactions between participants and ecosystem:
- Taking pictures & identification, collecting seeds/sticks/leaves, coming closer for inspection
- Interaction between guide & participants:
- Information through anecdotes, tricks, pointing at examples and challenges/questions
- Conversations about aging participant group in these activities and disconnection of youth from nature.

Insight: Potential in engaging through taking pictures & noticing details. Need for engaging my generation.

Figures 18 & 19: How harvesting tomatoes marks hands and harvesting beans cleans them.

Phood Farm

19/9/2024, Gardening, Eindhoven:

Autoethnography:

- Dirty hands from harvesting tomatoes got clean from harvesting beans which had dew on them. (figures 18 & 19)
- The way you look at plants when harvesting and weeding is similar: Every time you think you have everything, you see something new.
- While working with a specific focus in your gaze, you also notice a lot of insects. (figure 20)

Insight: A lot of noticing can happen while working.

5/10/2024, Gardening, Eindhoven (figure 21):

Autoethnography:

- Hypocrisy? Not harvesting plant parts with insects to not disturb them too much, but puncturing the tunnels made by a vole to discourage it from eating the plants.

Contextual inquiry with community farmers:

- Participation for social aspect and relaxing
- Wanting to learn more about permaculture
- Sharing experiences & bringing friends to PF

Insight: Social aspect is important and can be a way for immediately sharing non-human appreciation beyond PF.

Figure 20: Ladybug

Figure 21: sowing on a prepared bed.

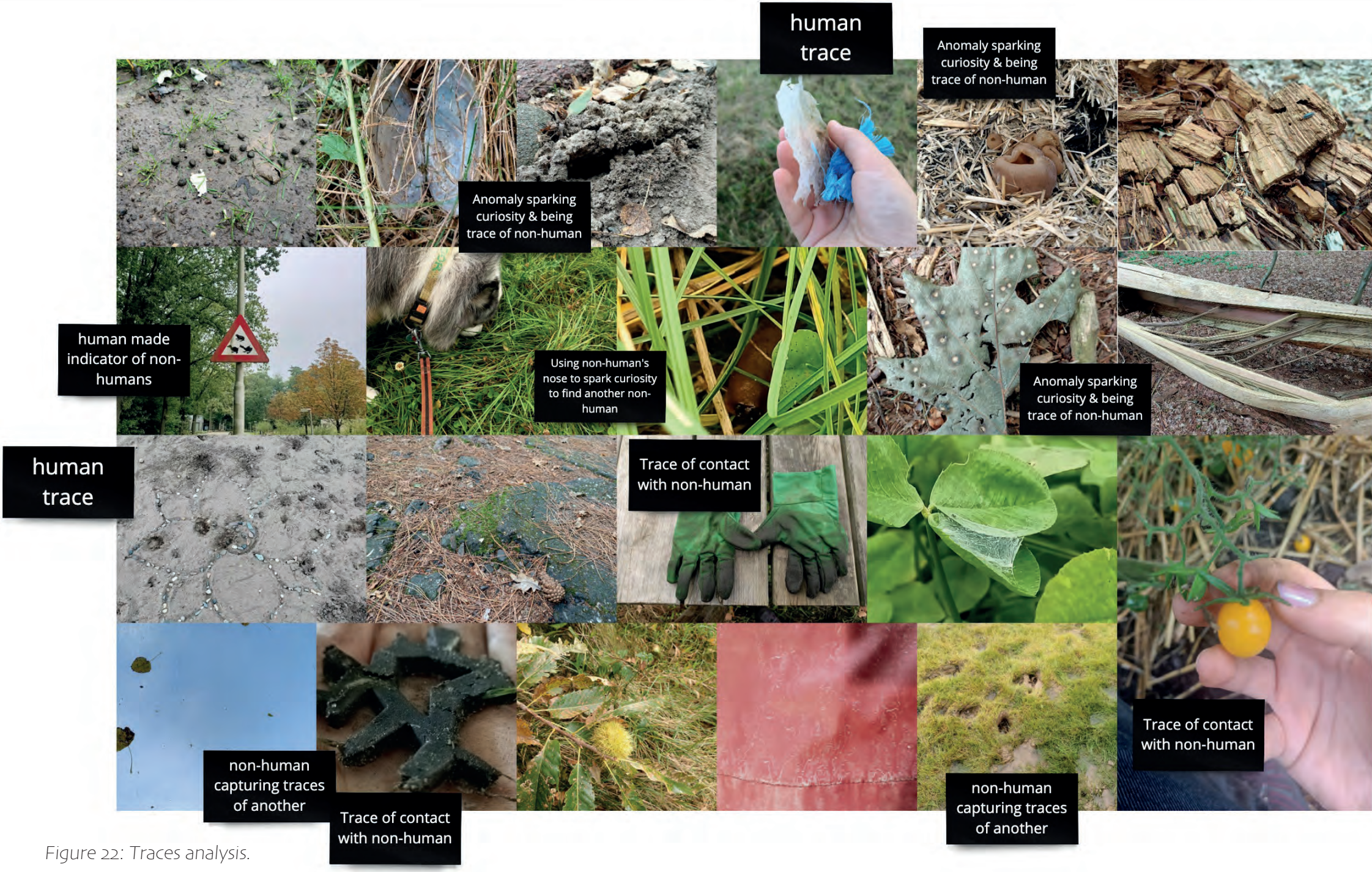


Figure 22: Traces analysis.

Iteration 2: Traces, Maps & Detective

From textures to traces

Based on the first iteration's insights, the meaning behind textures becomes important. Who made them? The textures become non-human traces. I made an inspirational walk, using Obsidentify and taking pictures to deepen my understanding of these methods [52]. Combining the taken pictures of traces in a collage [72], I analysed the types of traces (figure 22) and considered important affordances in my design (Appendix P).

Brabants Landschap

14/10/2024, first online meeting with main contact:

- Organisation structure (Appendix Q)
- Project goal & communication tips (drop in the pond).
- Collaboration partners that work on similar goals, such as "groene verbinders".
- First iteration ideas.
- Need for reaching younger generations and current initiatives like "natuurwerkklus" to offer more flexibility for involving this busy generation. This is a national problem.
- "Young means people below retirement age"

Detective Point Of View (POV)

By discussing the collage about traces (figure 22) an idea emerged during coaching: Speculation based on pictures of traces about what could have happened or what will happen in the ecosystem. I continued this idea (Appendix R).

Insight: this perspective fits with the curiosity lens and offers opportunities to combine sensing with cognitive aspects, similarly to the methods of IVN guides.

This led to Crime Scene Investigation functioning as a story for sparking people's interest through familiarity (Appendix S). What are the important elements that can be translated to traces in an ecosystem? I created a first prototype to explore this further (figure 23).

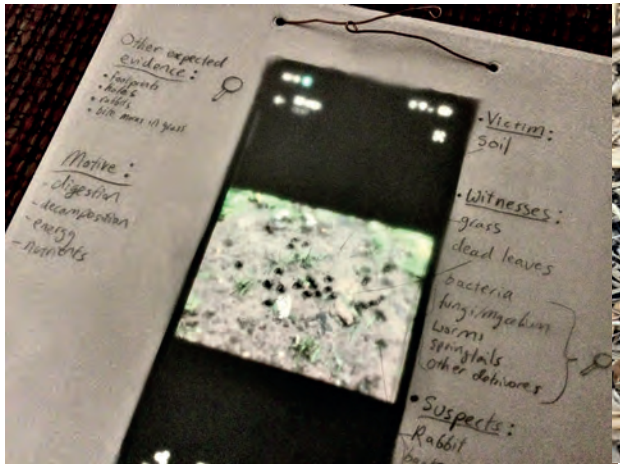


Figure 23: The speculation prototype allows for speculating around a trace by annotating the picture.

Figure 24: Cup mushroom identified with Obsidentify while weeding.

Phood Farm

17/10/2024, gardening, Eindhoven:

Autoethnography:

- Noticing non-humans (non-plants) and using Obsidentify & questions to Farm Lead to learn about them (figure 24).

Contextual inquiry:

- Permaculture practices to confuse potential "plagues", such as mixing plants based on smell and colour.
- Not disturbing the soil when weeding (only removing leaves and leaving them on the soil to keep the nutrients in the system)

Insight: A lot can be learned while working. This is also the context when more specific questions arise based on non-human encounters and gardening tasks.

Midterm Demoday

For midterm demoday (11/10/2024), I presented my project goal, collaborations, first iteration, IVN VEV methods and tools, ideas about a detective POV and project challenges. Based on a suggestion I explored lenses, finding curiosity most interesting (Appendix P). I learned about the potential of sparking curiosity through senses and challenges and the role knowledge and discovery play in satisfying the curiosity.

Phood Farm

1/11/2024, harvesting sweet potatoes, Eindhoven:

Autoethnography:

- Finding sweet potatoes by following the roots resembles walking a maze. You cannot fully predict where they go and in what place you can still find a sweet potato.
- Some sweet potatoes had parts missing (probably vole that ate it but also split through cold (figure 25)).

Contextual inquiry:

- Learning about ecosystem while working and for school tours
- Wood as sustainable material suggestion
- Room for education on more rainy days.

Insight: Found traces could be an incentive to learn about the ecosystem and permaculture principles.

Maps

I participated in the More-than-Human carddeck workshop by Bureau Moeilijke Dingen during Dutch Design Week (DDW), resulting in inspiration while noticing. **Insight: Documentation of non-humans through map annotations (figure 26) & photos and foraging some fallen leaves and seeds.**

Inspiration: American oak leaf close-up looks like a map (figure 27)

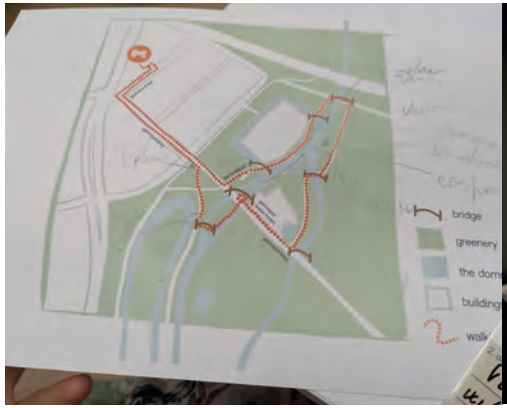


Figure 26: Annotated map

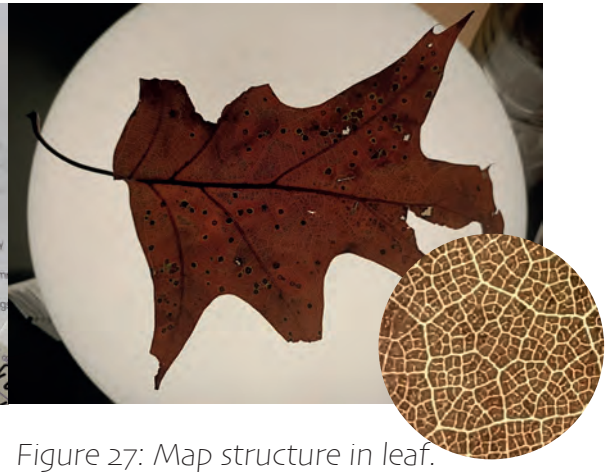


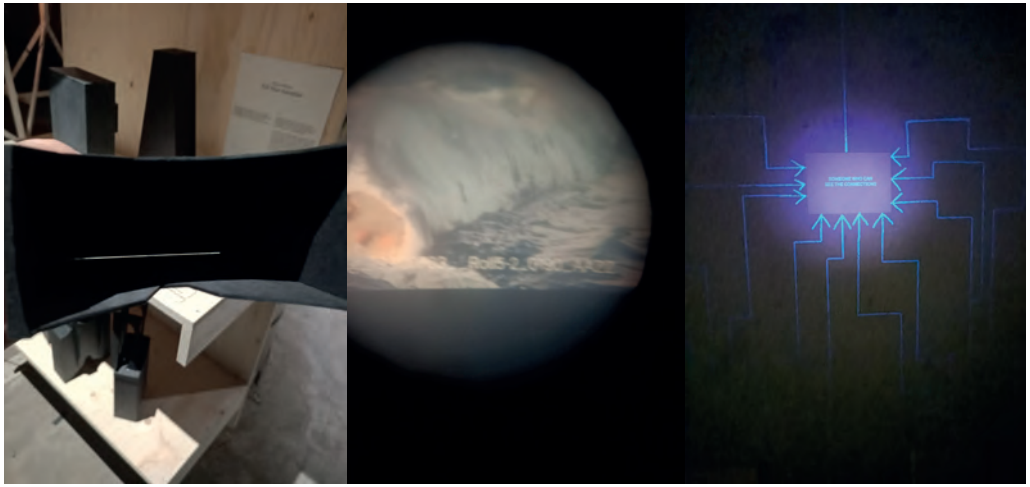
Figure 27: Map structure in leaf.

Figure 25: Traces on sweet potato found while harvesting.

Iteration 3: Guided Perspective

Perspective Guiding DDW inspiration

Limiting vision through darkness & flashlight/blacklight, through "glasses". Designs by Rients Willy Dijkstra, Anna Favaretto and Carlo Bramanti.



Enhancing perspective by using phones as sensors through signs/lenses. Designs by Louise van Brussel, Elias Hintermayr, BioArt Laboratories

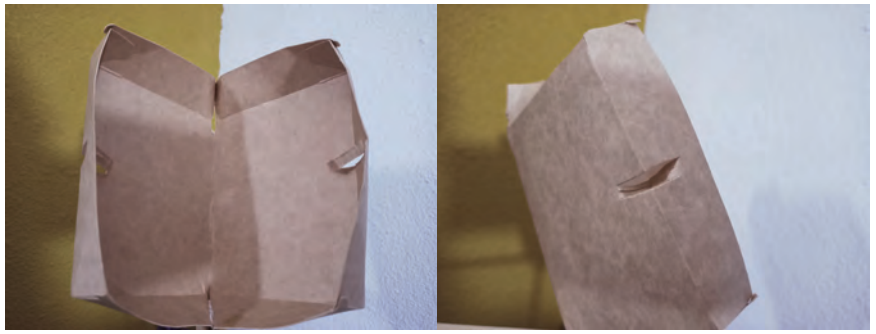
Insight: Perspective guiding could help sparking curiosity and encourage noticing.

Thriving Planet Workshop

During DDW, I hosted a workshop about Sharing Non-Human Appreciation in the 4TU Thriving Planet design talk (figure 28 on the next page). This offered insights in simplifying designs for increased accessibility, working in duos for stimulating discussion, and facilitating deep focus and consideration of non-human perspectives.

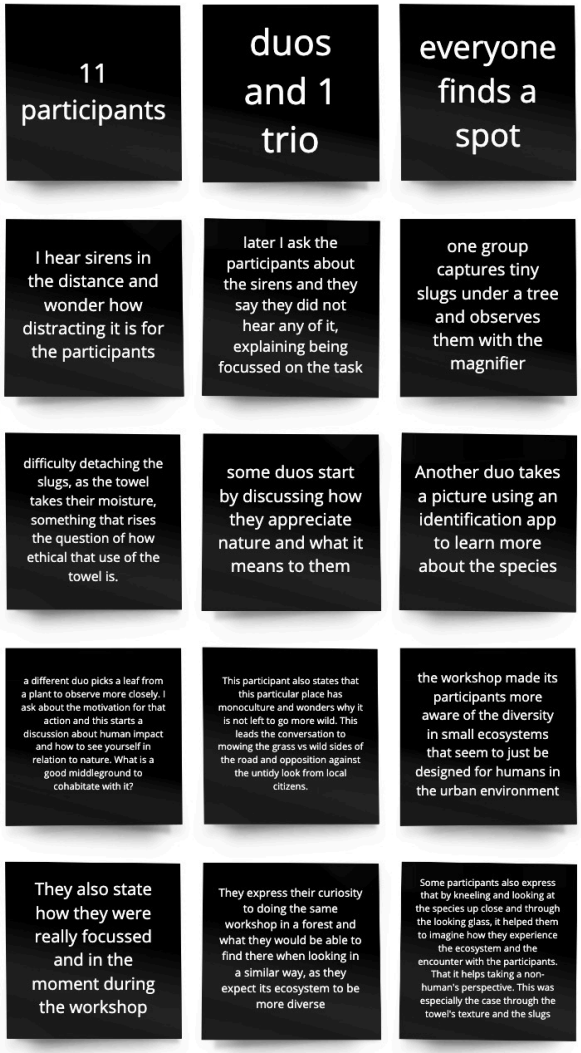
Vision Tools Experiments

Prey animals inspired side perspective:



1 direction fish eye

Insight: Potential in developing wearables for exploration but might offer too little depth and be viewed as toys for children. How is it different from using magnifiers?



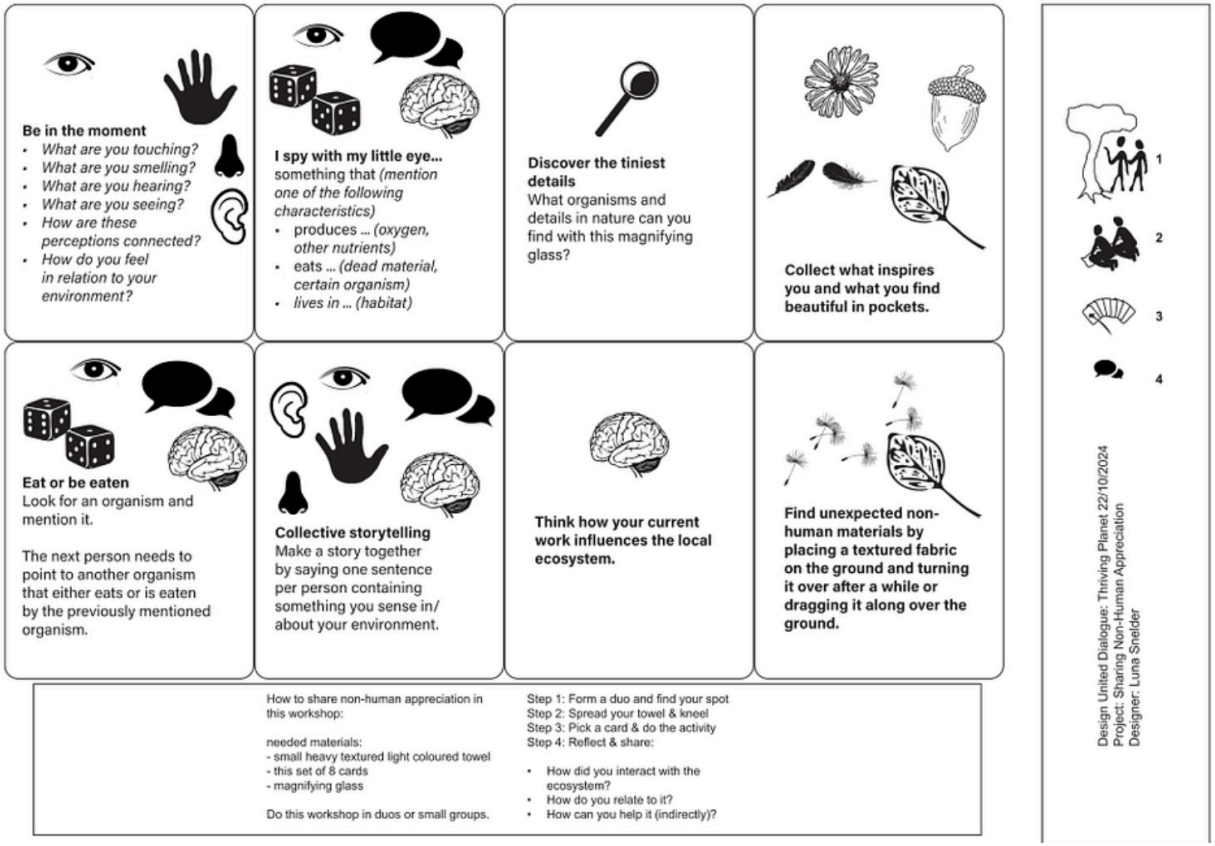


Figure 28: 4TU Thriving Planet Sharing Non-Human Appreciation workshop.

Nieuw Zwanenburg

31/10/2024, Concept presentation of iteration 2 & 3, Oirschot:

- Discussion about purpose, what ecosystem means to them & how people are disconnected from nature.
- Positive reactions to visual tool, but more to speculation prototype combined with noticing.
- Potential target audiences and how it adapts to them, policy makers being best focus for now as NZ is in starting phase.
- Planning next steps for exploring ecosystem with farmer and planning a pilot.
- Autoethnography for finding potential traces for inspiration.

Insight: The parallel between CSI and noticing in nature is helpful for involvement. NZ offers interesting testing opportunity, and their ecosystem has both human and non-human traces.

Iteration 4: Towards ESI

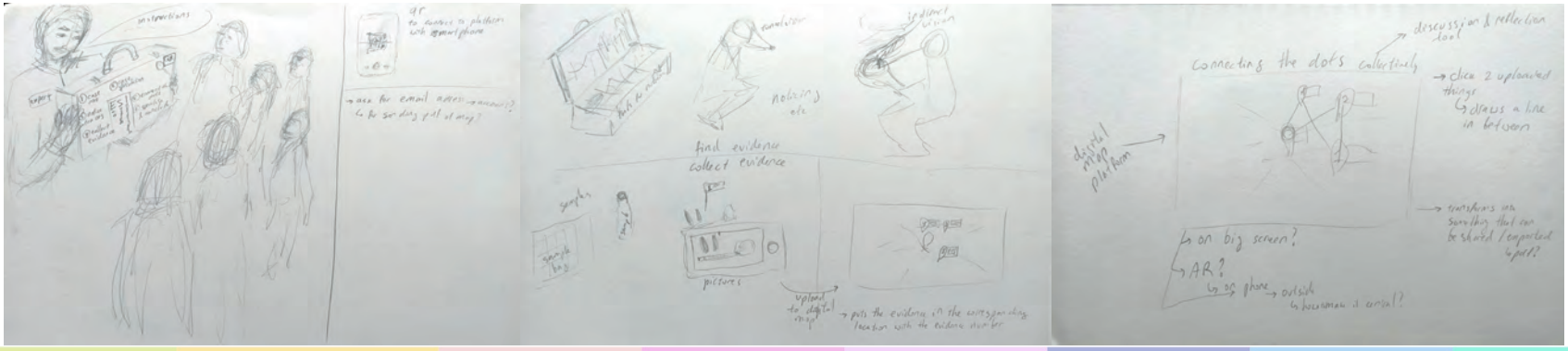
Nieuw Zwanenburg

7/11/2024, NZ farmer contextual inquiry, Oirschot:

- Discussing local farming practices & their positive and negative effects on the ecosystem.
- Discussing the properties of the fibre crops and the care it needs.
- Looking for traces between the fibre crops and discussing what it could be from.
- Discuss guided tours given by farmer and potential role of farmer as expert in my design.

Insights: Many interesting traces can be found at NZ. The farmer knows a lot about potential causes for traces. Farmers are quite busy, but could maybe take a role in the design? -> Need for checking that: Main contact suggests potentially event coordinator taking that role but remains uncertain.

The insights gained at NZ contributed to further concept development through storyboard sketches, a user journey and mindmap (Appendix T). A digital platform would appear useful.



Journey Steps Which step of the experience are you describing?	**Invitation to Nieuw Zwanenburg** How are people invited?	**Arrival at Nieuw Zwanenburg (NZ)** How are they introduced to ESI?	**Case Introduction** What are the instructions?	**Case Speculation** What are the assumptions?	**Searching Evidence** How can they notice?	**Collecting Evidence** How can they collect?	**Connecting the Dots** What can we conclude together?	**Speculation** What if they had interfered by doing X?	**Concluding and Sharing** What do they take away?
Time & Location	X weeks in advance, digital	5 - 10 minutes, at NZ (outside general area)	3 - 5 minutes, at case location (NZ)	~10 minutes, at case location (NZ)	15-30 minutes?, around case location (NZ)	10 minutes, around case location (NZ)	10 minutes?, on case location or somewhere inside with a screen (NZ)	10 minutes?, on case location or somewhere inside with a screen (NZ)	5 minutes closure, somewhere at NZ, sharing continues beyond
Actions What does the visitor do? What information do they look for? What is their context?	Read email or message with invitation to tour/event at NZ; Find information about planned event (subscribe); Check agenda and RSVP	Look at the outside of the design; Listen to information about the use of ESI; Go to case location?; Link phone to digital map?	Listen to case introduction; See the main trace of the crime; Hand the brief/evidencelist + rare over to the next person to observe closely; Stand in a circle?	Thinking along when trying to list potential suspects, victims, motives, routines, routines, traces; Mentioning potential suspects etc.; Asking questions to the farmer (expert); writing down the assumptions	Form duos and pick a tool for finding a specific trace; Use tool for noticing and search for the traces	Mark found evidence?; Take picture of found evidence & upload with location pin; Take a sample or capture some properties (size, distance, ?) when necessary/ possible!	Look at all evidence placed on map (digital?); Connect related evidence, discussing how it is related; Show and look at physical evidence to illustrate further	Speculate about potential ways to have prevented the crime; Explore & reflect on possible impacts that would have made on the revealed connections; Consider & reflect human & personal impact on ecosystem	Help cleaning up; Share with the group what their take away message is/ what this activity taught them; Share map pdf and collected evidence & insights with colleagues/
Needs and Pains What does the visitor want to achieve or avoid? *Tip: Reduce ambiguity, e.g. by using the first person narrator.*	Reason for attending (bringing value); Unclarity of what to expect regarding time and content.	Becoming intrigued/ interested; Overview of what is (to be) expected; Not understanding the plan; Uncompatible phone or low battery?	Ability to hear the information; remembering all information?; some knowledge about what they are seeing on the trace evidence; lack of concentration?	feeling invited to speculate and free to make mistakes; hints or some ecological knowledge; guidance in structural thinking.	understanding how the tool works; knowing what to look for/ how to look (examples & guidance); finding the use awkward; some assumptions don't leave traces or are not visible	knowing how to mark, upload and take samples (instruction); knowing when it is ethical to take a sample; difficulty in capturing (movement, scale)	some ecological knowledge or expert to help make connections; overview of the bigger picture (ecosystem); feeling overwhelmed by the amount of possible connections	specific scenarios?; examples of impact; tired? losing concentration	casual atmosphere to talk freely & step back into their normal self; memory token of experience; finding the right audience or setting to talk about their experience?
Touchpoint What part of the service do they interact with?	Invitation by organisation, mentioning of ESI activity (name/short explanation)	Overview of steps/ instructions; Outer casing of ESI; map on the casing?; digital platform/app ???	Case picture; map?; outer casing of ESI kit	ESI case frame + chalk/writing material	tools for visual direction for noticing; guiding prompts; instruction/ example; marking tape/something to indicate an area around the crimescene	Marker signs + writing material?; upload button on platform?; evidence collection bags & measurement tools	digital map with evidence pins that is accessible on a screen or phone screen; way to make connections/ annotate them??	some scenario cards/stickers that illustrate certain kinds of human interventions; reflection question cards?; timetravel token on map or casing to illustrate speculation/what if....	overview of placement tools in casing for cleaning up and storing the toolkit; pdf of map with evidence & collected physical evidence
Visitor Feeling What is the customer feeling? *Tip: Use the **emoji app** to express more emotions*	😀	🤫 🧭	🤫	😮	🔍 😀 🔦	📷 😀	🤔 🗺️	⏳ 🤔	🌱 🤗 🐾
Backstage									
Farmer actions	Plan time to host the tour/ESI; Check for potential traces; Pick a case	Explain about NZ farming practices; Introduce and shortly explain the steps taken in ESI; Lead group around NZ to case location; Instruct participants to connect with phone	Show case; Explain evidence; Indicate crime location; Explain own role (expert to answer questions) and role of participants (investigators)	Ask guiding questions when it remains silent; Answer audience questions; Tell audience about species that are local; Do not correct all wrong assumptions, as this will happen naturally	Handing out tools and ensuring people work together; walking around giving hints where necessary; answering questions; putting the perimeter around the crime scene	help naming species?; answer questions; gather group for final steps	ask guiding questions about connections between evidence; answer questions/ confirm suggested connections	Asking how they could have prevented the "crime"; Asking reflective questions about the human role & impact; Answering questions	Collect and store materials; listen to people's take away message
Nieuw Zwanenburg actions	Invite participants/ visitors; Plan for hosting the event/tour; Keep track of accepted invites	Welcome visitors; Give information about the planning/day?; Other presentations ?	Support farmers?	Support farmers?	Help handing out materials; keep track of time	help gathering the group; take pictures of participants as memory?	take pictures; tech support in case of using a big screen	Help answering and asking questions to provide a more interesting reflection	collect and store materials; send taken pictures to participants; send pdf of map with evidence to participants
Role of Technology	online/digital communication; digital planning/ calendar	connecting phones to the digital platform of ESI	shown case is added to digital map	search internet for information when necessary?	using phone function for visual noticing	Use identification app?? ; Use digital platform to upload taken pictures; smart phone for taking pictures	digital map on smartphone or big screen with collected evidence displayed in right spot; way to click two pieces of evidence and connect them with a line (red?)	search internet for information when necessary!	email/other digital communication; export map with evidence to high quality PDF
Design requirements to support the process & experience	Title; 1 sentence description; Something to help farmers make new cases?	Casing that allows for transporting all tools to site; Storyboard with steps to be taken; digital platform to connect to?; QR code/NFC tag for connecting phones?	Case excence introduction picture holder?; digital place for central case part; the case can be passed between people; indicator sign for the main crime trace	listing space for speculations; writing/stamping/drawing materials; examples? guiding titles/ questions	noticing explanations/ guidance; how to divide tasks and tools; how to determine size of exploration area	instructions for how to capture and collect evidence; affording collection of any different type of evidence (open-ended formula); location and picture upload to digital map	guiding questions; a way to guide what connections to discuss & how many to make	setting the scene for speculation; prompting speculation and reflection	export map with evidence to high quality PDF

Brabants Landschap

11/11/2024, online feedback meeting:

- Presenting ESI concept with first user journey and trace pictures.
- Potential of attracting a younger target group due to escape room resemblance and ESI being a separate activity.
- Potentially including ESI in tours but requiring limited time. Splitting tasks could help in shortening time.
- Importance of doing ESI without disturbing nature.
- Making the process shareable to allow for participants to repeat the activity (lo-fi) with their network.

Insight: ESI's research aspect makes it more interesting for adults. The steps are complex, so clear overview is required.

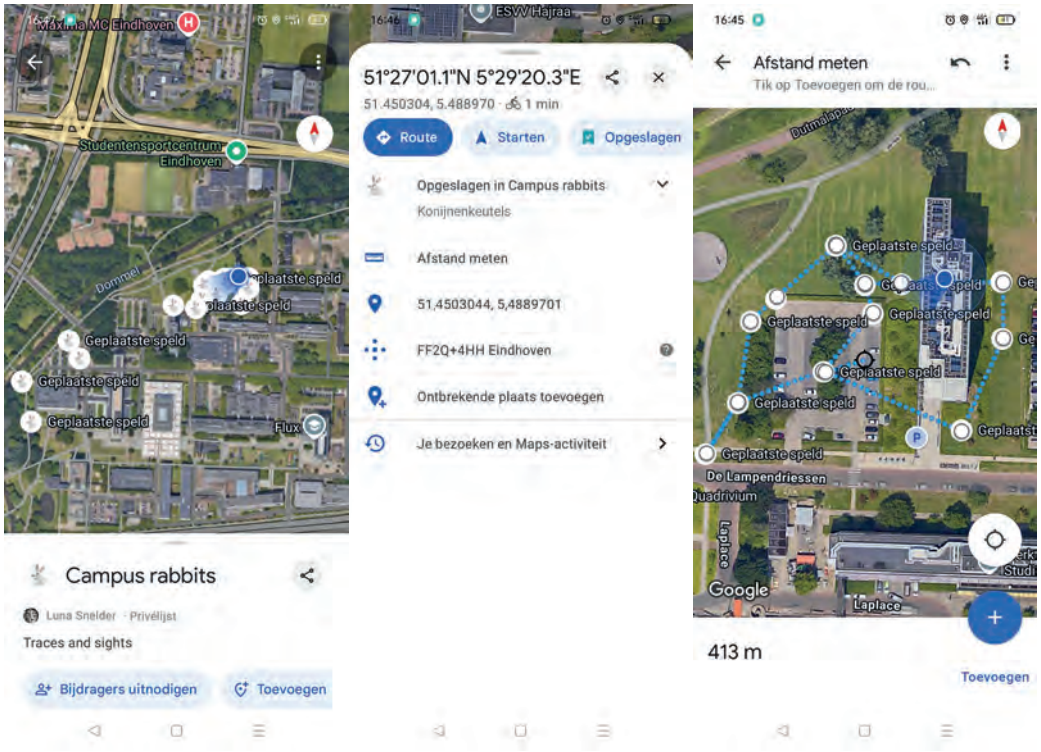


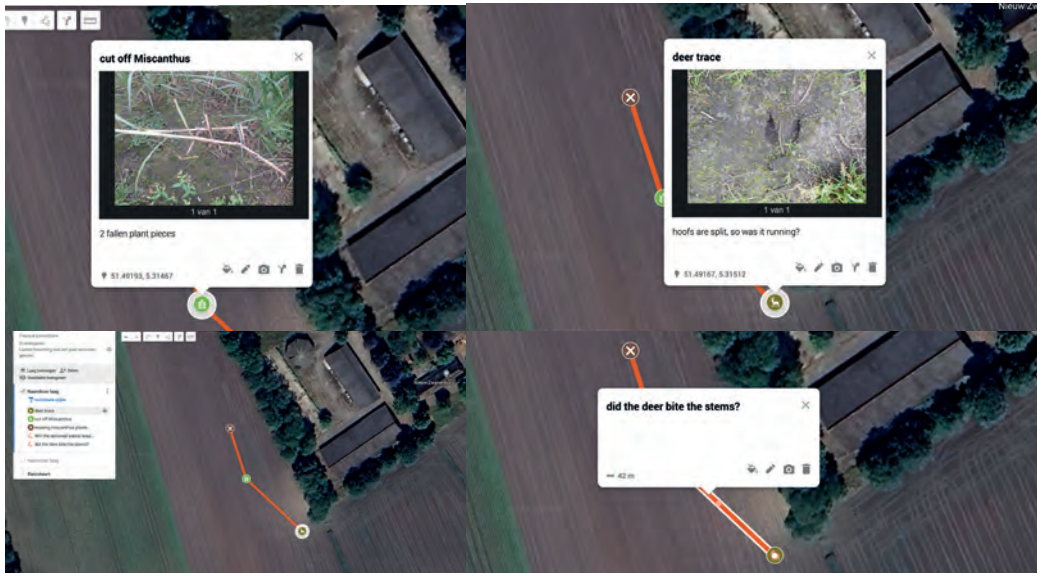
Figure 29: Personal rabbit noticing list in Google Maps.

Digital platform

A digital ESI platform offers a separate community space including a map and inviting participants. The ESI facilitator (Head Inspector) and participants upload pictures of traces with corresponding location to the map and make connection lines between them for ecosystem relations. These lines can be annotated. The map can be exported to share the experience with the participant's network. Given the natural context, accessing the platform from smartphones is most realistic, but overview could be challenging. AR/Google Streetview could be supportive. I explored Google maps list sharing (figure 29), and Google maps My maps, which offers open source more possibilities, but is private (figure 30). A paid upgrade is Google Maps Platform (used by e.g. iNaturalist).

Since a functioning prototype is needed for actual implementation, a digital platform does not seem realistic according to creative technologist Wesley Hartogs. Developing a properly functioning platform and interaction around it requires more time and investment than currently available, but can be interesting for future development. An alternative is a physical version, requiring printed pictures. A thermo printer is most suitable due to affordability.

Figure 30: Opportunities for connecting and annotating pictures in My Maps.



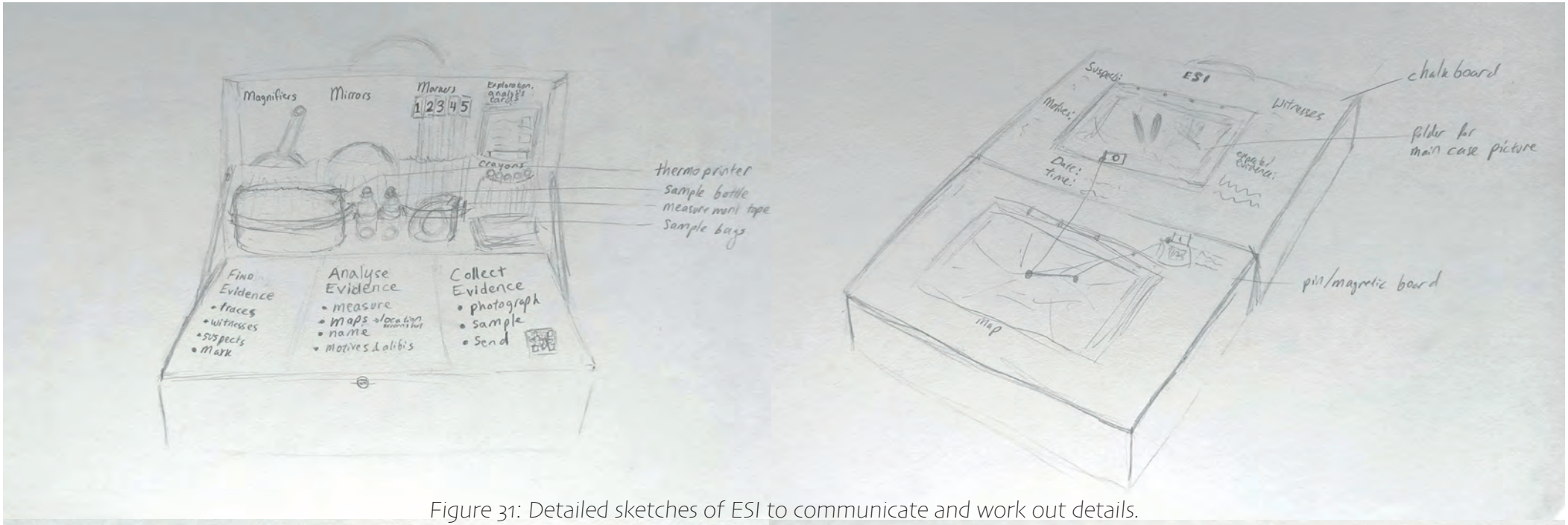
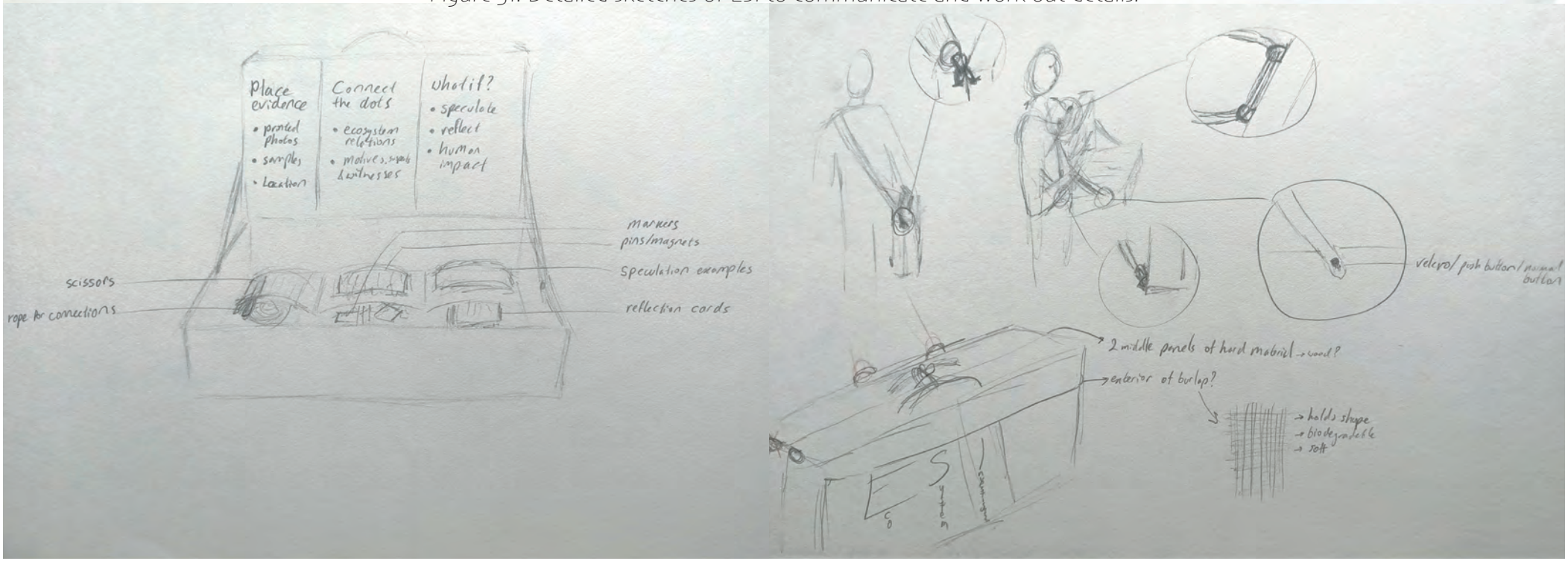


Figure 31: Detailed sketches of ESI to communicate and work out details.



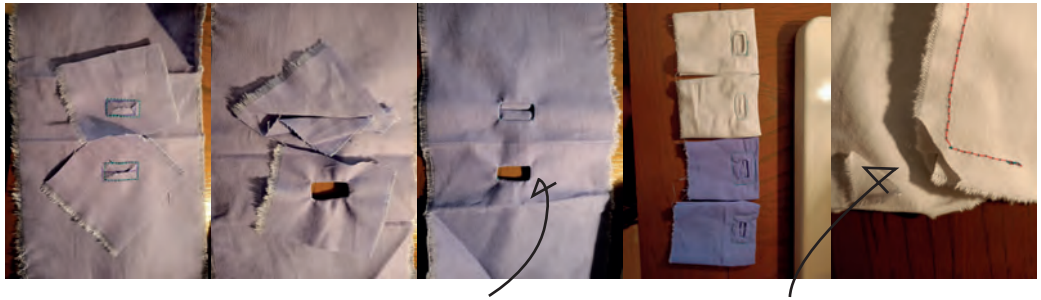
Materialising ESI

The format of a briefcase was already present, but now a pinboard/ magnetic chalkboard should be added. After quick consideration, a wooden hardcase was excluded, as it would be heavy and uncomfortable to carry on long walks. Therefore, ESI would be a bag (figure 31).

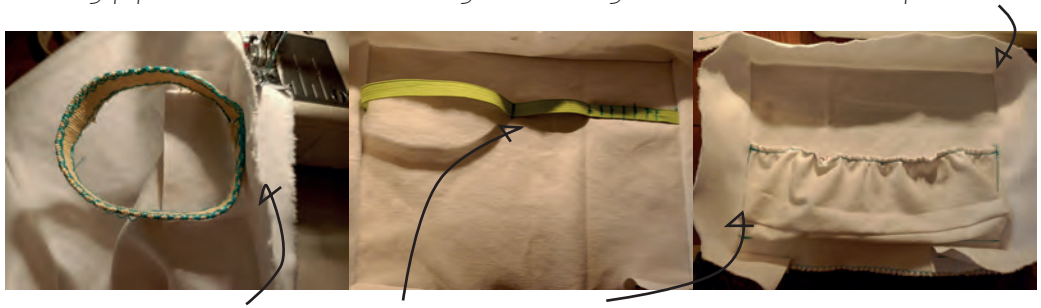
For further insight in realisation, I created a half sized cardboard version from an old box (figure 32). I made a sewing pattern in Adobe Illustrator before purchasing materials (Appendix U). Before cutting and sewing the final prototype, I made a half-sized version from old fabric to determine the right order and improve my sewing skill (figure 33). Then final version was constructed (figure 34).

Figure 32: Half scale, functional cardboard prototype for ESI.

Figure 33: Acquiring needed sewing skills while creating half scale fabric model.



Making piped button holes that align & cutting extra fabrics for sharp corners.



Attaching handles, elastic band and pockets neatly.

Neat finish and zipper attachment to lining and outer fabric at end.

How to attach boards with allowing for movement.

Figure 34: Making the briefcase.

IVN Veldhoven-Eindhoven-Vessem

19/11/2024, feedback from main contact and chair, Veldhoven:

- Presentation of concept & walk through steps by showing sketches, positive first reaction.
- Suggestions for ready-made bag content (magnifiers, search cards).
- Suggestions for instruction cards
- Discussing usability (wearing preferences, waterproof, etc).
- Potential use context in requested tours, public tours and children parties.
- Using ESI for keeping track of non-human encounters and revealing relations, rather than predefined case.
- Plan to test with guides and present during GMM in February.

Insight: ESI is modular enough that it can facilitate multiple user journeys and different ecosystems (adapt supportive exploration tools accordingly).

Phood Farm

21/11/2024, feedback from Farm Lead and community farmers, Eindhoven:

- Concept presentation with cardboard model, positive first reaction.
- Suggestion for archiving results to look back to.
- Idea to include permaculture principles in cases and how it supports learning.
- Workload is already high, so finding time is challenging. If doing this while working, how interesting will it remain when doing it a lot?
- Box is better for outside.

Insight: PF could use a sturdier version of ESI offering seamless experience while working and including permaculture education to increase learning. Food is core business.

Design: EcoSystem Investigation

ESI is a tool for actively engaging adults in exploring the ecosystem through finding traces and learning about interconnectedness and their position within the system. ESI is stimulating exchange between people prompted by the environment with the purpose of improving environmental awareness and a sense of connection to nature as pathway to a more sustainable world [55].

ESI's current form is a waterproof bag containing exploration and analysis tools (figure 35). It can be worn in hand, as cross-body, backpack and opened on chest for explanation purposes (figure 36).

Figure 35: ESI is a waterproof bag with tools for environmental exploration and analsyis of the ecosystem.

Figure 36: ESI's different carrying/wearing possibilities.

ESI is facilitated by a knowledgeable community member, taking the role as Head Inspector. They prepare a case based on a non-human trace or leave this to emerge from exploration. They instruct the group and introduce the case, also sharing their phone number (Appendix V). The group can speculate about potential non-human encounters by discussing potential suspects, witnesses and evidence. Then the main traces are shown, exploration materials (limited to encourage exchange) handed out, and participants start noticing, analysing and documenting (figure 37). The Head Inspector supports and prints the pictures. All traces are discussed, placed and connected as collective sensemaking to reveal the ecosystem. During discussion, potential theories arise about what happened in the case. The discussion continues towards human influence and can be supported with illustrations of influences.

See also demoday video.

ESI is designed for communities, guides and their public, currently focused on adults, but levels can be adjusted based on the chosen case, amount of example traces and Head Inspector support.

A fixed context (area exploration), such as NZ or PF, allows for returning to traces and preparing cases. In a dynamic context (route exploration), such as IVN VEV and BL, it could work better if the participants and guide collect traces throughout the walk and see how they connect, not requiring a predetermined case. See **appendix W** for detailed user journeys per community.

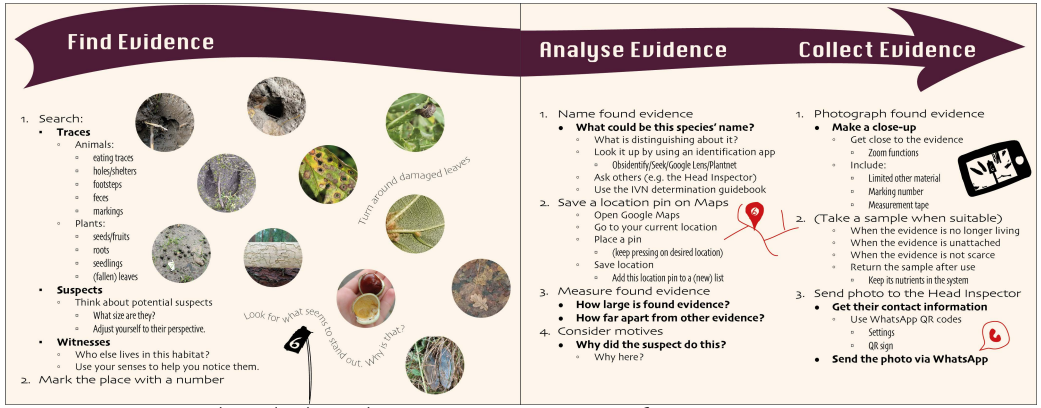


Figure 37: ESI's detailed exploration instructions for participants.

Initial Evaluation

Phood Farm

7/12/2024, Feedback from three farm leads, Eindhoven:

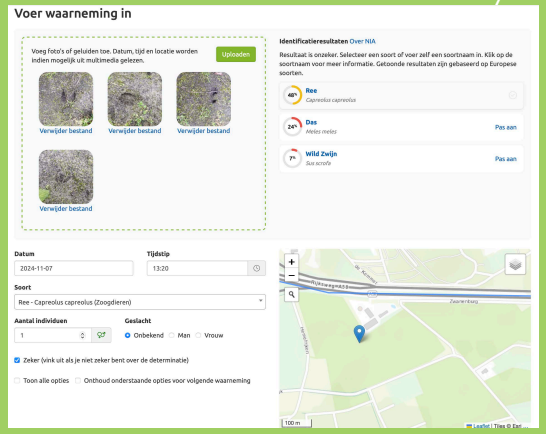
- Impressed with high-quality prototype.
- Seeing opportunities for educating about permaculture and local ecosystem during farming and tours.
- Wanting to plan a pilot to see how it works.

Insight: It is difficult to fully understand ESI without doing it.

IVN Veldhoven-Eindhoven-Vessem

17/12/2024, Feedback from main contact, Veldhoven:

- Suggestions for small improvements in instruction cards
- Testing fit and suggestion to have a closing strap for shoulder bands.
- Arranging test in february
- Potential to use Obsidentify for archive function to save observations and immediately identify them:



- Discussing further implementation, DIY ideas and scaling out to national IVN

Insight: It would be valuable to develop ESI further for IVN.

Brabants Landschap

17/12/2024, Feedback in online meeting:

- The design looks very finished
- The participants are not known upfront in public walks, which could make case tailoring difficult, possibly resulting in frustration.
- The province and big nature-related organisations exchange tools (function as depot).
- Maybe testing in spring.

Insight: ESI could fit well in a depot to be shared with multiple organisations, reducing costs for them and overproduction.

Nieuw Zwanenburg

19/12/2024, Pilot & feedback, Oirschot:

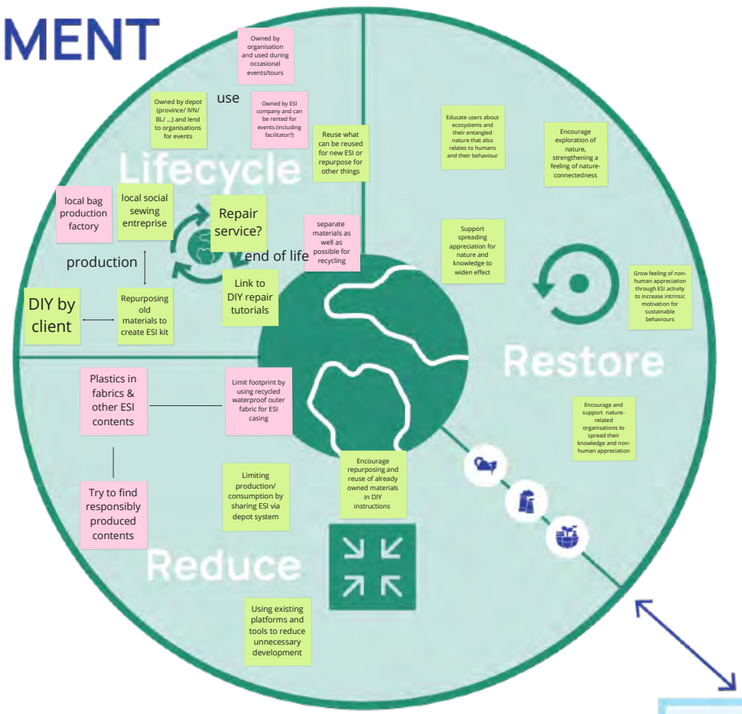
- Pilot participants: 7, with various backgrounds relevant for NZ, most were familiar with or part of NZ. I was the head inspector.
- Relatively positive reactions.
- Discussion about whether the reference to Crime Scene Investigation is helpful or maybe not that necessary to this extent. Does it distract from the actual ecosystem relations?
- Most enthusiasm in discoveries during exploration (even in rain) and the discussion and speculation about found traces sparked discussion (figurezzΩΩ).
- Criticism on how speculation moved away from factual findings to imaginative theories, but also seeing potential in sharing those personal theories.
- Next steps concerning possibly adapting ESI for NZ and exhibiting it there will be discussed 5/2/2025.

Insight: Due to my limited knowledge and experience, the depth of truthful discussion was limited. The quality of ESI depends on the qualities of the Head Inspector.

Figure 38: NZ pilot: Explaining ESI, introducing case, searching evidence in the exploration phase. Pictures by Iris Bekker and Kaj van Kernebeek.

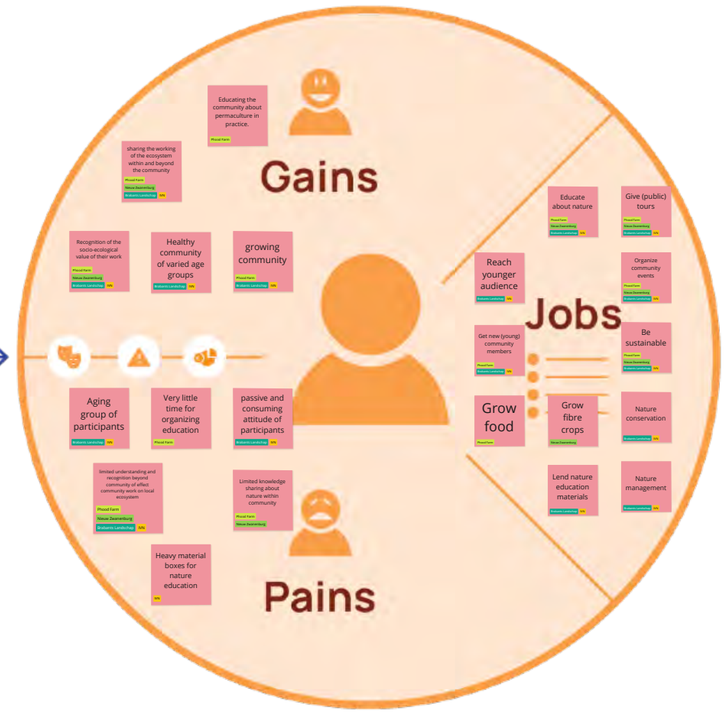
Figure 39: NZ pilot: Placing evicence, discussing theory with further detail available in original photo, result. Pictures by Iris Bekkers and Luna Snelder.

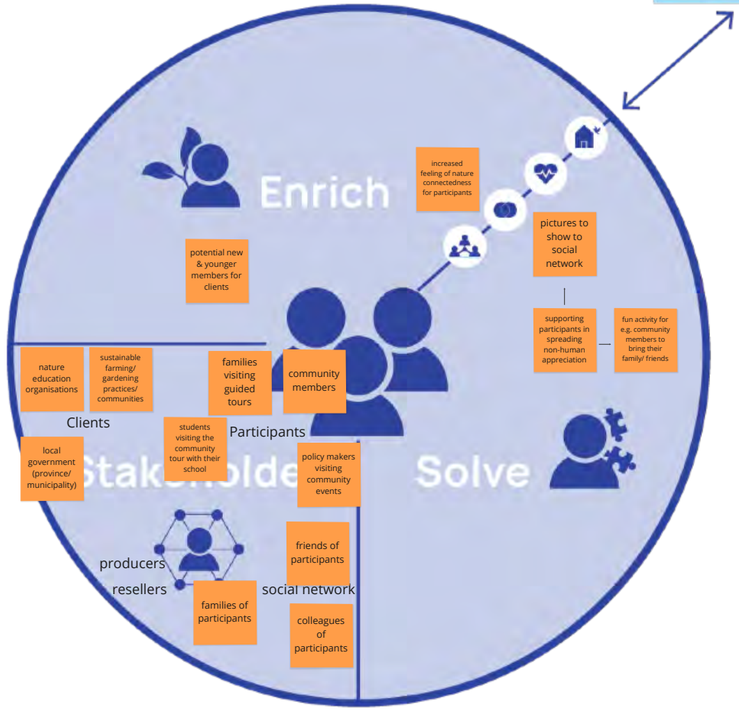
ENVIRONMENT



PROPOSITION

CUSTOMER





SOCIETY

Figure 40: Triple layered Value Proposition Canvas.

The Sustainable Business Model Canvas

Project: ESI | Owner: Luna | Version: 1

Figure 41: Sustainable business model canvas.

Positive Impact (Maximise)

intrinsic motivation for sustainable behaviours

ecosystem awareness

More subsidies for bringing people in contact with nature (helping communities and thus spreading the message)

Using existing platforms and tools to reduce unnecessary development

Limiting production/ consumption by sharing ESI via depot system

Encourage repurposing and reuse of already owned materials in DIY instructions

You can use the Sustainability Impact Canvas to generate the input for this section

Negative Impact (Minimise)

material transport

ESI modularity to enable its use in many different contexts

separate materials as well as possible for recycling

reuse and repurpose where possible

plastic, paper waste, glued materials

thermo printer paper

phone charge used when using camera/ Obsidentify/ maps

thermo printer charge

limited use when owned and used by one organisation

people disrupting nature in their ESI activities

Overasking guides of (volunteer based) organisations

You can use the Sustainability Impact Canvas to generate the input for this section

Sustainable Partners

current development partners

IVN Veldhoven Eindhoven Vessem

Nieuw Zwanenburg

Phood Farm

Brabants Landschap

digital resources

wordpress

WhatsApp

Google My Maps

Waarneming.nl Obsidentify

Potential partners

lifecycle

Local & social practices

Manufacturers

Patagonia?

sustainable outdoor brands

Vaude

Repair company/ practice

recycling company

DIY for repairs

Fixing Fashion

network and depot

Trefpunt Groen Eindhoven

Municipality Eindhoven

Province Noord-Brabant

Sustainable Value Creation

Facilitate ESI instruction workshops

Network for new clients and partners

Customize ESI for context

Encourage resource and knowledge sharing between partners and clients

Produce ESI need based

ESI Maintenance

Maintain and create for Open Source DIY platform/ community

Look for local partners in manufacturing

innovate and develop

rent ESI

Build relations with sustainable suppliers

Look for partners in recycling

Sustainable Tech & Resources

wood, metal, paper, cotton

plastics (try using recycled)

Human Labour

electricity

transport (try limit fossil fuels)

Knowledge about ecosystems

creative software

sewing machine

internet

Sustainable Value Proposition

Enabling nature-related communities to share their knowledge and non-human appreciation more interactively and with a wider reach

spreading ecosystem awareness and feeling of nature-connectedness

modular method and toolkit to fit multiple contexts, create new stories, and use existing/already community owned tools

Shared ownership of toolkit between local communities to lower costs and increase use

Sustainable Customer Relation

cocreation of personalizing ESI for context

ESI instruction workshops

Regular contact to ensure customer satisfaction

Repair support DIY/link to local service

Replace old product with new (material discount)

Responsible customers

current

potential

IVN Veldhoven Eindhoven Vessem

Nieuw Zwanenburg

(Nature-related) organizations that include nature education/tours in their tasks

IVN (national)

Natuur Monumenten

Phood Farm

Brabants Landschap

Staatsbosbeheer

regional nature conservation organisations

Local sustainable gardening and farming communities

Governmental parties

Sust. Channels

Trefpunt Groen Eindhoven

network contact between current and potential partners

spread information through ESI workshops

direct email to potential customers

LinkedIn?

Municipality Eindhoven

website

Province Noord-Brabant

End of Life

DIY repair

link to repair service

collect product (parts) for refurbished version

separate product parts for material recycling

*Can the product be **profitably recycled**, upcycled, reused, refurbished?*

Cost Structure & Additional Costs

variable costs | monthly costs | single investment

Materials

Transport

promotion material

Maintenance

Electricity

Storage

software

Machines

clients Subsidisation ESI

Revenue & Sustainability Premium

Sales | Projects | Rent ESI

ESI product

ESI DIY licence & support service

ESI cocreation context adaptation

ESI product

ESI instruction workshop

ESI product care service

Threebility

threebility.com

View the instructions for this canvas and download our free Sustainable Business Model Innovation Game

The Sustainable Business Model Canvas by Threebility is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

Business

To investigate how ESI could be realised as sustainable business, I used several tools. I used a triple layered value proposition canvas to assess how it can be useful for my collaboration partners, but also what further ecological and social value ESI can bring (figure 40) [27]. The societal implication was further considered through the social profit canvas (Appendix X) [85]. The ecological component was further assessed in an impact canvas (Appendix Y) [86]. These elements informed my sustainable business model canvas (figure 41) [86]. Producing ESI took approximately 40 hours and costed almost 250 euros (full overview in Appendix Z). This could be reduced to 190 euros, and the number of hours would decrease with more practice. Nevertheless, producing ESI myself is expensive. Maybe too expensive to sell as a complete product to communities that are not profit focused. To accommodate this, ESI could involve a combination of products and services (order is increasing in costs):

- DIY packages & open-source materials for sharing knowledge.
- Instruction to instructors workshops to learn working with ESI.
- Production & Renting (shared ownership). This could be via a depot at e.g. IVN & Brabants Landschap or the province of Noord-Brabant Nature Education Depot.
- Tailoring ESI to communities. Meeting local needs and reflecting the place, identity and shared interests can be more valuable than off-the-shelf materials when designing tools for environmental education [43].

Discussion

The chosen scope, methods and limited timespan come with limitations.

Data

Only qualitative highly contextual data was collected and everything passed through my perspective as designer. I compensated this through continuous contact with communities to validate earlier insights.

ESI is still in testing phase, limiting validity of its method. Considering the work with multiple communities, this is understandable due to the intensive work needed to adjust ESI to the different contexts (scaling out strategy) [60]. This increases the importance of ESI's modularity in method and (where possible) in prototype. The limited testing is overcome by validation throughout the participatory process [11]. The eventual ripple effect could not be tested within a semester but is supported by literature and participant's stories and my own experience.

Nature-connectedness

Connecting with nature [39, 59] can be supported by ESI-like activities. I experienced this while working on this topic (2 years). Through increased contact with nature by working with nature-related communities and learning more about it from them and through diving into literature related to noticing and designing for such activities, I am looking into much more detail when I am outside. I find little moments of joy in observing the (traces of) rabbits on campus or seeing the resilience of some bushes that are first entirely eaten by caterpillars, then filled with their cocoons and moths to later see that feeding and sheltering this species has left no permanent traces.

Currently, ESI focuses on individual disconnection constructs. For reaching a more culturally diverse audience, different causes for disconnection need to be tackled relating more to social injustices and inequalities [6].

Collaboration

The main collaboration was with people leading communities, resulting in less participants but often more experience and knowledge per participant. Involving leaders afforded discussions of implementation opportunities. It is not realistic to meet many people from multiple communities in one semester.

There was less dependency on communities' available time due to the spread. Resulting in reduced load on the communities. By limiting community work to PF, I could balance the design work needed for this project while working with four communities.

Business & postcapitalism

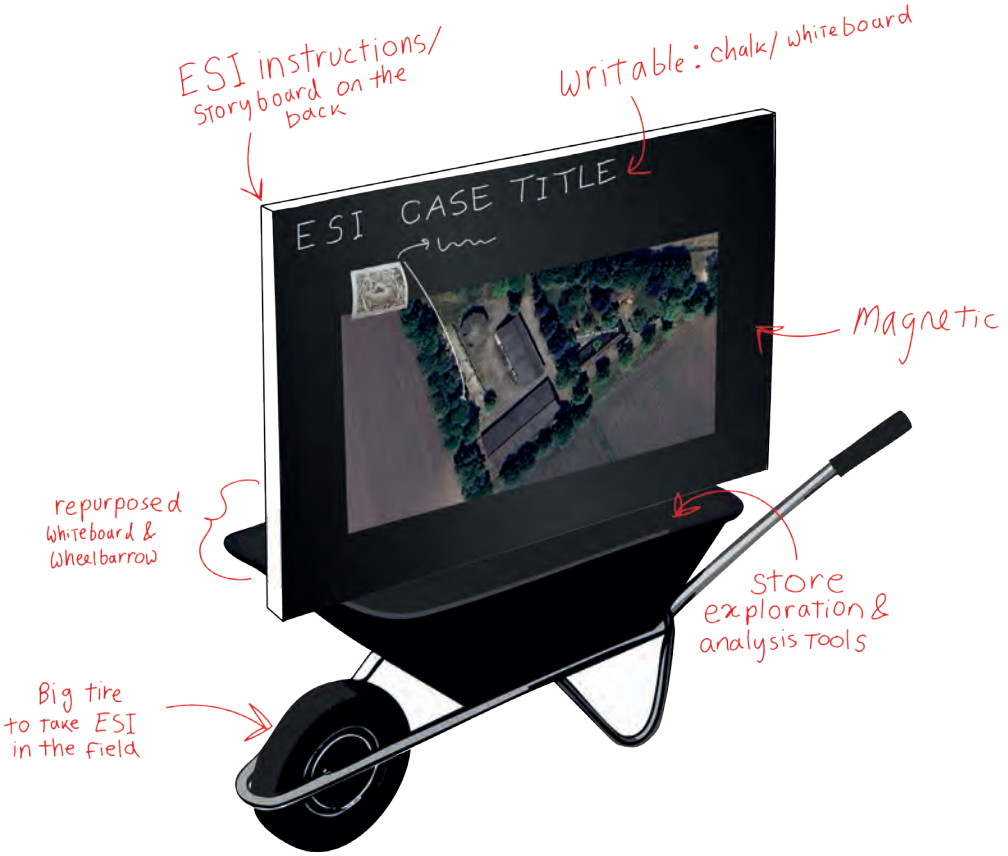
Many "sustainability" related design is operating in a capitalistic system, as it is said that business interest enables the existence and development of design and with that feeding into problems like consumerism [79]. ESI is aimed at making socio-ecological impact rather than economic growth, by investing time, effort and experience in building relations and bringing exchange beyond money, resonating with postcapitalistic ideas. I cannot operate fully as postcapitalistic business in a capitalist system, but by implementing the values I can support transition.

Future Work

I plan to continue ESI working on ESI for implementation.

An important step would be further testing. There will be a pilot at PF on 25/1/2025, and at IVN VEV on 19/2/2025. In a later stage it would be interesting to measure ESI's impact: Environmental psychologists have developed various scales that attempt measuring pro-environmental behaviours [5], and its most important nature-connectedness [33]. The Pro-nature Conservation Behaviour Scale (ProCoBS) was developed to specifically measure conservation behaviours (a more specific version of pro-environmental behaviour that concerns e.g. biodiversity) [5]. This scale is a self-report measure, designed for quick evaluation of an intervention's effectiveness. It can be used with low costs and its short version can easily be used by conservation organisations. These properties make the ProCoBS a good candidate for further assessing ESI's effect within nature-related communities.

In upcoming iterations, I will adjust ESI based on small suggestions. I aim to improve the speculation about human impact, which requires more testing and redesign to become a smooth logical step. Furthermore, there are community specific requests. Phood Farm would like to implement permaculture principles. Nieuw Zwanenburg could use a bigger board, resulting in the suggestion to change the format. I imagine the following:



To work on the realisation of ESI as social entrepreneur, I plan to iterate on ESI for a simplified DIY version and making aspects open source to reach a broader audience. I aim to do further market research and contact more nature-related organizations such as national IVN, Natuurmonumenten, Staatsbosbeheer, permaculture practices, etc. To realise ESI, I need to further investigate production possibilities and how to keep that effective and sustainable in materials and processes. To support my process, I will consult startup experts.

Conclusion

In a world where we are disconnected from nature, we no longer take care or responsibility for the climate. EcoSystem Investigation emerged from collaboration. It is a tool for empowering nature-related communities in sharing their non-human appreciation to raise nature-connectedness, to foster an intrinsic motivation for sustainability, towards planetary well-being. With this report I hope to explain the development of ESI to my collaboration partners and examiners. I hope to inspire more designers to work on similar missions, as transformation requires collaborative effort.

Human Appreciation

Special thanks to:

My contacts at IVN Veldhoven-Eindhoven-Vessem, Nieuw Zwanenburg, Phood Farm and Brabants Landschap, for the opportunity to learn and placing this project in a context. It would be meaningless without you!

Daisy, thank you for your continuous encouragement, ideas and pinpointing the value in the small nuances!

Lenneke, thank you for your helpful suggestions and critical perspectives to support further improvement.

My friends & family.

Term Explanation

1 With non-humans I refer to natural phenomena (from weather to animals, also known as "nature"). Nature definition: "the biophysical environment as it exists without human beings" [84], which in itself is problematic as it continues to disconnect humans from "nature".

2 Non-human appreciation is not a term in academic literature, but nature appreciation is. The philosophical field of environmental aesthetics concerns how humans appreciate nature and what qualities are important [20]. The cognitive model by Carlson states that knowledge from scientific disciplines and experience through local stories and traditions are needed to appropriately appreciate nature [12]. Berleant proposes a more participatory manner of appreciation, the non-cognitive model, where direct engagement through senses is valued [8]. These two models both inspire non-human appreciation. From the more-than-human design field, the definition of noticing by Rosen is most related [63]: "Noticing is to become purposefully aware of with all available senses, and to treat the object of awareness as worthy of recognition. It is further a politically sensitive skill that recognises the interconnectedness of ecological, economical, and cultural systems – and how these systems function from more-than-human perspectives."

3 With sustainability I aim eventually for a balanced and durable relation between people, humans and non-humans. Through sharing non-human appreciation this can go from supporting biodiversity to efforts for decreasing carbon footprint and climate activism. I imagine a ripple effect. Sharing non-human appreciation can be the first drop creating a wave of actions towards a sustainable planet.

4 Experienced non-human appreciators: People who regularly engage in caring for nature activities, through which they develop non-human appreciation. They can learn from other non-human appreciators and teach less experienced non-human appreciators (people who are more disconnected from nature, potentially already spending recreational or commuting time in natural environments).

References

1. Akama, Y. et al. 2020. Expanding Participation to Design with More-Than-Human Concerns. Proceedings of the 16th Participatory Design Conference 2020 - Participation(s) Otherwise - Volume 1 (New York, NY, USA, Jun. 2020), 1–11.
2. Alcock, I. et al. 2020. Associations between pro-environmental behaviour and neighbourhood nature, nature visit frequency and nature appreciation: Evidence from a nationally representative survey in England. Environment International. 136, (Mar. 2020), 105441. DOI:https://doi.org/10.1016/J.ENVINT.2019.105441.
3. Anggarendra, R. and Brereton, M. 2016. Engaging children with nature through environmental HCI. Proceedings of the 28th Australian Conference on Computer-Human Interaction - OzCHI '16 (New York, New York, USA, 2016), 310–315.
4. Bakker, M. 2024. Natuurbescherming moet radicaal anders, stelt nieuw VN-rapport. 'Het is net als met slavernij: een beetje minder kan niet' | de Volkskrant.
5. Barbett, L. et al. 2020. Measuring actions for nature-development and validation of a pro-nature conservation behaviour scale. Sustainability (Switzerland). 12, 12 (Jun. 2020). DOI:https://doi.org/10.3390/SU12124885.
6. Beery, T. et al. 2023. Disconnection from nature: Expanding our understanding of human–nature relations. Wiley Online Library. 5, 2 (Apr. 2023), 470–488. DOI:https://doi.org/10.1002/pan3.10451.
7. Beery, T.H. and Lekies, K.S. 2021. Nature's Services and Contributions: The Relational Value of Childhood Nature Experience and the Importance of Reciprocity. Frontiers in Ecology and Evolution. 9, (May 2021). DOI:https://doi.org/10.3389/FEVO.2021.636944.
8. Berleant, A. 2018. Aesthetics and environment: Variations on a theme. Aesthetics and Environment: Variations on a Theme. (Jan. 2018), 1–179. DOI:https://doi.org/10.4324/9781351163361.
9. Bidwell, N.J. and Browning, D. 2006. Making there. Proceedings of the 20th conference of the computer-human interaction special interest group (CHISIG) of Australia on Computer-human interaction: design: activities, artefacts and environments - OZCHI '06 (New York, New York, USA, 2006), 229.
10. Børresen, S.T. et al. 2023. The role of education in biodiversity conservation: Can knowledge and understanding alter locals' views and attitudes towards ecosystem services? Environmental Education Research. 29, 1 (2023), 148–163. DOI:https://doi.org/10.1080/13504622.2022.2117796.
11. Bratteteig, T. and Wagner, I. 2016. Unpacking the Notion of Participation in Participatory Design. Computer Supported Cooperative Work: CSCW: An International Journal. 25, 6 (Dec. 2016), 425–475. DOI:https://doi.org/10.1007/s10606-016-9259-4.
12. Carlson, A. 2011. Aesthetic Appreciation of Nature and Environmentalism. Royal Institute of Philosophy Supplement. 69, (Oct. 2011), 137–155. DOI:https://doi.org/10.1017/s1358246111000257.
13. Chan, K.M.A. et al. 2020. Levers and leverage points for pathways to sustainability. People and Nature. 2, 3 (Sep. 2020), 693–717. DOI:https://doi.org/10.1002/pan3.10124
14. Clarke, R. et al. 2018. More-than-human urban futures: Speculative participatory design to avoid ecocidal smart cities. ACM International Conference Proceeding Series. 2, (Sep. 2018). DOI:https://doi.org/10.1145/3210604.3210641.
15. De Natuurdetective voor educatie, evenementen en exposities: https://www.natuurdetective.nl/. Accessed: 2025-01-09.
16. Dema, T. et al. 2020. Designing in the Network of Relations for Species Conservation: The Playful Tingtibi Community Birdhouse. Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (New York, NY, USA, Apr. 2020), 1–14.
17. Download Merlin Bird ID for iOS and Android – Merlin Bird ID –Free, instant bird identification help and guide for thousands of birds: https://merlin.allaboutbirds.org/download/. Accessed: 2025-01-09.

18. Een gemeenschap voor naturalisten · iNaturalist: https://www.inaturalist.org/. Accessed: 2025-01-09.
19. Emmett, R.S. and Nye, D.E. 2017. The Environmental Humanities. The Environmental Humanities. (Oct. 2017). DOI:https://doi.org/10.7551/MITPRESS/10629.001.0001.
20. Environmental Aesthetics (Stanford Encyclopedia of Philosophy): https://plato.stanford.edu/ENTRIES/environmental-aesthetics/#ConVie. Accessed: 2024-12-29.
21. Flow Learning: https://www.sharingnature.com/flow-learning.html. Accessed: 2025-01-09.
22. Forlano, L. 2017. Posthumanism and Design. She Ji: The Journal of Design, Economics, and Innovation. 3, 1 (Mar. 2017), 16–29. DOI:https://doi.org/10.1016/J.SHEJI.2017.08.001.
23. Gaver, W. et al. 2019. My Naturewatch Camera. Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (New York, NY, USA, May 2019), 1–13.
24. Geerts, L. 2024. Streep door natuurbeleid vorige kabinet, huidige stikstofaanpak provincies van tafel.
25. Gooley, T. 2015. The Lost Art of Reading Nature's Signs. The Experiment.
26. Heitlinger, S. and Houston, L. 2021. Algorithmic food justice: Co-designing more-than-human blockchain futures for the food commons. Conference on Human Factors in Computing Systems - Proceedings. (May 2021). DOI:https://doi.org/10.1145/3411764.3445655.
27. Hogenhuis, B. and Van Der Boog, P. 2024. Integrating societal and ecological impact in innovation from day 0 Here's the Triple layered Value Proposition Canvas.
28. Home | iSpot: https://www.ispotnature.org/. Accessed: 2025-01-09.
29. Home - Phood Farm: https://phoodfarm.org/. Accessed: 2025-01-09.
30. Home - Pl@ntNet: https://plantnet.org/en/. Accessed: 2025-01-09.
31. Home - Veldhoven Eindhoven Vessem: https://www.ivn.nl/afdeling/veldhoven-eindhoven-vessem/. Accessed: 2025-01-09.
32. Home » Brabantslandschap.nl: https://www.brabantslandschap.nl/. Accessed: 2025-01-09.
33. Hughes, J. et al. 2018. Evaluating connection to nature and the relationship with conservation behaviour in children. Journal for Nature Conservation. 45, (Sep. 2018), 11–19. DOI:https://doi.org/10.1016/J.JNC.2018.07.004.
34. Johnson, C. 2021. Growing Roots: Rewilding, Transformative Learning, And Ecological Consciousness In Nature Connection.
35. Kaiser, F.G. et al. 2014. Appreciation of nature and appreciation of environmental protection: How stable are these attitudes and which comes first? European Review of Applied Psychology. 64, 6 (Nov. 2014), 269–277. DOI:https://doi.org/10.1016/J.ERAP.2014.09.001.
36. Kawas, S. et al. 2020. "Otter this world." Proceedings of the Interaction Design and Children Conference (New York, NY, USA, Jun. 2020), 444–457.
37. Lengieza, M.L. 2024. Eudaimonic self-expansion: The effects of eudaimonic reflections on nature connectedness. Journal of Environmental Psychology. 94, (Mar. 2024). DOI:https://doi.org/10.1016/j.jenvp.2024.102231.
38. Lumber, R. et al. 2017. Beyond knowing nature: Contact, emotion, compassion, meaning, and beauty are pathways to nature connection. PLOS ONE. 12, 5 (May 2017), e0177186. DOI:https://doi.org/10.1371/JOURNAL.PONE.0177186.
39. Mackay, C.M.L. and Schmitt, M.T. 2019. Do people who feel connected to nature do more to protect it? A meta-analysis. Journal of Environmental Psychology. 65, (Oct. 2019). DOI:https://doi.org/10.1016/J.JENVP.2019.101323.
40. Maddali, H.T. and Lazar, A. 2020. Sociality and Skill Sharing in the Garden. Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (New York, NY, USA, Apr. 2020), 1–13.
41. Manley, K.E. et al. 2024. Gratitude for Nature: Abundant Appreciation and Rare Reciprocity in Free Response Reflections. Ecopsychology. 16, 4 (Dec. 2024), 359–369. DOI:https://doi.org/10.1089/eco.2022.0022.

42. Manzini, E. and M'Rithaa, M.K. 2016. Distributed Systems And Cosmopolitan Localism: An Emerging Design Scenario For Resilient Societies. Sustainable Development (Sep. 2016), 275–280.
43. Matos, S. et al. 2022. Cultural probes for environmental education: Designing learning materials to engage children and teenagers with local biodiversity. PLoS ONE. 17, 2 February (Feb. 2022). DOI:https://doi.org/10.1371/journal.pone.0262853.
44. Monticelli, L. 2021. On the necessity of prefigurative politics. Thesis Eleven. 167, 1 (Dec. 2021), 99–118. DOI:https://doi.org/10.1177/07255136211056992/ASSET/IMAGES/LARGE/10.1177_07255136211056992-FIG1.JPEG.
45. Nature detective | Activities | Scouts: https://www.scouts.org.uk/activities/nature-detective/. Accessed: 2025-01-09.
46. Nature Detectives | Center Parcs: https://www.centerparcs.ie/discover-center-parcs/things-to-do/activities/nature-detectives.html. Accessed: 2025-01-09.
47. Nature Detectives - Activities and Resources - Woodland Trust: https://www.woodlandtrust.org.uk/blog/2020/03/nature-detectives/. Accessed: 2025-01-09.
48. Nature Detectives Discover Clues to Mysteries of Outdoor World: https://naturedetectivesusa.com/. Accessed: 2025-01-09.
49. Nature Mentoring: https://nature-mentor.com/. Accessed: 2025-01-09.
50. Nazir, J. and Pedretti, E. 2016. Educators' perceptions of bringing students to environmental consciousness through engaging outdoor experiences. Environmental Education Research. 22, 2 (Feb. 2016), 288–304. DOI:https://doi.org/10.1080/13504622.2014.996208.
51. Nieuw Zwanenburg: https://www.nieuwzwanenburg.nl/. Accessed: 2025-01-09.
52. ObsIdentify - Apps - Waarneming.nl: https://waarneming.nl/apps/obsidentify/. Accessed: 2025-01-09.
53. Olsson, P. et al. 2017. The concept of the Anthropocene as a game-changer: A new context for social innovation and transformations to sustainability. Ecology and Society. 22, 2 (Jun. 2017). DOI:https://doi.org/10.5751/ES-09310-220231.
54. Omann, I. et al. 2020. Assessing opportunities for scaling out, up and deep of win-win solutions for a sustainable world. Climatic Change. 160, 4 (Jun. 2020), 753–767. DOI:https://doi.org/10.1007/s10584-019-02503-9.
55. Pitt, H. 2017. Questioning care cultivated through connecting with more-than-human communities. Social and Cultural Geography. 19, 2 (2017), 253–274.
56. Preece, J. 2016. Citizen Science: New Research Challenges for Human–Computer Interaction. International Journal of Human-Computer Interaction. 32, 8 (Aug. 2016), 585–612. DOI:https://doi.org/10.1080/10447318.2016.1194153.
57. Pritchard, A. et al. 2020. The Relationship Between Nature Connectedness and Eudaimonic Well-Being: A Meta-analysis. Journal of Happiness Studies. 21, 3 (Mar. 2020), 1145–1167. DOI:https://doi.org/10.1007/S10902-019-00118-6.
58. Reddy, A. et al. 2021. Encountering ethics through design: a workshop with nonhuman participants. AI and Society. 36, 3 (Sep. 2021), 853–861. DOI:https://doi.org/10.1007/S00146-020-01088-7/FIGURES/4.
59. Richardson, M. et al. 2021. Moments, not minutes: The nature-wellbeing relationship. International Journal of Wellbeing. 11, 1 (2021), 8–33. DOI:https://doi.org/10.5502/IJW.V11I1.1267.
60. Riddell, D. and Moore, M.-L. 2015. Scaling Out, Scaling Up, Scaling Deep: Advancing Systemic Social Innovation and the Learning Processes to Support it Scaling Out, Scaling Up, and Scaling Deep
61. Rodgers, S. et al. 2022. Phenology Probes: Exploring Human-Nature Relations for Designing Sustainable Futures. ACM International Conference Proceeding Series. (Nov. 2022), 216–228. DOI:https://doi.org/10.1145/3572921.3572936.
62. Romani, A. et al. 2022. Codesign with more-than-humans: toward a meta co-design tool for human-non-human collaborations. European Journal of Futures Research. 10, 1 (Dec. 2022). DOI:https://doi.org/10.1186/s40309-022-00205-7.
63. Rosén, A.P. 2022. NOTICING NATURE: Exploring More Than Human-Centred Design in Urban Farming.

64. Rosén, A.P. 2022. Relating to Soil: Chromatography as a Tool for Environmental Engagement. DIS 2022 - Proceedings of the 2022 ACM Designing Interactive Systems Conference: Digital Wellbeing. (Jun. 2022), 1640–1653. DOI:https://doi.org/10.1145/3532106.3533503.
65. Roundy, P.T. and Lyons, T.S. 2022. Humility in social entrepreneurs and its implications for social impact entrepreneurial ecosystems. Journal of Business Venturing Insights. 17, (Jun. 2022), e00296. DOI:https://doi.org/10.1016/J.JBVI.2021.E00296.
66. Rousseau, S. and Deschacht, N. 2020. Public Awareness of Nature and the Environment During the COVID-19 Crisis. Environmental and Resource Economics. 76, 4 (Aug. 2020), 1149–1159. DOI:https://doi.org/10.1007/S10640-020-00445-W/TABLES/3.
67. Ryokai, K. et al. 2011. GreenHat. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (New York, NY, USA, May 2011), 2149–2152.
68. Schuttenhelm, R. 2024. Nederland kampioen biodiversiteitsverlies, "de natuur staat er dramatisch voor."
69. Sverdrup-Thygeson, A. 2021. Op de schouders van de natuur. De Bezige Bij.
70. Sverdrup-Thygeson, A. 2018. Terra Insecta . De Bezige Bij.
71. Tomico, O. et al. 2023. Living-with and Designing-with Plants. Interactions. 30, 1 (Jan. 2023), 30–34. DOI:https://doi.org/10.1145/3571589.
72. Tomico, O. et al. 2024. Seeding a Repository of Methods-To-Be for Nature-Entangled Design Research. Proceedings of the 2024 ACM Designing Interactive Systems Conference, DIS 2024. (Jul. 2024), 1101–1115. DOI:https://doi.org/10.1145/3643834.3660745.
73. Varanasi, U. 2020. Focusing Attention on Reciprocity between Nature and Humans Can Be the Key to Reinvigorating Planetary Health. Ecopsychology. 12, 3 (Sep. 2020), 188–194. DOI:https://doi.org/10.1089/eco.2020.0011.
74. Vella, K. et al. 2021. Human-Nature Relations in Urban Gardens: Explorations with Camera Traps. Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (New York, NY, USA, May 2021), 1–13.
75. Veselova, E. and Fi, E.V. 2019. Design for Sustainable Entangled Human-Nature Systems. Nordic Design Research Society (NORDES).
76. Vogels, J.J. et al. 2024. Nitrogen deposition and heathland management cause multi-element stoichiometric mismatches, reducing insect fitness. Functional Ecology. (Dec. 2024). DOI:https://doi.org/10.1111/1365-2435.14671.
77. Webber, S. et al. 2023. Engaging with Nature through Technology: A Scoping Review of HCI Research. Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (New York, NY, USA, Apr. 2023), 1–18.
78. Weber, A. et al. 2020. SHARING LIFE The Ecopolitics of Reciprocity Alternative Worldviews. Heinrich Böll Stiftung.
79. Wizinsky, M. 2022. Design after capitalism: transforming design today for an equitable tomorrow. The MIT Press.
80. Wolsko, C. and Lindberg, K. 2013. Experiencing Connection With Nature: The Matrix of Psychological Well-Being, Mindfulness, and Outdoor Recreation. Ecopsychology. 5, 2 (Jun. 2013), 80–91. DOI:https://doi.org/10.1089/eco.2013.0008.
81. Yggdrasil - Voor plezier en eenvoud in de natuurlijke moestuin: https://yggdra.be/. Accessed: 2025-01-09.
82. Yntema, F. and Schaap, S. 2024. Onderzoekers: afspraken biodiversiteit volstaan niet, meer actie nodig.
83. Zhang, Z. and Zurlo, F. 2020. Positioning Participant Engagement in Participatory Design. Stephanidis, C., Marcus, A., Rosenzweig, E., Rau, PL.P., Moallem, A., Rauterberg, M. (eds) HCI International 2020 - Late Breaking Papers: User Experience Design and Case Studies. 12423, (2020), 367–380. DOI:https://doi.org/https://doi.org/10.1007/978-3-030-60114-0_25.
84. Zylstra, M.J. et al. 2014. Connectedness as a Core Conservation Concern: An Interdisciplinary Review of Theory and a Call for Practice. Springer Science Reviews. 2, 1–2 (Dec. 2014), 119–143. DOI:https://doi.org/10.1007/S40362-014-0021-3.
85. Jong A Pin, R. and de Wit, J. 2022. Social profit canvas toont de sociale winst van de dorpsondersteuner. ESB. (Nov. 2022).
86. Threebility The Sustainable Business Model Innovation Game.

Appendices

A. The envisioned ripple effect of sharing non-human appreciation.

B. Active adult benchmark

C. IVN Affinity diagram

D. NZ Affinity diagram

E. PF Affinity diagram

F. BL Affinity diagram

G. Reaching out document

H. Value exchange in collaboration

I. 52 weken duurzaam benchmark

J. Dille & Kamille benchmark

K. Video inspiration analysis

L. AI ecosystem story

M. Presentation slides IVN

N. Brainstorm with main contact IVN

O. Analysis of IVN guided tour

P. Listing affordances

Q. Brabants Landschap organisation structure map

R. First mindmaps relating to ESI

S. Crime Scene Investigation elements

T. Mindmap based on first user journey

U. Sewing pattern

V. ESI instructions

W. User journey per community

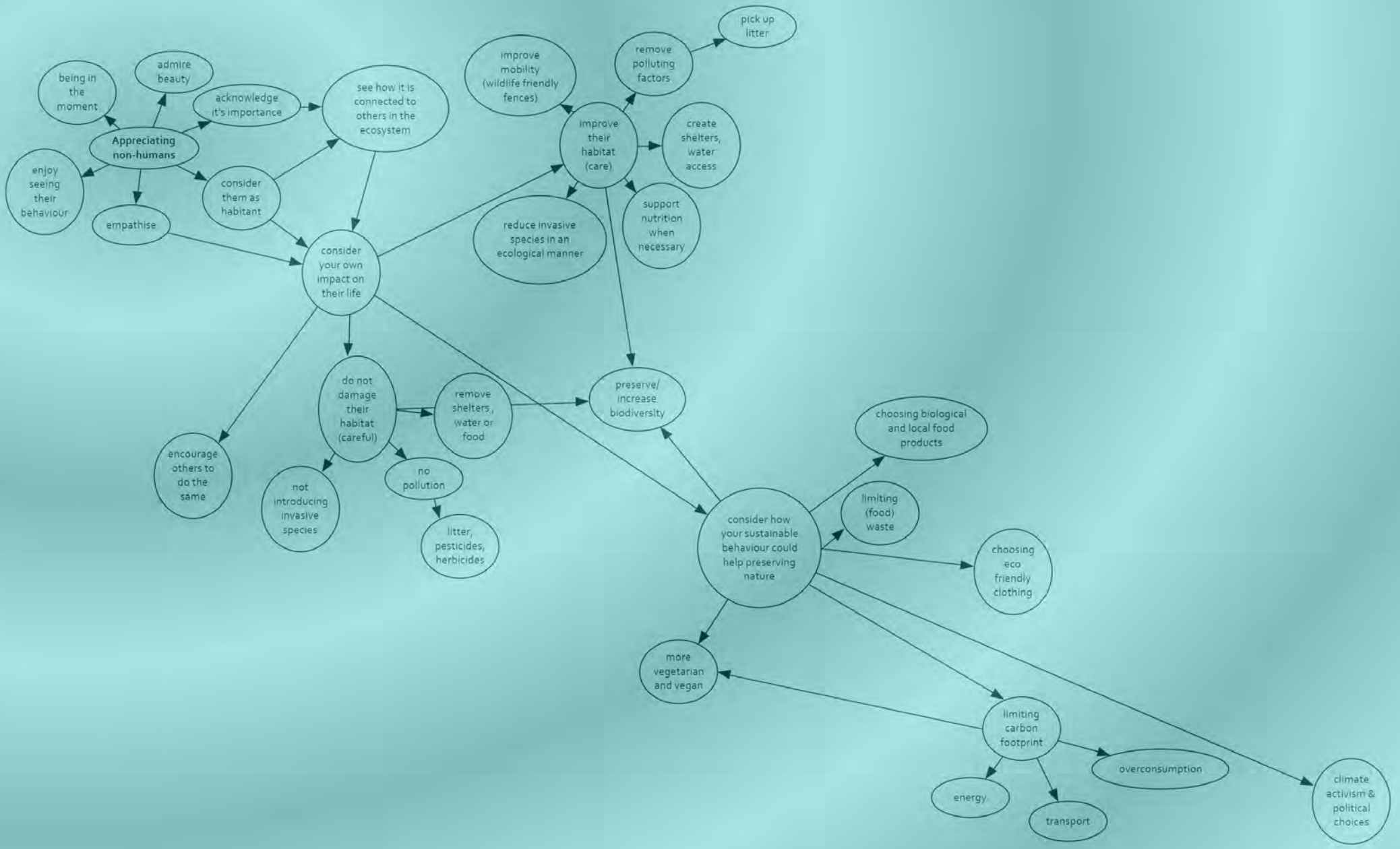
X. Social Profit canvas

Y. Impact canvas

Z. Costs overview

AA. ERB, informed consent form and approval email

A) The envisioned ripple effect of sharing non-human appreciation.



B) Active adult benchmark.

for adults

Passive: advice/ information about nature

Active: encourage nature exploration

for children

G) Reaching out document

Sharing Non-Human Appreciation

Wie ben ik:

Ik ben Luna Snelder, master student Industrial Design aan de TU Eindhoven. Ik studeer komend semester (september – februari) af en ben opzoek naar community's om mee samen te werken. Ik ontwerp voor een duurzamere en inclusievere wereld en doe dit het liefst vanuit de praktijk samen met de mensen en natuur.

Mijn afstudeerproject:

In mijn afstudeerproject "Sharing non-human appreciation" heb ik als doel om samen met mensen die al waardering voor de natuur hebben iets te ontwerpen wat deze mensen helpt om die waardering te verspreiden. Door meer mensen de natuur te laten waarderen hoop ik hen intrinsiek te motiveren om respectvoller met de natuur om te gaan en hen te inspireren om duurzamere keuzes te maken in het dagelijks leven. Ik hoop met mijn ontwerp een soort beweging in gang te zetten waardoor meer mensen de natuur gaan waarderen en nadenken over hoe ze daarmee omgaan.

Mochten jullie als community graag nog een bepaald iets willen meenemen in dit project, dan sta ik daar zeker voor open. Ik ben opzoek naar een gelijkwaardige samenwerking die ook wat teruggeeft aan de community.

Ik hoop als eindresultaat iets neer te zetten wat ook daadwerkelijk geïmplementeerd kan worden in onze samenleving en mogelijk als tool in de community. Hiervoor wil ik graag samen met de community's nadenken over hoe dat op een goede manier zou kunnen en een soort (business) plan ontwikkelen om zo ook echt een duurzame impact te kunnen maken.

Mijn voorbereidend project is te vinden op mijn portfolio website: https://lunasnelder.com/sharing-non-human-appreciation/

Doel:

- De mensen met waardering voor de natuur in hun kracht zetten en tools geven om die waardering door te geven aan anderen in hun sociale netwerk en buiten de community. Ik hoop dat dit resulteert in meer geïnspireerde mensen die proberen duurzamere keuzes te maken in hun dagelijks leven.
- Ik hoop dat dit een soort verandering in gang zet waarbij steeds meer mensen waardering voor de natuur ontwikkelen en zich milieubewuster gaan gedragen en dan ook anderen weer aanmoedigen om hetzelfde te doen.

Wanneer:

Het project loopt van 02/09/2024 tot 01/02/2025. Het project wordt op 13/12/2024 gepresenteerd op Demoday (de dag dat alle projecten van Industrial Design worden gepresenteerd in een soort mini Dutch Design Week). Dit betekent dat het contact met community's voornamelijk plaatsvindt in de periode voor 13/12/2024. Natuurlijk zijn jullie van harte welkom om Demoday te bezoeken! Ik zou graag in de eerste weken van september kennis maken met de community.

Hoe hoop ik uw organisatie te betrekken:

Ik ben opzoek naar community's rondom Eindhoven waar mensen met waardering voor de natuur samenkomen. Ik ben van plan om met deze mensen samen tot een ontwerp te komen door hen te observeren en interviewen tijdens hun werk in de community en door hen te betrekken in het ontwerpproces. Dit betekent dat wie wilt mag deelnemen, maar dat het ook prima is als dat maar een paar mensen binnen een community zijn. Alle input is welkom!

In dit project onderzoek ik de mogelijkheden van het delen van waardering voor de natuur buiten de community. Daarvoor is het mogelijk interessant om te onderzoeken of deze waardering gedeeld kan worden in het sociale netwerk van deelnemers aan de community, maar ook momenten waarop niet-leden in contact komen met de community zijn hiervoor interessant. Denk hierbij aan evenementen als open dagen.

De intensiviteit van betrokkenheid is iets waar ik graag de mogelijkheden van zou willen bespreken. Ik stel mijzelf hierbij flexibel op. Ik schat rond de 2 tot 4 keer per maand, maar dat hangt af van de manier waarop mensen willen worden betrokken.

Wat heb ik nodig:

- Mensen die willen meedenken/mee ontwerpen voor manieren waarop we waardering voor de natuur kunnen delen buiten de community.
- Mensen die ik mag observeren en interviewen tijdens het werken in de natuur.
- Mensen die willen proberen om het ontwerp dat we samen ontwikkelen te gebruiken/testen/evalueren.
- De natuurlijke omgeving van de community als ontwerp & onderzoek locatie wanneer dat logisch is.
- Mensen met wat kennis van de natuur die dat graag zouden willen delen.

Ik ben al heel blij met een klein beetje, dus als u bij één van deze puntjes iets zou kunnen betekenen is dat al fantastisch!

Wat dit project uw organisatie kan brengen:

- Mogelijkheid om uw gedachtegoed verder te verspreiden
- Mogelijkheid om meer mensen aan te trekken door het verspreiden van gedachtengoed en publiciteit.
- Publiciteit op Demoday, in mijn verslag en op mijn portfolio website etc. Bij een geslaagd project is er misschien ook mogelijkheid tot verdere tentoonstelling ervan op bijvoorbeeld de Dutch Design Week.
- Mogelijkheid om mee te denken ontwerpen voor een stapje dichter bij een duurzame toekomst.
- Tool die uw organisatie kan gebruiken om meer mensen de natuur te laten waarderen.
- Bijzondere en interessante ervaring waarin u mogelijk ook een nieuw perspectief op uw eigen organisatie krijgt en nieuwe mogelijkheden ziet.
- Als u een specifieke wens heeft, kunnen we onderzoeken hoe dat met dit project samenvalt en zal ik mijn uiterste best doen om die te realiseren waar mogelijk.

H) value exchange

MY ORGANIZATION

ESI

Potentially implement ESI

Influence project

Good collaboration with student project

Mentioned in graduation deliverables, websites, to other partners

Collaboration in design project

- Insight in current practice
- Feedback
- Knowledge about nature (education)

Testing opportunnity

IVN guided tour

petri dish

presentation for GMM and board

NON-PROFIT

IVN VEV

CONSUMER

Member IVN

CONSUMER

Visitor IVN

- Insight in current practice
- Feedback

Project on display

Testing opportunnity

NON-PROFIT

Nieuw Zwanenburg

CONSUMER

Involved @ Nieuw Zwanenburg

CONSUMER

Event visitor Nieuw Zwanenburg

- Insight in current practice
- Feedback
- Knowledge about permaculture gardening

discussing project with team

Testing opportunnity

Parttaking in farming

Phood vegetables

COMPANY

Phood Farm

CONSUMER

Member Phood Farm

CONSUMER

Visitor Phood Farm

- Insight in current practice
- Feedback
- Knowledge about related practices

discussing project with team

NON-PROFIT

Brabants Landschap

CONSUMER

Member Brabants Landschap

CONSUMER

Visitor Brabants Landschap

Resellers

SUPPLIER

Karteris (fabrics)

SUPPLIER

Fournituren.nl

SUPPLIER

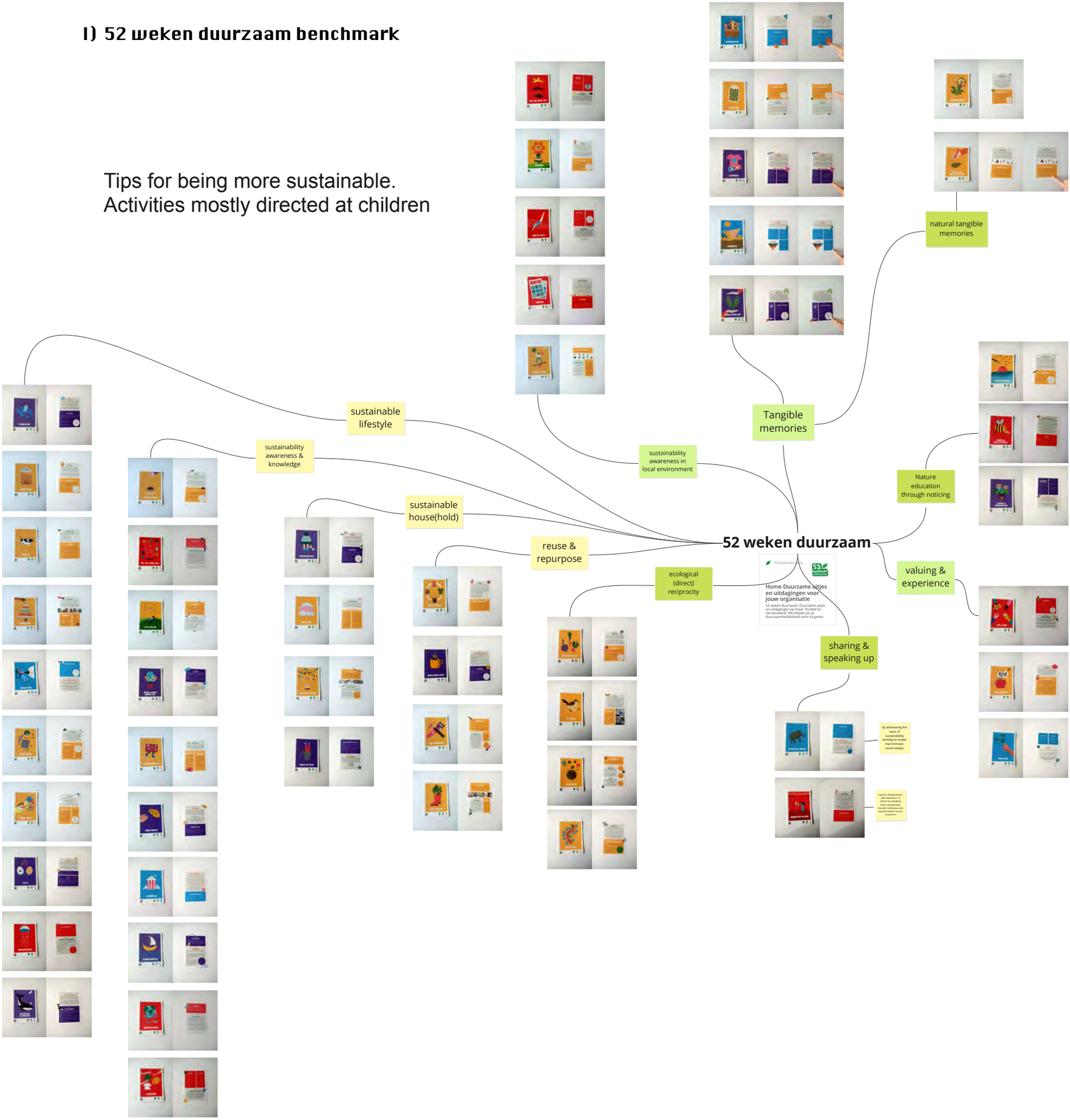
Amazon.nl

SUPPLIER

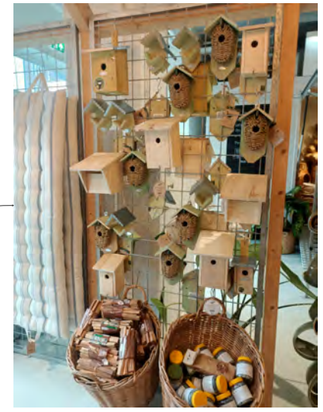
Bol.com

1) 52 weken duurzaam benchmark

Tips for being more sustainable.
Activities mostly directed at children



J) Dille & Kamille Benchmark



book with ideas of what to do with natural materals

designs to help non-humans (reciprocity)

benchmark at Dille & Kamille

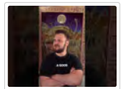
noticing tools for children to explore non-humans in their surroundings

K) video inspiration

caption glasses, making sound visible

senses

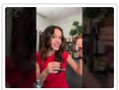
Smelling the past in a specific place to engage people



challenge

easter egg hunt to let people notice details in art. inspiring to let people notice nature

making it tangible



tangible visual way of learning about an invisble system

invisible scale (atom) make it understandable by translating it to sizes people understand

large mechanic demonstration of grasshopper leg

Teaching/noticing in an engaging way

illustrated scientific story about mushroom robot

illustrated scientific story about brain imaging on dog about their perception of smell vs human sight

illustrated scientific story about human sight vs other animal's sight --> special camera

Visual storytelling

zooming in to illustrations to explore new worlds. Relates to how you can explore in nature. Relates to how all traces and explorations are linked in an ecosystem. Relates to how I experienced this project (entanglement of everything I see in daily life with project). Relates to maps and zooming in to see specific traces idea.

Seaweed hat DIY instructions

Capturing soil into a fabric

leaf stamping with bleach

photogram: technique for visual capturing that allows for viewing something differently

monoprinting: technique for visual capturing

relief printing of tree stems

Capturing non-humans visually

fish rubbing (stamping with fish to capture size)

appreciating non-humans

artwork that initially represents beauty of nature, but at different angle is made from things that pollute it and that people have nostalgic relations with.

non-human appreciation??
Shrine-like setting for died plants, but also first letting those plants die....

How getting to know/observing & videos contribute to learning to appreciate non-humans

craft & art

nature craftsmanship & storytelling/fairy tales

craftsmanship combined with tree history and biology

traces

showing non-human story behind a trace mystery, illustrating labour

explaining and demonstrating reasons for famous plant anatomy

ecosystem awareness

noticing biology explanation video about tree stump

mentioning unusual connection in ecosystem to start explaining its needs and how small actions can not only disrupt, but also repair ecosystems

fleeting landart with natural materials and placement

video on mushroom foraging and special glasses

Making a wearable feeder to observe up close

noticing tools

public space gardening for awareness

biodiversity in public places promotion & explanation

guerilla gardening & positive effect on community

Kun je een kort leuk verhaal schrijven over ecologie rondom een boom. Daarin komen de volgende elementen voor: de naam van de boom (soort), waar de boom van houdt (leefomgeving), boombewoners (soorten die in de boom leven), boomhelpers (soorten die het functioneren van de boom ondersteunen) en boomzorgen (dingen die moeilijk zijn voor de boom).

L) AI ecosystem story

Er was eens een majestueuze oude eik met de naam Eloise, die trots stond te stralen in het hart van een weelderig groen bos. Eloise hield van vochtige grond en voldoende zonlicht, waardoor ze midden in het bos haar takken wijd kon uitstrekken. De frisse lucht en het gezang van de vogels waren de muziek die haar elke dag omringde.

Eloise maakte haar huis voor veel verschillende boombewoners. In haar stevige takken nestelden merels, die vrolijk floten en hun jongen grootbrachten. In de holtes van haar dikke, kromme stam woonden eekhoorns, die druk in de weer waren met het verzamelen van eikels. Boven in de kruin zweefden vlinders en bijen, die vrolijk van bloem naar bloem fladderden en zich tegoed deden aan de nectar van de kleurrijke bloemen die rondom Eloise bloeiden.

Maar Eloise had ook boomhulpjes die haar ondersteunen in het dagelijks leven. Aan de wortels van de eik woonden vriendelijke schimmels, die haar voedzame stoffen uit de grond aanboden. Deze schimmels hielpen haar niet alleen sterker te worden, maar zorgden er ook voor dat haar bladeren mooi groen waren. De vlinders en bijen waren ook belangrijk, want ze hielpen bij de bestuiving en zorgden ervoor dat er meer bloemen groeiden om hun nectar aan te bieden.

Toch had Eloise ook zijn zorgen. Soms was er te weinig regen, waardoor de grond rondom haar wortels uitdroogde en ze niet genoeg voedingsstoffen kon opnemen. Daarnaast waren er stormen die haar takken deden kraken en haar bladen deden ritselen. En dan waren er ook nog de hongerige rupsen die haar bladeren opaten, wat haar ertoe bracht om zich in te spannen om grotere, gezonde bladeren te laten groeien.

Ondanks deze zorgen bleef Eloise vol vertrouwen haar schaduw over het bos verspreiden. Met alle boombewoners en helpers aan haar zijde, zaaide ze het leven om zich heen en zorgde ze voor de ecologie in haar omgeving. Ze wist dat met de kracht van de natuur alles kon bloeien, zolang ze maar samenwerkten. En zo vervolgde Eloise, de eik, haar leven vol avontuur, in harmonie met de wereld om haar heen.

MJ IVN VEV presentation

Sharing Non-Human Appreciation

Bij IVN Veldhoven Eindhoven Vessem

Wie ben ik?

- Luna Snelder, 24 jaar, Eindhoven & Arnhem
- Master Industrial Design TU/e
- Ontwerpen voor een duurzame & inclusieve samenleving

Wat is “non-human appreciation”?

- Non-human: niet mensen
  - voor mij focus op natuur (zowel levende als niet-levende factoren)
- Waardering voor natuur
  - Kennis
  - Zorg
  - Schoonheid
  - In het moment zijn

Doel:

- Ontwerp tool die ondersteunt bij delen van waardering voor natuur
  - Mensen die deze waardering al hebben of ervaren tijdens een activiteit bij IVN
  - Hoe kunnen zij worden ondersteunt om anderen daarover te vertellen of dat te laten zien?

- Uiteindelijk doel: meer duurzaam gedrag door milieubewustzijn

Een beeld schetsen: voorbereidend project

- Stadsakkers Eindhoven

Samen een beweging in gang zetten

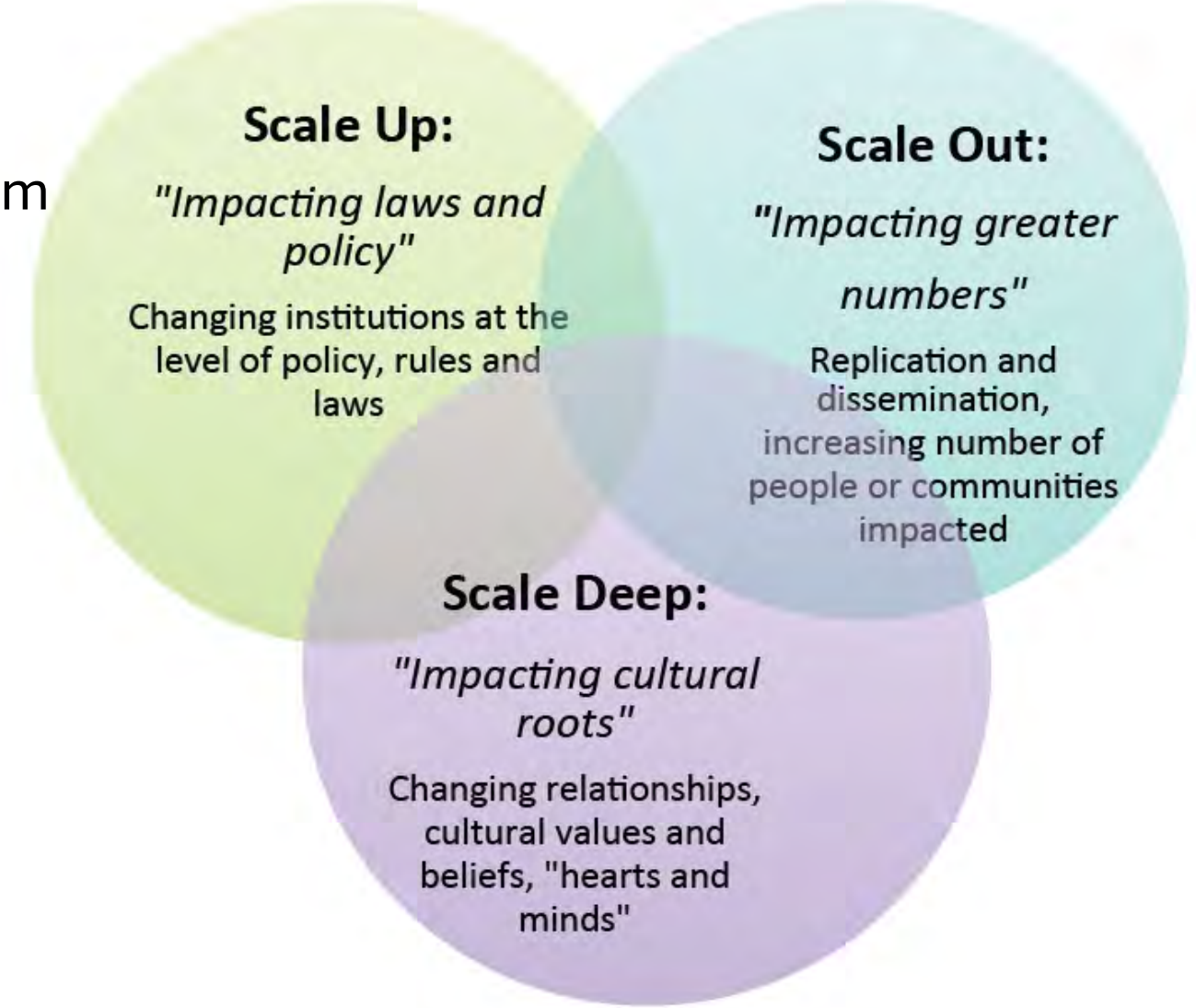
- Samenwerking met:
  - IVN Veldhoven Eindhoven Vessem
  - Nieuw Zwanenburg
  - Phood farm
  - Brabants Landschap

- Scaling out, up & deep

Samen een beweging in gang zetten

- Samenwerking met:
  - IVN Veldhoven Eindhoven Vessem
  - Nieuw Zwanenburg
  - Phood farm
  - Brabants Landschap

- Scaling out, up & deep



Waarom IVN?

- Natuureducatie = delen van waardering voor natuur
- Context: Wandelingen met gids → moment waarop mensen van buiten in contact komen met IVN gedachtengoed.
  - Hoe vertellen zij hun ervaring verder?
- Feedback & meedenken
  - Passend bij activiteiten
  - Milieuvriendelijk
  - Toegevoegde waarde
- Testen
- Implementeren?

Planning

- 24 september
- 6 oktober
- …?
- 13 december 9:00-17:00 demoday
- Verslaglegging & afronden – februari
- 6 februari presentatie voor IVN?

Planning

iteration 1

Week 3	Week 4	Week 5	Week 6	Week 7
• present to IVN board • phoodfarm, • ERB, • brainstorming, • ideation • reading	• To IVN (Etje Hendrikx), • finish ideation, • first prototypes, • meet farmers NZ?, • reading	• finish prototyping, • check prototype suitability with Jos de Bruin from IVN, • IVN participating in walk and testing first iteration in that setting (6/10/2024), • phoodfarm, • reading	• Midterm demoday, • feedback/testing communities, • data analysis • reflection • reading	• Present at Nieuw Zwanenburg, • contact/present to Brabants Landschap, • Reflection/analysis, • initial thoughts, • reading • phoodfarm
Date 16/9/2024 - 21/9/2024	Date 23/9/2024 - 27/9/2024	Date 30/9/2024 - 4/10/2024	Date 7/10/2024 - 11/10/2024	Date 14/10/2024 - 18/10/2024

Planning

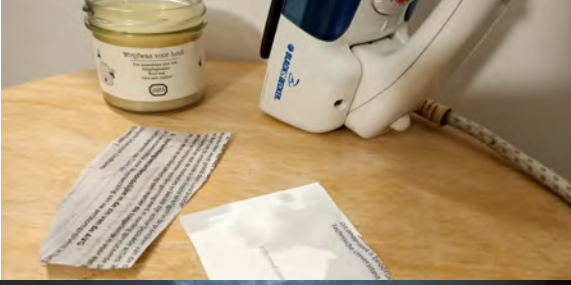
iteration 2

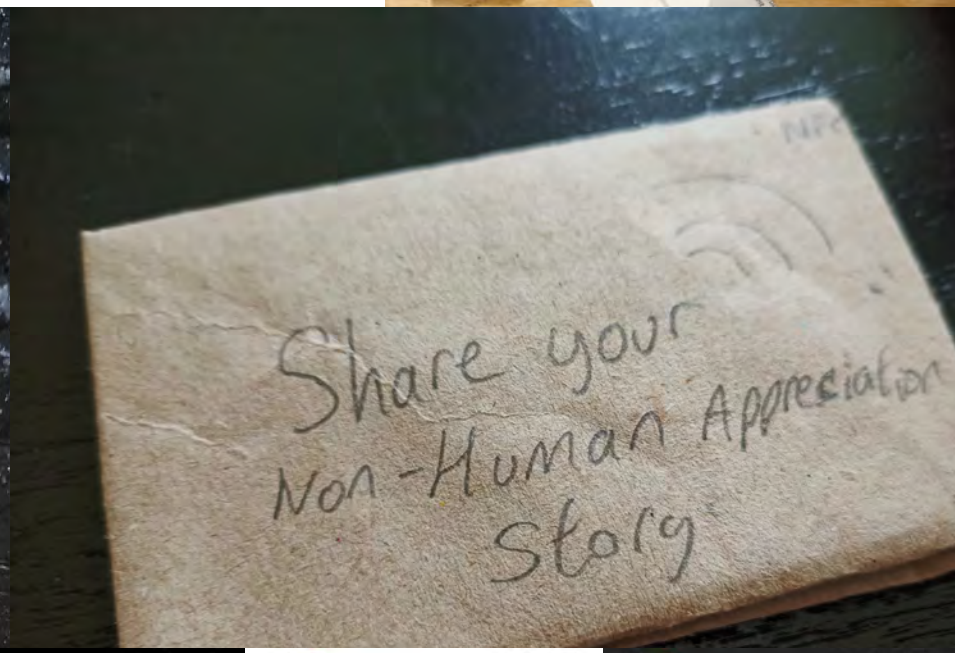
Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
• DDW inspiration, • reading, • feedback on M2.1 concept in DU thriving planet talk	• analyse feedback, inspiration, • start brainstorming/ ideating for new version, consider scaling & implementation, • phoodfarm • reading • writing benchmark	• continue ideation & consider implementation, • input NZ about scaling and their business, • reading	• start prototyping, • phoodfarm, • report writing!	• Prototyping, • prepare for testing, • send demoday invitations, • write article for IVN Praatkruid magazine ?	• testing???!! • input communities, • start analysis?, • reading, • phoodfarm, • report writing
Date 21/10/2024 - 25/10/2024	Date 28/10/2024 - 1/11/2024	Date 4/11/2024 - 8/11/2024	Date 11/11/2024 - 15/11/2024	Date 18/11/2024 - 22/11/2024	Date 25/11/2024 - 29/11/2024

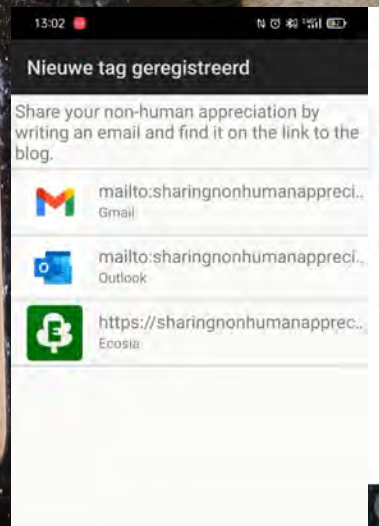
Planning

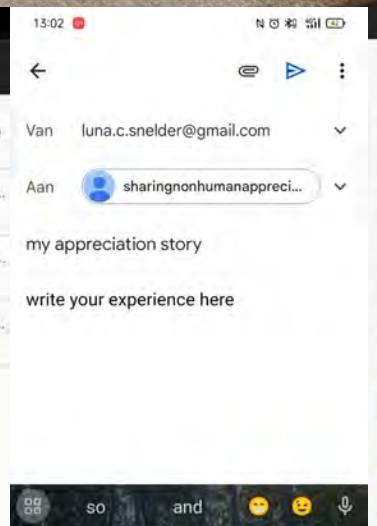
Week 14	Week 15: Demoday	Week 16	Week 17, 18 (holidays)	Week 19: Report	Week 20: Portfolio	Weeks 21, 22, 23 Presentations
• analysis, discuss results with communities and • discuss implementation, • filming for demoday & pictures, • reminder demoday invitation	• prepare final things for demoday, • prepare for gathering feedback, • gather feedback, • phoodfarm???? • invitation to final presentation??	• final concept adjustments, • finalize implementation/ business/???, • initial setup report	• report writing, • prepare for final presentation and • portfolio	• finish report, • continue work on portfolio	• finish portfolio, • continue on final presentation • Reminder presentation IVN Praatkruid magazine	• final presentation • presentation at IVN (6/2/2025 19:30)
Date 2/12/2024 - 6/12/2024	Date 9/12/2024 - 13/12/2024	Date 16/12/2024 - 20/12/2024	Date 23/12/2024 - 3/1/2025	Date 6/1/2025 - 10/1/2025	Date 13/1/2025 - 17/1/2025	Date 20/1/2025 - 7/2/2025

Eerste experimenten & ideeën

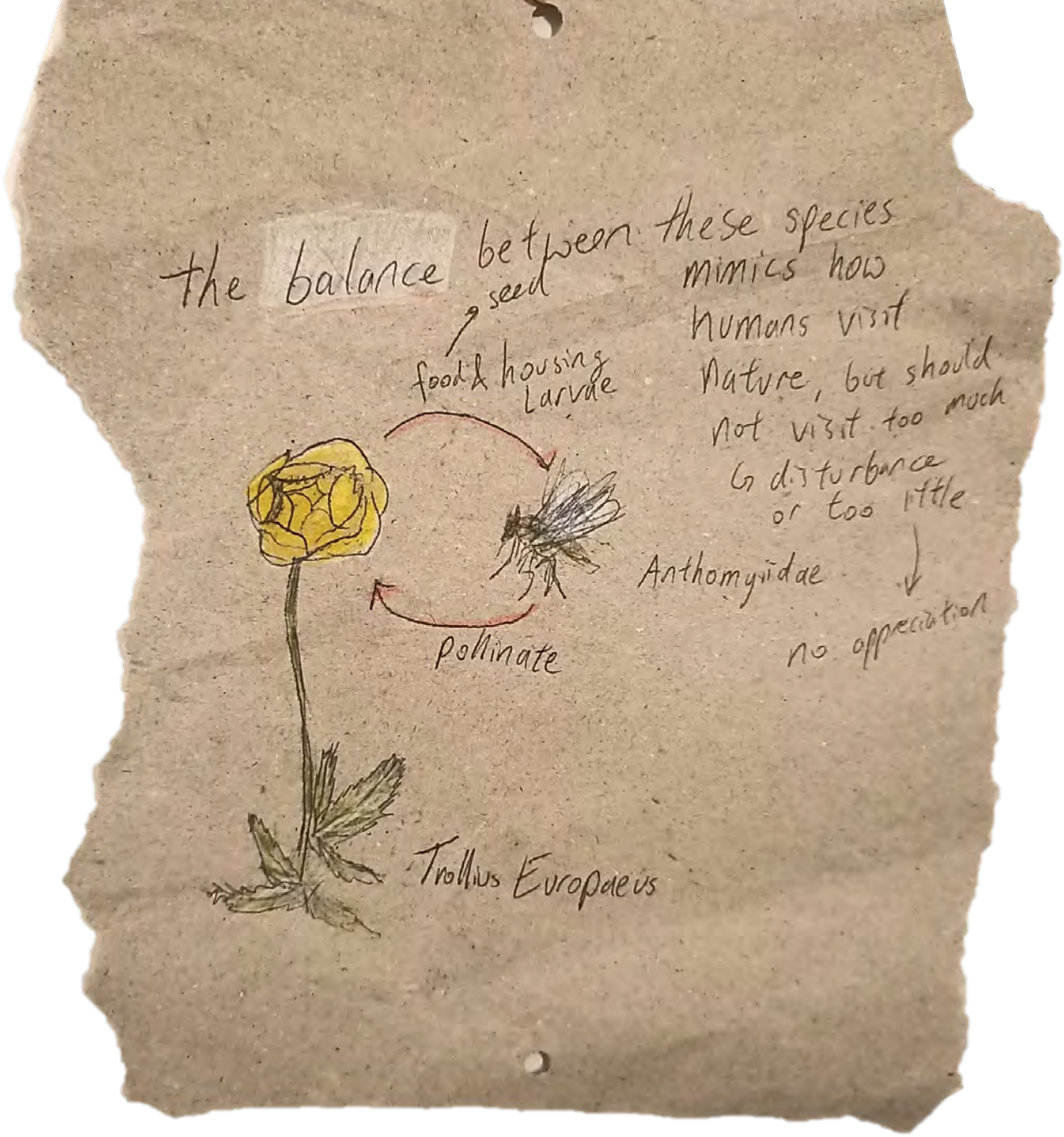


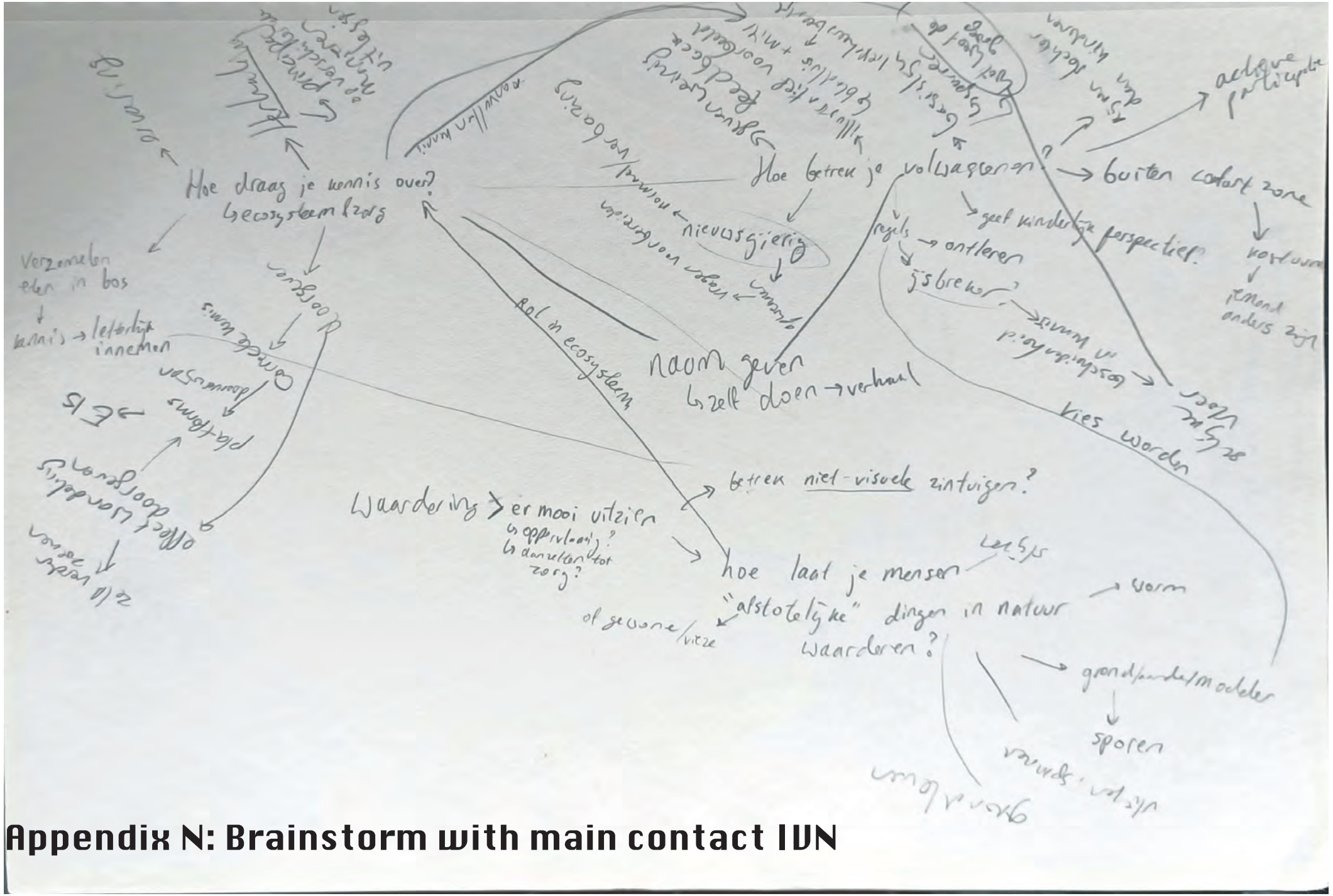






Vragen, ideeën, feedback, zorgen, ..?





Appendix N: Brainstorm with main contact IVN

Tools for noticing details

--> finding traces and other evidence

They need to afford alternative perspective:

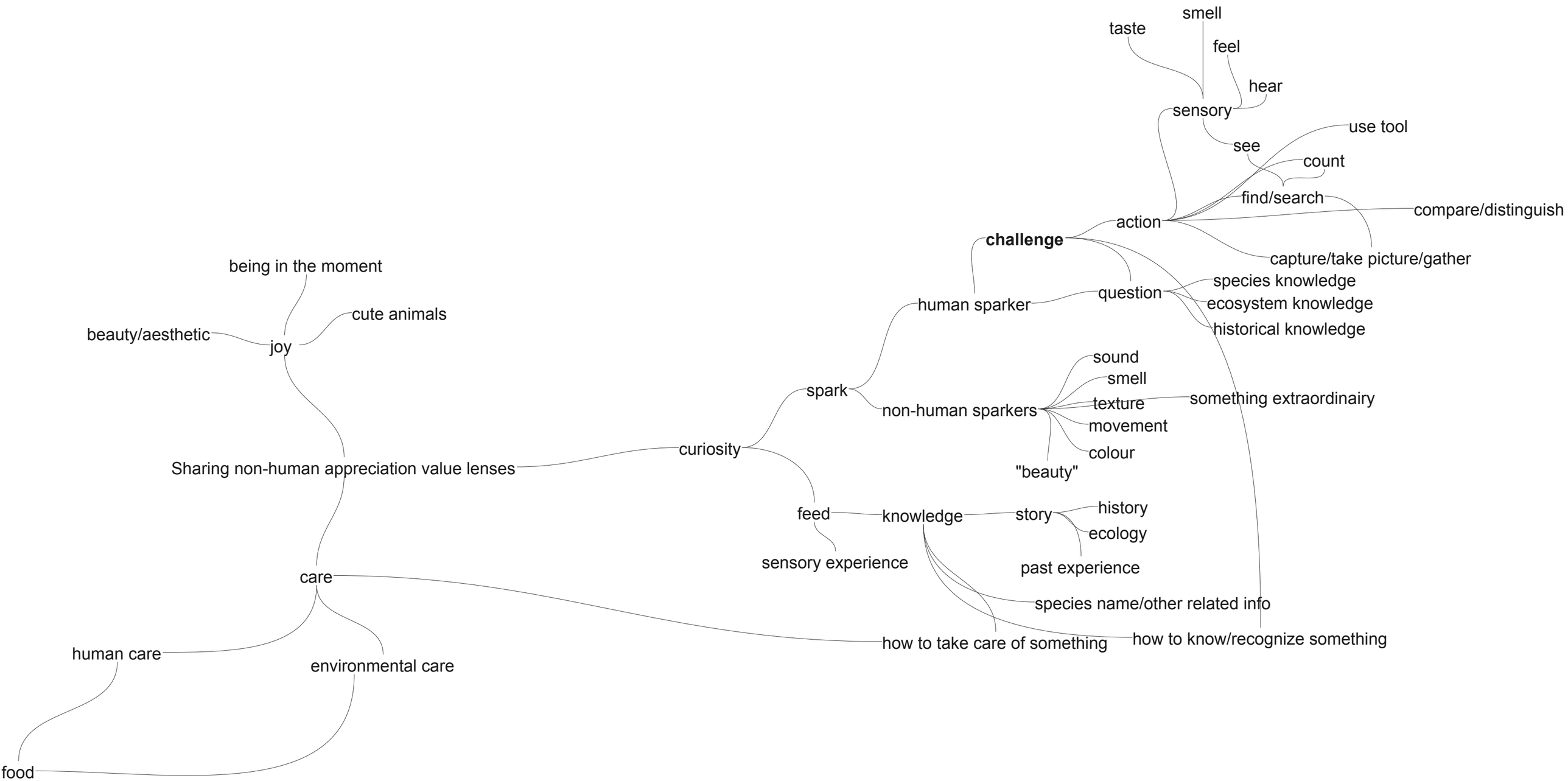
- through alternative position (e.g. encourage kneeling)
- through adapting visual perspective (e.g. enlarging, limiting, etc.)
- through other sensory amplification/adaption
- through curiosity of a dog/child/other person
- through a challenge/exercise (such as trying to find evidence)

Tools for capturing evidence/traces/non-humans/part of the experience

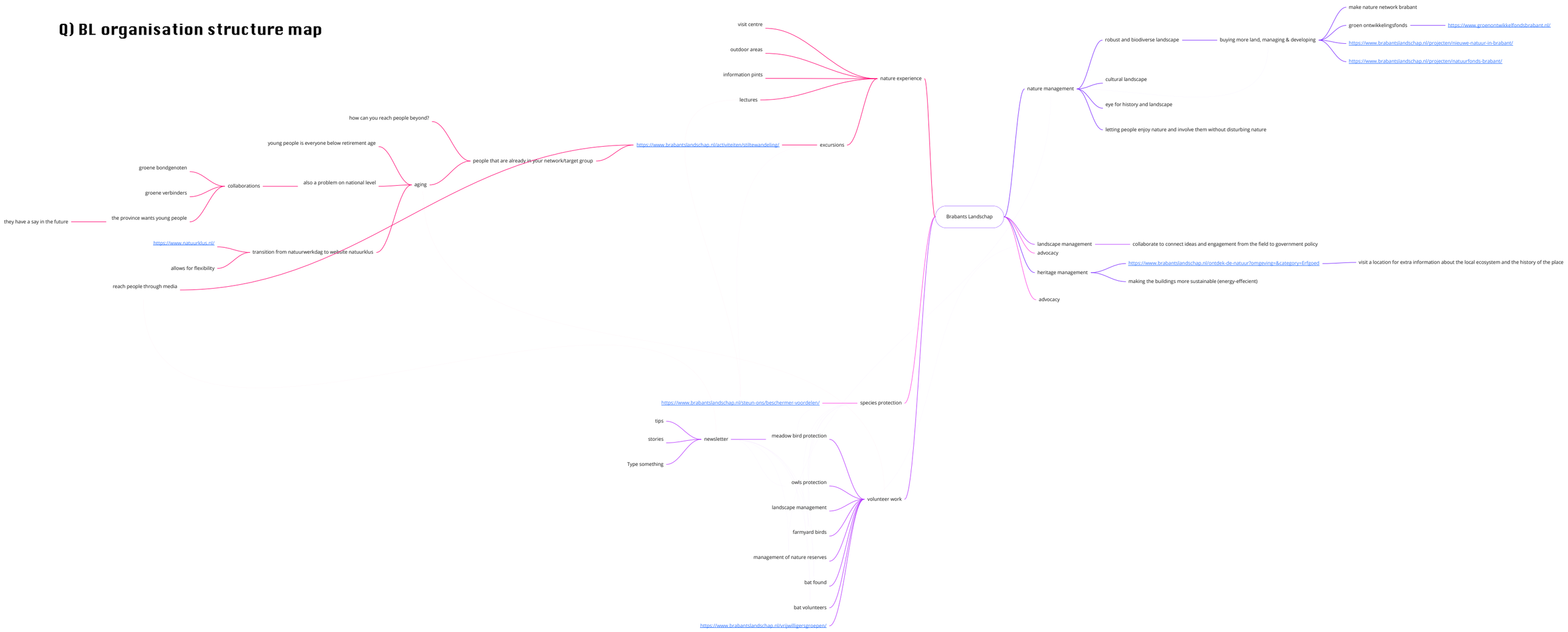
--> tangible memories, help storytelling/sharing about non-human appreciative experience

They need to afford:

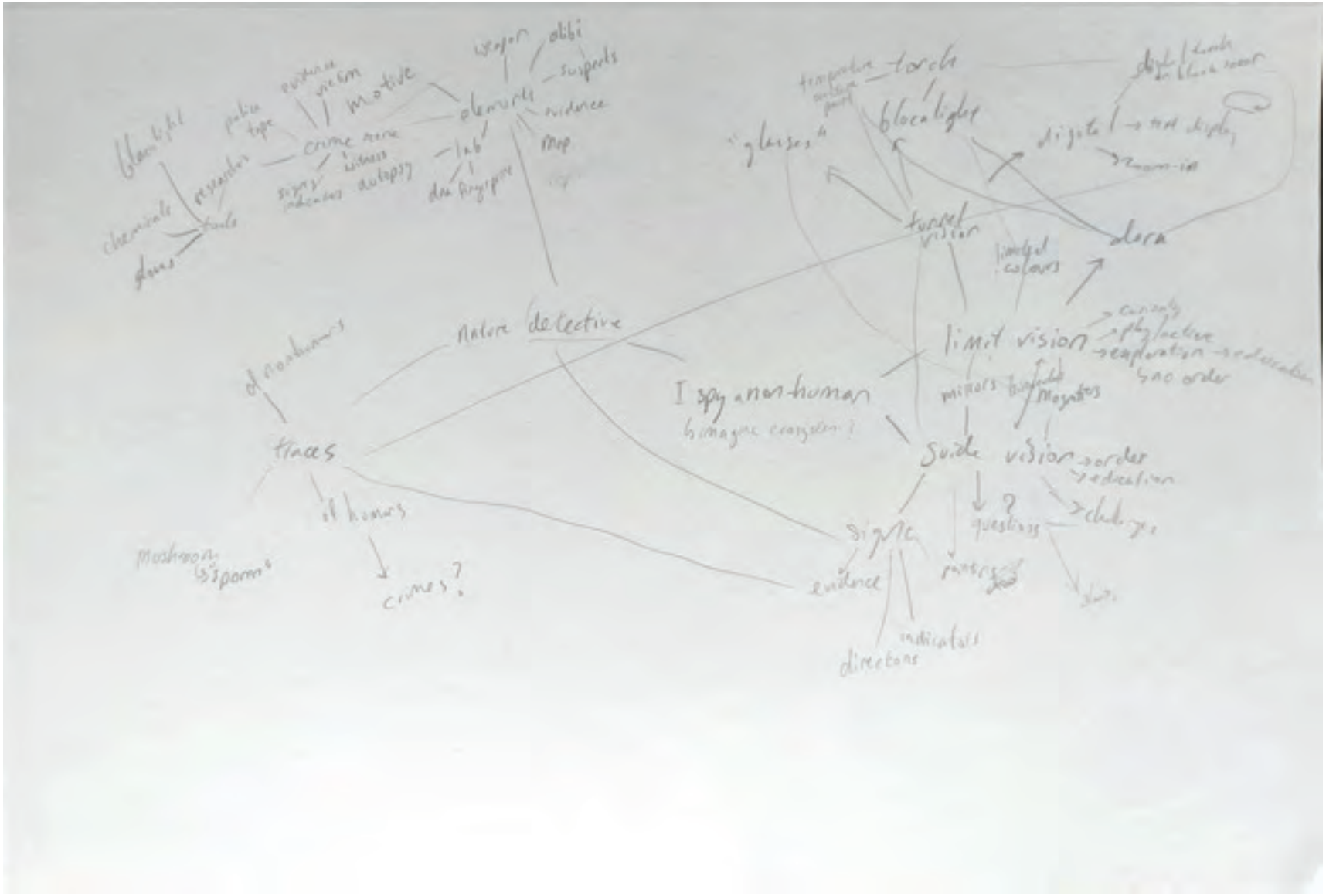
- aesthetic experience
- quick capturing
- doable for target audience
- not damaging/disturbing ecosystem
- meaningful captured thing (that can actually be talked about in detail)

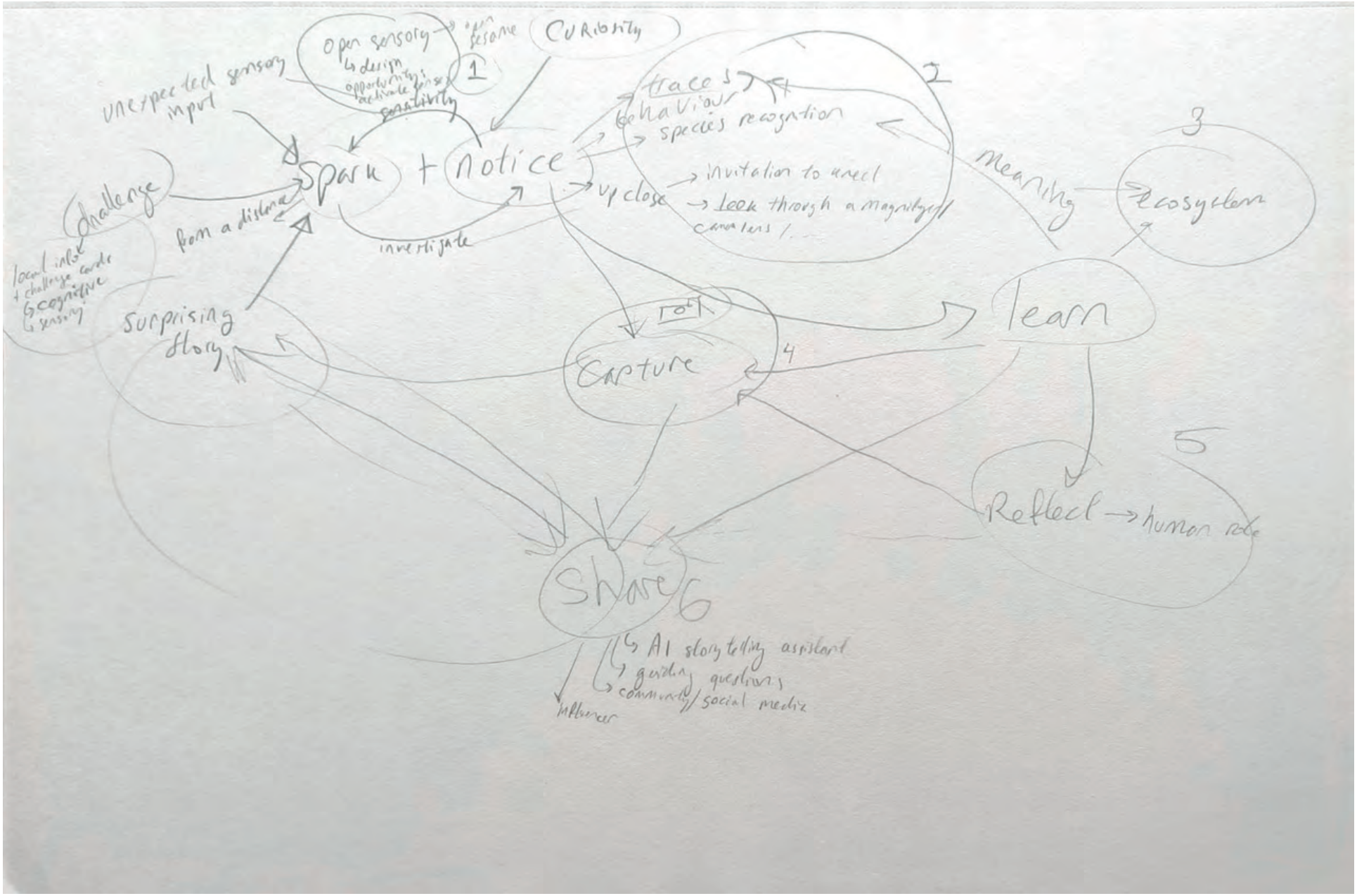

smell
taste
feel
hear
sensory
use tool
see
count
find/search
compare/distinguish
action
capture/take picture/gather
challenge
being in the moment
species knowledge
question
ecosystem knowledge
cute animals
human sparker
historical knowledge
beauty/aesthetic
joy
sound
smell
spark
texture
something extraordinairy
non-human sparkers
movement
curiosity
colour
"beauty"
Sharing non-human appreciation value lenses
history
feed
knowledge
story
ecology
sensory experience
past experience
care
species name/other related info
how to take care of something
how to know/recognize something
human care
environmental care
food

Q) BL organisation structure map

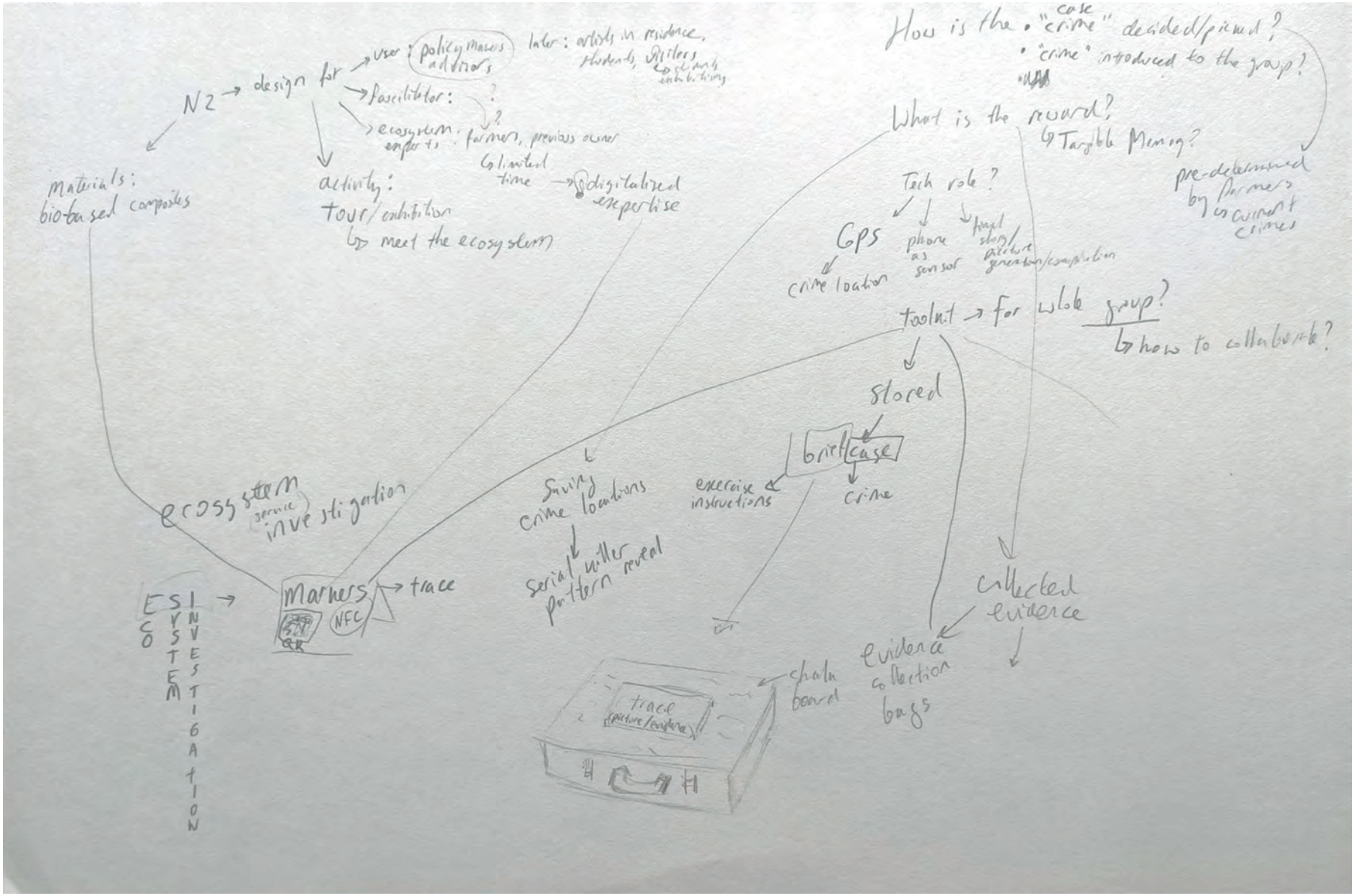


Appendix R: First Mindmaps relating to ESI





open sensory
open sesame
CURiosity
1
unexpected sensory input
spark + notice
traces
behaviour
species recognition
2
3
meaning
ecosystem
challenge
from a distance
investigate
up close
invitation to unect
look through a magnifyer/ camera lens/...
local info + challenge cards
cognitive
sensory
surprising story
learn
Capture
4
5
Reflect
human role
Share
6
AI storytelling assistant
guiding questions
community/social media
influencer



N2 → design for
→ user: policymakers advisors
later: artists in residence, students, visitors
→ facilitator: ?
→ ecosystem experts: farmers, previous owner
limited time → digitalized expertise
materials: bio-based composites
activity: tour/exhibition
meet the ecosystem
How is the • "case crime" decided/picked?
• "crime" introduced to the group?
What is the reward?
Tangible Memory?
pre-determined by farmers
current crimes
Tech role?
GPS
crime location
phone as sensor
final story/picture generation/completion
toolkit → for whole group?
how to collaborate?
stored
brief case
exercise instructions
crime
Saving crime locations
serial killer pattern reveal
collected evidence
evidence collection bags
chalk board
trace (picture/evidence)
ecosystem (service) investigation
ECO SYSTEM INVESTIGATION
Markers
NFC
QR
trace

S) CSI elements inspiration

www.liveabout.com

Crime Scene Investigator Job Description: Salary, Skills, & More

Crime scene investigators respond to crime scenes along with police investigators to find and gather evidence to bolster an investigation.

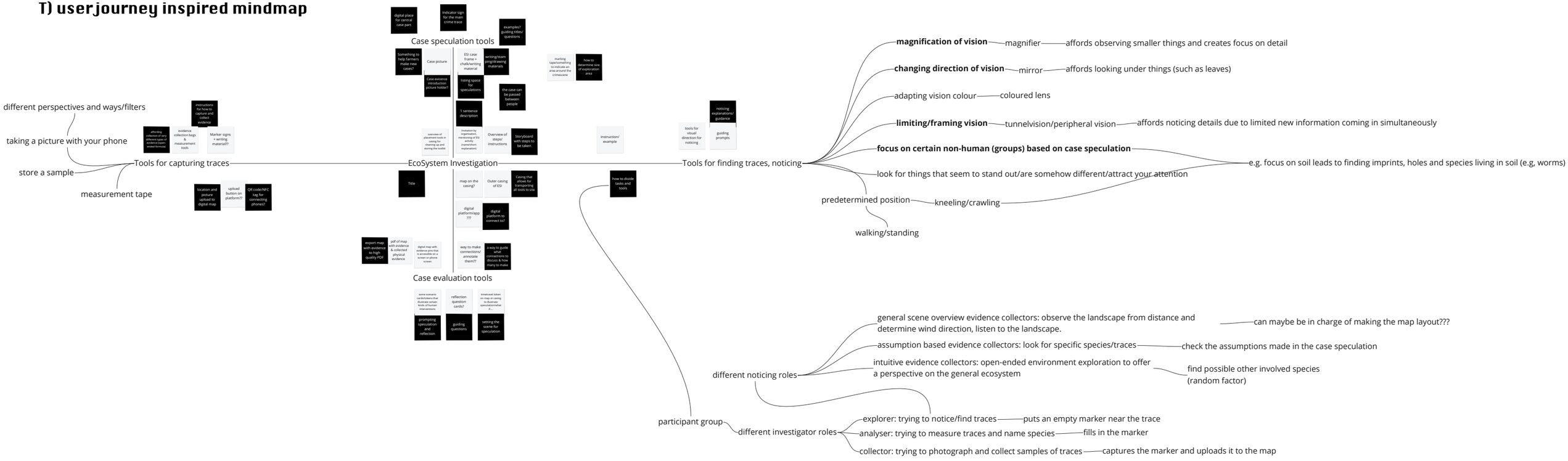
1. Identify visual clues at a crime scene.
2. Collect crime scene evidence.
3. Classify and organize evidence.
4. Photograph crime scenes.
5. Report findings.

1. **Problem-solving:** Gathering visual clues and other evidence at a crime scene and trying to interpret what happened is like trying to piece together a puzzle. Crime scene investigators need to be good at this type of problem-solving.
2. **Critical thinking:** Before drawing any conclusions, crime scene investigators need to know how to use the scientific method to eliminate all other possibilities.
3. **Attention to detail:** Examining a crime scene requires the ability to notice minute details and subtle differences. Moreover, the handling and cataloging of evidence must be done following precise procedures so that no evidence can be questioned because of mishandling.
4. **Photography**: Taking photographs of a crime scene often is part of a crime scene investigator's job. In addition to general photography skills, these professionals need to know how to record all relevant angles and perspectives in the best way possible to allow investigators to study the crime scene after the fact.

tools:

- Area marking tape
- gloves
- evidence indicator number signs
- gloves
- evidence collection bags
- camera
- measuring tape/device
- blacklight
- magnifier
- other evidence capturing tools

T) userjourney inspired mindmap



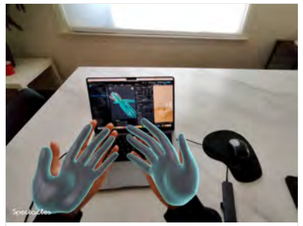
Technology inspiration

Technologies that are interesting for digitalizing ESI (future?)

www.geocaching.com

Get the free Official Geocaching app and join the world's largest treasure hunt.

There are millions of geocaches worldwide, just waiting for you to find them. There are probably even some within walking distance of where you are right now. Visit Geocaching.com to see just how many geocaches are nearby and to learn how to start findi...



www.linkedin.com

IDEO on LinkedIn: #emergingtechnology #ar #xr | 16 comments

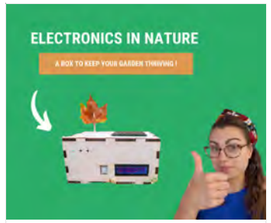
The future of #emergingtechnology is so bright, we've gotta wear shades. 😎 Recently, our team was invited to be part of the development program of Snap Inc.'s... | 16 comments on LinkedIn

robots.net

How To Make A Augmented Reality App | Robots.net

Learn how to create your own augmented reality app with our step-by-step guide. Discover the tools, frameworks, and techniques needed for a successful AR app development.

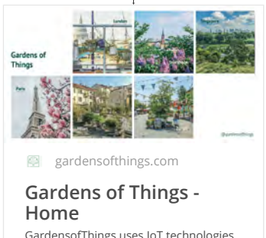
Sensing in nature



www.instructables.com

Electronics in Nature | DIY Environmental Sensing Box With Arduino Uno and Moisture, Temperature and Humidity, and Light Intensity Sensor 💦🔥🌳🌧️🌚

Electronics in Nature | DIY Environmental Sensing Box With Arduino Uno and Moisture, Temperature and Humidity, and Light Intensity Sensor 💦🔥🌳🌧️🌚: The Electronics in Nature box aims to engage children with nature and electronics. The box explores the use ...



gardensofthings.com

Gardens of Things - Home

GardensofThings uses IoT technologies and data science to monitor green infrastructure in cities. This digital ecosystem helps cities to address climate change.

Sensing time traces in nature

hraf.yale.edu

Relative and Absolute Dating Methods in Archaeology

The Earth is around 4.6 billion years old. Physical evidence of geological changes and the mineralized remains of living organisms (fossils), as well as material remains and artifacts of human societies, offer archaeologists important insights into the ...

NFC opportunities for leaving traces

nfcw.nl

Welke NFC-app gebruiken voor programmeren? - NFC World

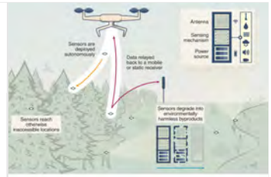
Ontdek welke NFC-app het beste is voor het programmeren van NFC-tags. Tips en tools voor beginners en professionals.

gototags.com

The Future of Environmentally Friendly NFC Tags - GoToTags

NFC is starting to see significant growth with smart product labeling and smart packaging for Connected Things projects. With NFC tags now being put into product labels and packaging, connecting those products to a personalized digital experience, the e...

biodegradable tech



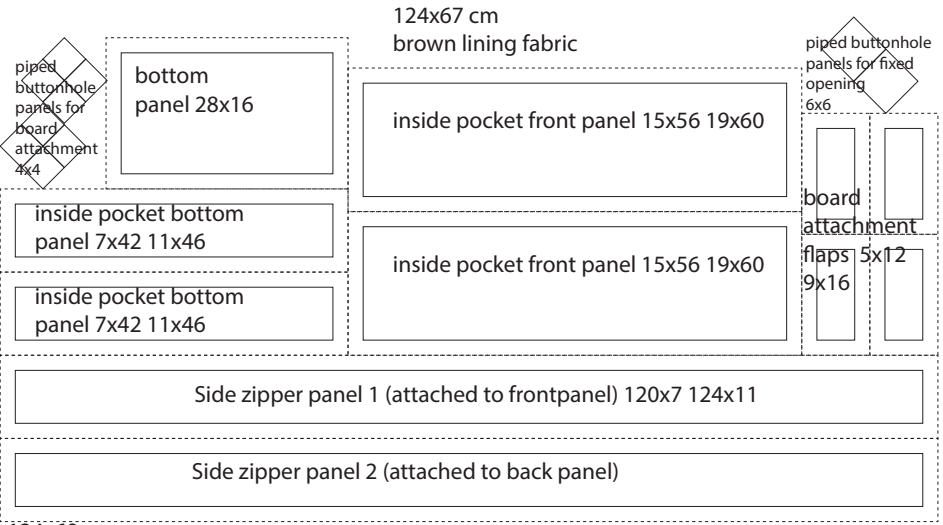
www.nature.com

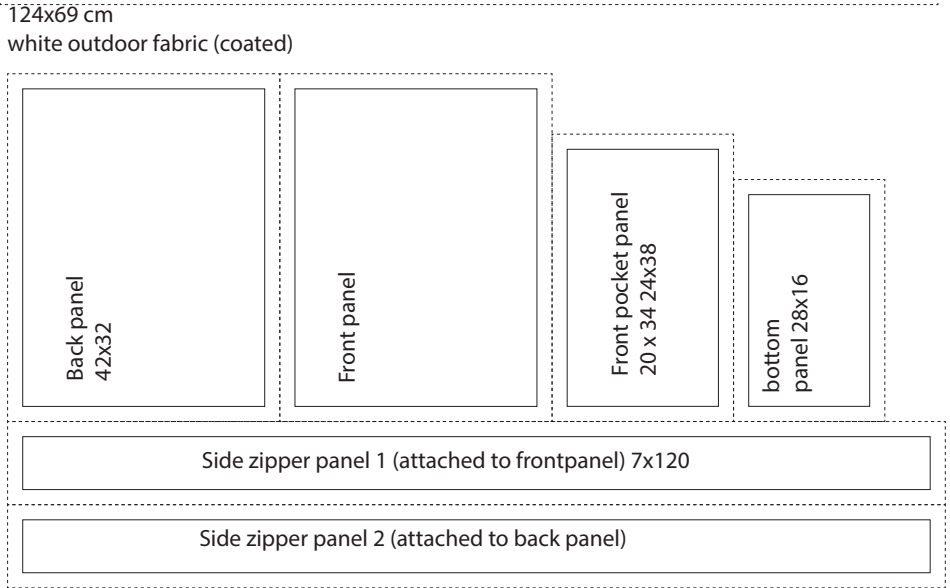
Biodegradable sensors are ready to transform autonomous ecological monitoring - Nature Ecology & Evolution

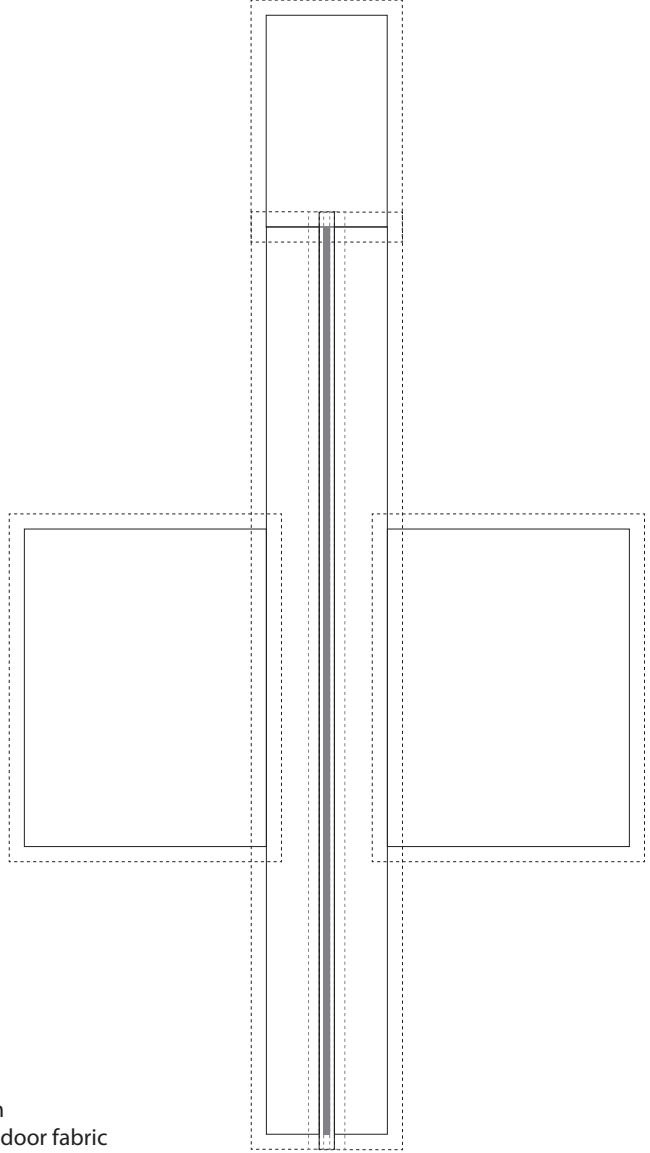
Recent breakthroughs have led to the development of biodegradable sensors which, after collecting data, break down into byproducts that are harmless to their surroundings. Using these sensors to collect ecological data on vast scales and in fine resolut...

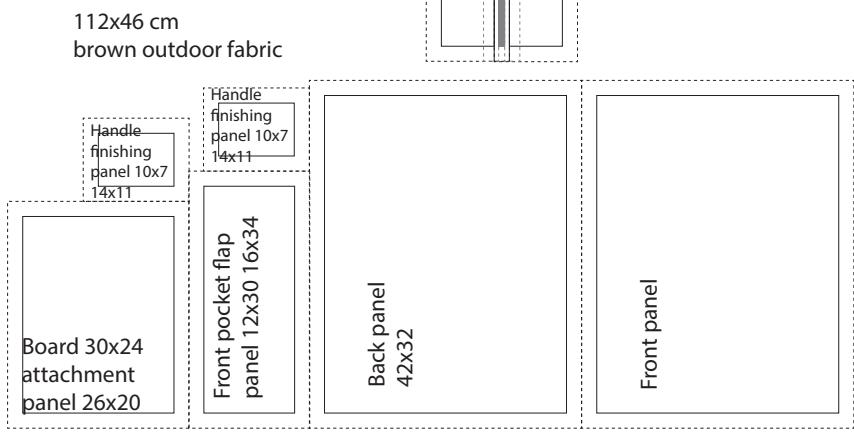
1. cutting
2. sew pockets (finish edges), sew flaps (with piped button holes), elaastic on inside parts, bands
3. attach boards (buttons, bottoms (velcro, sew)) and take them out
4. attach pockets
5. sew zipper on outer fabric (inside out to flip)
6. sew outer parts and lining parts (also corners next to zipper)
7. attach flaps, handles, bands
8. attach inner lining seams to outer fabric seams
9. include the zipper between lining and outer fabric
10. finishing touches

U) sewing pattern for ESI









Find Evidence

Search:

- Traces
- Suspects
- Witnesses

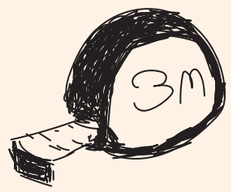
Mark with a number

Analyse Evidence

Name found evidence

Save a location pin on Maps

Measure found evidence



Consider motives

Collect Evidence

Photograph found evidence

(Take a sample when suitable)

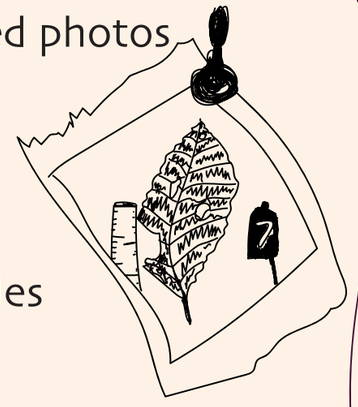
Send photo to the Head Inspector

Place Evidence

Connect the dots

What if?

Printed photos

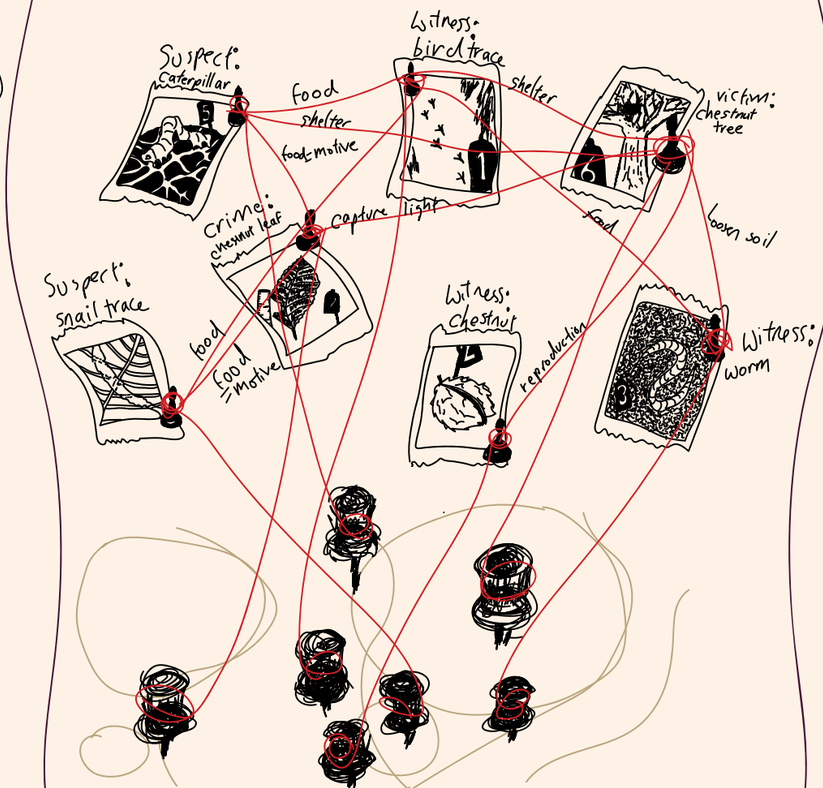


Samples

Locations

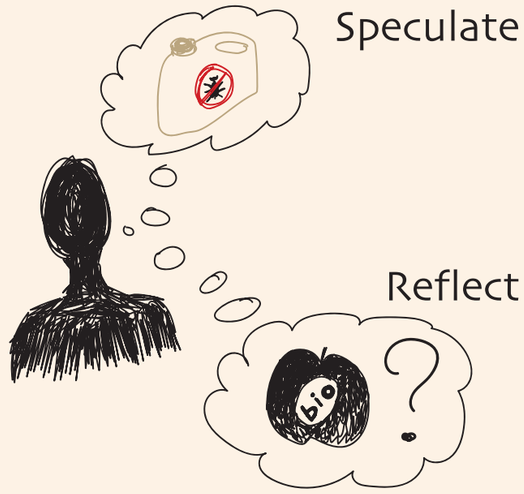
Ecosystem relations:

- Habitat/shelter
- food/nutrients
- ...



Motives, suspects & witnesses

Speculate



Reflect

Human impact

W) Social profit canvas

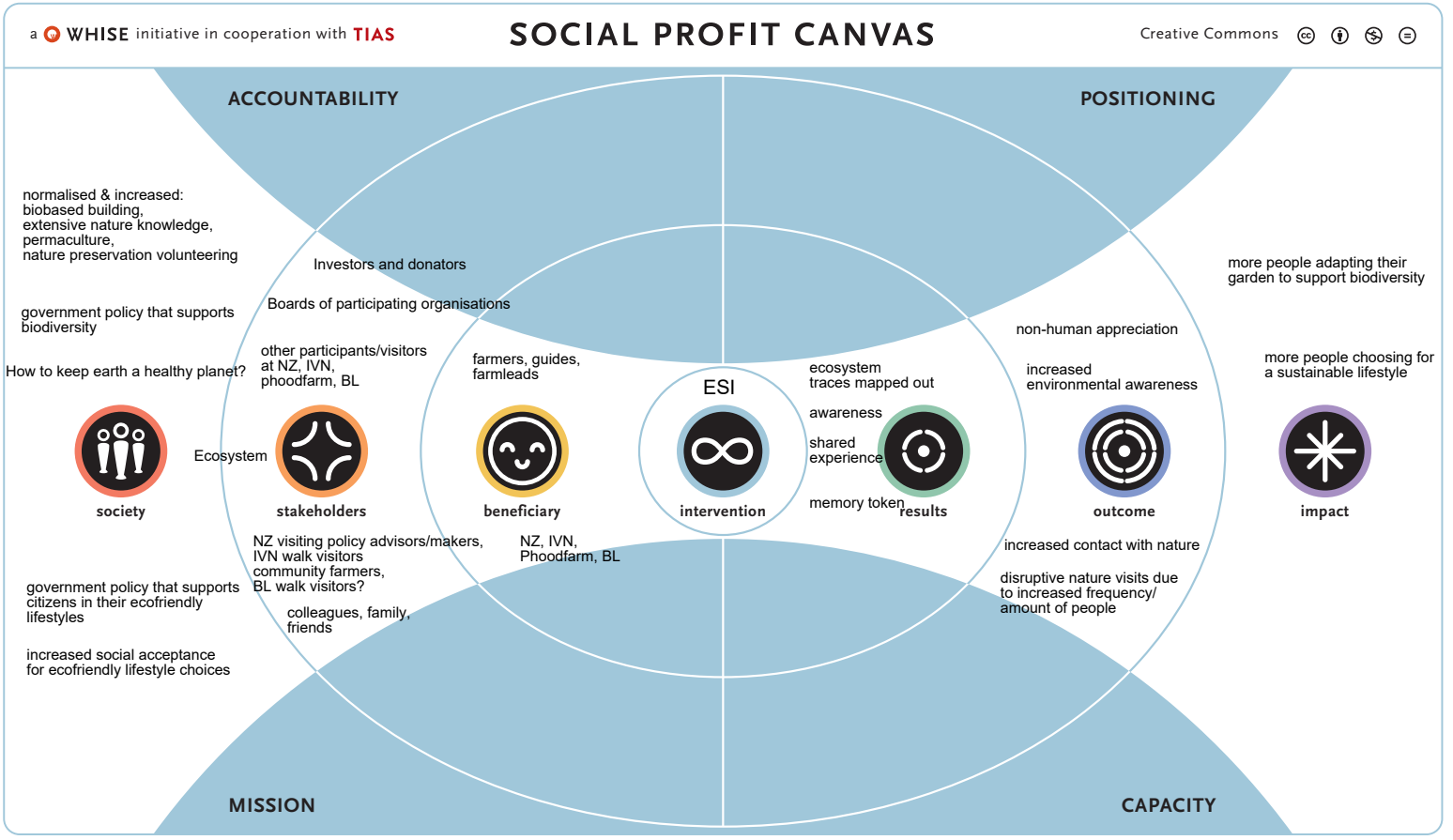


Figure 5.6 The Social Profit Canvas

EBSCO Publishing : eBook Collection (EBSCOhost) - printed on 11/10/2024 11:47 AM via TECHNISCHE UNIVERSITEIT EINDHOVEN
AN: 3242270 ; Marc Vermeulen, Anke Vroomen, Mark Wolbert, Jaap Hoenderdos, Harlan Cloete, Toni van Niekerk, Erwin Schwella.; Social Profit Canvas: Starting Point for Social Profit and Value
Account: s2738458.main.ehost

Copyright 2022. African Sun Media.
All rights reserved. May not be reproduced in any form without permission from the publisher, except fair uses permitted under U.S. or applicable copyright law.

8) impact canvas

The Sustainability Impact Canvas

Project: ESI | Owner: Luna | Version: 1

Positive Impact (Maximise)

Negative Impact (Minimise)

Technology / Product (direct 1st order effects)

Educate users about ecosystems and their entangled nature that also relates to humans and their behaviour

Encourage exploration of nature, strengthening a feeling of nature-connectedness

Encourage and support nature-related organisations to spread their knowledge and non-human appreciation

Use waterproof fabric made of recycled plastic

Plastics in fabrics & other ESI contents

metal

cotton

wood and paper

sewing machine

material transport

Waste generated *during disposal*

Aim for more local products in ESI of good quality

ESI modularity to enable its use in many different contexts

separate materials as well as possible for recycling

reuse and repurpose where possible

plastic, paper waste, glued materials

Application of Technology / Product (indirect 2nd order effects)

Using existing platforms and tools to reduce unnecessary development

Limiting production/ consumption by sharing ESI via depot system

Encourage repurposing and reuse of already owned materials in DIY instructions

Induction *(of resource consumption, e.g. energy)*

Obsolescence *(e.g. via shorter product life cycles)*

thermo printer paper

phone charge used when using camera/ Obsidentify/ maps

thermo printer charge

limited use when owned and used by one organisation

Societal & Structural Change (systemic 3rd order effects)

Incentivisation *(e.g. of fuel saving drive styles)*

Decision making *(e.g. via agent based models)*

intrinsic motivation for sustainable behaviours

ecosystem awareness

More subsidies for bringing people in contact with nature (helping communities and thus spreading the message)

Rebound effects *(e.g. via additional consumption)*

New risks *(e.g. via rising network vulnerability)*

people disrupting nature in their ESI activities

Overasking guides of (volunteer based) organisations

Threebility
threebility.com

View the instructions for this canvas and download our free Sustainable Business Model Innovation Game

The Sustainability Impact Canvas by Threebility is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

Y) user journeys: NZ, IUN UEU & BL, PF

These activities can blend into one activity throughout a tour

Journey Steps Which step of the experience are you describing?	**Invitation to Nieuw Zwanenburg** How are people invited?	**Arrival at Nieuw Zwanenburg (NZ)** How are they introduced to ESI?	**Case Introduction** What are the instructions?	**Case Speculation** What are the assumptions?	**Searching Evidence** How can they notice?	**Collecting Evidence** How can they collect?	**Connecting the Dots** What can we conclude together?	**Speculation** What if they had interfered by doing X?	**Concluding and Sharing** What do they take away?
Time & Location	X weeks in advance, digital	5 minutes, at NZ (outside general area, inside when having bad weather)	5 minutes, at case location (NZ)	~5 minutes, at case location (NZ)	15-30 minutes, around case location (NZ)	10 minutes, around case location (NZ)	20 minutes on case location (NZ)	5-10 minutes, on case location (NZ)	5 minutes closure, somewhere at NZ, sharing continues beyond
Actions What does the visitor do? What information do they look for? What is their context?	Read email or message with invitation to tour/event at NZ Find information about planned event (subscribe) Check agenda and RSVP	Look at ESI map with traces Save contact info of Head Inspector by scanning WhatsApp QR code Listen to information about the use of ESI Go to case location Gather for making a tour	Listen to case introduction and see trace pictures See the main evidence trace of the crime/mystery See and walk to other given traces Listen to some information about local ecosystem walk around NZ in tour	Thinking along when trying to list assumptions on suspects, witnesses, motives, traces Mentioning potential suspects etc. Asking questions to the head inspector writing down the assumptions on the chalkboard!	Form clues and take evidence markers and a magnifier/mirror Use tools and senses to notice Search for (traces of the) suspects, witnesses and other evidence discuss the type of traces you find Use detailed instruction cards when needing extra guidance	Mark found evidence Analyse the evidence (name, size, type, why there) Save location on maps Upload picture in Obsidentify to identify species & safe trace Take picture of found evidence and send to head inspector (kael) Take a sample when relevant/ possible?	Describe found trace and annotate what it is. Explain what this species means to you Place picture of trace in the categories "suspect" or "witness" Explain why it fits in that category Place location pin Connect related evidence, discussing how it relates to ecosystem relations, motives) Take group to physical evidence to have a better idea of what is likely driving it	Consider & reflect human & personal relation to the ecosystem Speculate about potential ways to have prevented the crime Explore & reflect on possible interventions that would have made on the revealed connections Think how you can help the ecosystem	Help cleaning up Share with the group what their take away message is and why, discussing main ideas. Share pictures and story of experience with colleagues Write down your personal ESI theory on what happened and your page in the guest book
Needs and Pains What does the visitor want to achieve or avoid? *Tip: Reduce ambiguity, e.g. by using the first person narrator.*	Reason for attending (for ranging value) Unclarity of what to expect regarding time and content.	Becoming intrigued/ interested Overview of what is (to be) expected Not understand the plan	Ability to hear the information remembering all information? some knowledge about what they are seeing on the trace evidence lack of concentration ?	feeling invited to speculate and free to make mistakes hints or some ecological knowledge guidance in structural thinking.	understand how the tool works knowing what to look for/ how to look (examples & guidance) feeling frustrated when unable to find/decide some assumptions don't leave traces or are not visible	knowing how to mark, upload and take samples (instructions) knowing when it is ethical to take a sample difficulty in capturing (movement, scale)	some ecological knowledge or expert to help make connections overview of the bigger picture (ecosystem) feeling overwhelmed by the amount of possible connections feeling like the case is inconclusive based on current findings	specific scenarios? examples of impact tired? losing concentration	casual atmosphere to talk freely & step back into their normal self memory token of experience finding the right audience or setting to talk about their experiences!
Touchpoint What part of the service do they interact with?	Invitation by organisation, mentioning of ESI activity (name/short explanation and reason for ESI)	Overview of steps/ instructions ESI map and chalkboard with case ESI explanation by head inspector	Case pictures map Head inspector's case introduction	Chalkboard with writing materials Head inspector's expertise	magnifiers, mirrors and other visual support tools detailed instruction cards Head inspector's expertise	Marker signs tape measure Identification booklet detailed instruction cards Head inspector's expertise	map with pins magnetic chalkboard with magnets thermoprinter thread and scissors chalk (marker) Head inspector's expertise	speculation scenario cards questions asked by the head inspector	ESI kit contents list to check completeness pictures taken during ESI
Visitor Feeling What is the customer feeling? *Tip: Use the **emoji app** to express more emotions*	📧 😀	📦 🤫 🧭	🤫 📋	📝 😶 🌼	🔍 🧐	📏 📷 🙂 🏷️	🎈 🤔 🗺️	⏳ 🤔	🌱 🤗 🐾
Backstage									
facilitator actions	Plan time to host the tour/ESI Check for potential traces and take some pictures Pick a case Install thermo printer app and connect with device Print the case picture with the thermo printer Place all pictures in the case and add some additional evidence to get the group started.	Explain about NZ practices Explain the purpose of ESI (clearing ecosystem disturbances, source motivation for sustainability) Introduce self as Head Inspector and shortly explain the steps taken in ESI Lead group around NZ to case location and bring ESI toolkit Share WhatsApp connect with participants ex. to share evidence via QR code in app.	Show mystery/ crime case Explain evidence Indicate crime location Explain own role as head investigator (expert to answer questions from the role of participants (investigators)	Ask guiding questions when it remains silent Answer audience questions Tell audience about species that are local Do not correct all wrong assumptions, as this will happen naturally	Handing out tools and ensuring people work together walking around giving hints where necessary answering questions	answer questions help naming species Lend out identification booklet to determine species' names gather group for final steps download whatsapp pictures	connect with thermo printer by turning on bluetooth and opening the app print whatsapp pictures in thermoprinter app Go one by one over the pictures with participants and let them explain and place the pictures and pins and annotate Connect the location and picture with a piece of red thread ask guiding questions about the connections between species and draws with chalk answer questions/ confirm suggested connections Collect evidence markers during visits to physical evidence.	Asking how they could have prevented the "crime" Asking reflective questions about the human role & impact Answering questions use speculation scenario cards (if needed	Mention option of writing personal theory on ESI in guest book Some concluding words listen to people's take away message Collect and store materials
Nieuw Zwanenburg actions	Invite participants/ visitors Plan for hosting the event/tour Keep track of accepted invites Ensure there is a big map on the board for ESI	Welcome visitors Give information about the planning/day? Other presentations ?			Help handing out materials keep track of time	help gathering the group take pictures of participants as memory	take pictures	Help answering and asking questions to provide a more interesting reflection	collect and store materials send taken pictures to participants
Role of Technology	online/digital communication digital planning/ calendar thermo printer app installation & bluetooth phone for taking pictures phone gps, for locating in combination with google maps	WhatsApp & QR scanners (camera) on phone	search internet for information when necessary?		Use identification app Use Google Maps to remember locations smart phone for taking pictures whatsapp and wiki4G for sending pictures to the head inspector	thermoprinter bluetooth google maps to check saved locations	search internet for information when necessary?	email/other digital communication
Design requirements to support the process & experience	Title 1 sentence description Instructions for setting up ESI Example cases to take inspiration from in setting up a new case	Casing that allows for transporting all tools to site Storyboard with steps to be taken	Chalk marker to write case title printed visual evidence Allowing the participants to come close to observe the evidence pictures Pins on map to indicate locations	listing space for speculations chalk(marker) examples?	noticing explanations/ guidance	instructions for how to capture and collect evidence How to share evidence with head inspector (instructions)	printer pins and magnets thread and scissors chalkmarker	illustrative examples of ecosystem interventions	Guestbook format for ESI theories

These activities blend into one iterative activity throughout a tour

Journey Steps Which step of the experience are you describing?	**Subscribing for public tour** How are people invited?	**Arrival at starting point tour** How are they introduced to ESI?	**Introduction Theme** What are the instructions?	**Ecosystem Speculation** What are the assumptions?	**Searching Evidence** How can they notice?	**Collecting Evidence** How can they collect?	**Connecting the Dots** What can we conclude together?	**Speculation** What if they had interfered by doing X?	**Concluding and Sharing** What do they take away?
Time & Location	X weeks in advance, digital	5 minutes, at starting point tour	5 minutes, at starting point tour	throughout 2 hour tour	throughout 2 hour tour	throughout 2 hour tour	throughout 2 hour tour	5-10 minutes at starting point of the tour	5 minutes closure, at starting point of the tour, sharing continues beyond
Actions What does the visitor do? What information do they look for? What is their context?	Find information about planned event on website or in local magazine Check agenda and RSVP	Look at ESI map with planned route Listen to information about the use of ESI Save contact info of Head Inspector by scanning WhatsApp QR code Gather for making a tour	Listen to information about local ecosystem Listen to theme introduction and see trace pictures Start walking tour listening to the introductions of mysteries	Thinking along when trying to list potential suspects, witnesses, mothers, tracers Mentioning potential suspects etc. Asking questions to the head inspector (guide) writing down the assumptions on the chalkboard!	Form duos and take evidence markers and a magnifier/mirror Use detailed instruction cards when needing extra guidance Use tools and senses to notice Search for (traces of the) suspects, witnesses and other evidence discuss the type of traces you find	Mark found evidence Analyse the evidence (name, size, type, why there) Save location on maps Upload picture in Obsidianity to identify species & safe trace Take picture of found evidence and send to head inspector (lead) Collect evidence marker Take a sample when relevant/ possible?	Describe found trace and annotate what it is. Explain what this species means to you Place picture of trace in the categories "evidence", "suspect" or "witness" Explain why it fits in that category Place location pin Connect related evidence/ species to ecosystem relations, mothers Take group to physical evidence to have a better idea of what is likely there/ is not	Consider & reflect human & personal relation to the ecosystem Explore & reflect on possible impacts on ecosystem interventions by humans Think how you can help the ecosystem	Help cleaning up Share with the group what their take away, message to world this workshop might share. Share pictures and story of experience with family/friends Write down your personal ESI theory on what happened on page in the guest book
Needs and Pains What does the visitor want to achieve or avoid? *Tip: Reduce ambiguity, e.g. by using the first person narrator.*	Reason for attending (bringing value) Unclarity of what to expect regarding time and content.	Becoming intrigued/ interested Overview of what is (to be) expected Not understand the plan bad weather	Ability to hear the information remembering all information? some knowledge about what they are seeing on the trace evidence lack of concentration ?	feeling invited to speculate and free to make mistakes hints or some ecological knowledge guidance in structural thinking.	understand how the tool works knowing what to look for/ how to look (examples & guidance) feeling frustrated when unable to find/decide some assumptions don't leave traces or are not visible	knowing how to mark, upload and take samples (instructions) knowing when it is ethical to take a sample difficulty in capturing (movement, scale)	some ecological knowledge or expert to help connections overview of the bigger picture (ecosystem) feeling overwhelmed by the amount of possible connections feeling like the case is inconclusive based on current findings	specific scenarios? examples of impact tired? losing concentration	casual atmosphere to talk freely & step back into their normal self memory token of experience finding the right audience or setting to talk about their experience?
Touchpoint What part of the service do they interact with?	Description by organisations, mentioning of ESI activity (name/short explanation and reason for ESI)	Overview of steps/ instructions ESI map and chalkboard ESI explanation by head inspector	Case pictures map Head inspector's case introduction	Chalkboard with writing materials Head inspector's expertise	magnifiers, mirrors and other visual support tools detailed instruction cards Head inspector's expertise	Marker signs tape measure Identification booklet detailed iinstruction cards Head inspector's expertise	map with pins magnetic chalkboard with magnets thermoprinter thread and scissors chalk (marker) Head inspector's expertise	speculation scenario cards questions asked by the head inspector	ESI kit contents list to check completeness pictures taken during ESI
Visitor Feeling What is the customer feeling? *Tip: Use the **emoji app** to express more emotions*									
Backstage									
facilitator (guide) actions	Plan time to host the tour/ESI Check for potential delays in the prewalk and what a story could be around that Ensure ESI is complete and ready for use Install thermo printer app and connect with device Print map with route Place map with route in ESI kit	General tour introduction Explain the purpose of ESI (sharing ecosystem knowledge) and its relevance for tourism motivation for sustainability Introduce self as Head Inspector and shortly explain the steps taken in ESI Share WhatsApp contact with participants or provide instruction via QR code in app	Talk about local ecosystem Introduce walk theme Take the group on tour Explain own role as head investigator (expert to answer questions) and role of participants (investigators) Introduce and discuss mysteries/ other things during the walk	Ask guiding questions when it remains silent Answer audience questions Tell audience about species that are local Do not correct all wrong assumptions, as this will happen naturally	Handing out tools and ensuring people work together walking around giving hints where necessary answering questions	answer questions help naming species Lend out identification booklet to determine species' names gather group for discussing findings download whatsapp pictures	connect with thermo printer by turning on bluetooth and opening the app print whatsapp pictures in thermoprinter app Go one by one over the pictures with participants and let them explain and share their answers with the group Connect the location and picture with a piece of red thread ask guiding questions about how each different species and draws with chalk answer questions/ confirm suggested connections	use speculation scenario cards (if needed Asking reflective questions about the human role & impact Answering questions	Mention option of writing personal theory on ESI in guest book Some concluding words listen to people's take away message Collect and store materials
Role of Technology	internet digital planning/ calendar thermo printer app installation & bluetooth printer google maps	WhatsApp & QR scanners (camera) on phone		search internet for information when necessary?		Use identification app Use Google Maps to remember locations smart phone for taking pictures whatsapp and wifi/4G for sending pictures to the head inspector	thermoprinter bluetooth google maps to check saved locations	search internet for information when necessary?	whatsapp? other digital communicati on
Design requirements to support the process & experience	Title 1 sentence description instructions for setting up ESI Example cases to take inspiration from in setting up a new case	Casing that allows for transporting all tools to one Storyboard with steps to be taken	Chalk marker to write theme title printed visual evidence Allowing the participants to come close to the visual evidence pictures Pins on map to indicate locations	listing space for speculations chalk(marker) examples?	noticing explanations/ guidance	Instructions for how to capture and collect evidence How to share evidence with head inspector (instructions)	printer pins and magnets thread and scissors chalkmarker	illustrative examples of ecosystem interventions	Guestbook format for ESI theories

These activities blend into one iterative activity throughout farming

Journey Steps Which step of the experience are you describing?	**Planning to go community farming** How are people preparing?	**Arrival at Rielse Erven** How are they introduced to ESI?	**Introduction Theme** What are the instructions?	**Ecosystem Speculation** What are the assumptions?	**Searching Evidence** How can they notice?	**Collecting Evidence** How can they collect?	**Connecting the Dots** What can we conclude together?	**Speculation** What if they had interfered by doing X?	**Concluding and Sharing** What do they take away?
Time & Location	X days in advance, digital	5 minutes at Rielse Erven (RE)	5 minutes (RE)	5 minutes (RE)	throughout work (RE)	throughout work (RE)	20 minutes (RE)	5-10 minutes (RE)	5 minutes closure, RE, sharing continues beyond
Actions What does the visitor do? What information do they look for? What is their context?	Information about this weeks activities/harvest in community & newsletter email Check agenda to decide when to go to Phood. Knowing how much time to plan to spend Hoping the weather will be good	Look at ESI map of Phood farm Listen to information about the use of ESI Save connect info of Head Inspector by scanning WhatsApp QR code Learn what needs to be done for work at the farm that day Overview of what is (to be) expected Becoming intrigued/ interested Not understand the plan bad weather	Listen to information about local ecosystem Listen to theme introduction (soils + permaculture topic) and see examples for picture Ability to hear the information remembering all information? some knowledge about what they are seeing on the trace evidence Lack of concentration ?	Thinking along when trying to be detective: suspects, witnesses, motives, traces Mentioning potential suspects etc. Asking questions to the head inspector (guide) writing down the assumptions on the chalkboard? feeling invited to speculate and free to make mistakes hints or some ecological knowledge guidance in structural thinking.	Start on the work that needs to be done Use tools like magnifier and senses to notice what non-human species are also working Search for (traces of the) suspects, witnesses and other evidence throughout the work discuss the type of traces you find with other participants Use detailed instruction cards when needing extra guidance understand how the tool works knowing what to look for/ how to look (examples & guidance) feeling frustrated when unable to find/decide some assumptions don't leave traces or are not visible	Mark found evidence Analyse the evidence (name, icon, type, why there) Save location on maps Upload picture in Obsidian/try to identify species & safe trace Take picture of found evidence and send to head inspector (lead) Take a sample when relevant/ possible? knowing how to mark, upload and take samples (instruction) knowing when it is ethical to take a sample difficulty in capturing (movement, scale) Having dirty hands with which you don't want to touch your phone?	Describe found trace and annotate what it is. Explain what this species means to you and how it relates to the permaculture theme Place picture of trace in the categories "evidence", "suspect" or "witness" Explain why it fits in that category Place location pin Connect related evidence, discovering how it is related + ecosystem relations, motives) Take group to physical evidence to have a better idea of what a likely story is some ecological knowledge or expert to help make connections overview of the bigger picture (ecosystem) feeling overwhelmed by the amount of possible connections feeling like the Lake is inconclusive based on current findings	Consider & reflect human & personal relation to the ecosystem Explore & reflect on possible impact on ecosystem interventions by humans (in relation to permaculture) Think how you can help the ecosystem specific scenarios? examples of impact tired? losing concentration	Help cleaning up Collect evidence markers Share with the group what their take away message to/ what they would like to share with them. Share pictures and story of experience with family/friends Write down your personal ESI theory on what happened on page in the guest book casual atmosphere to talk freely & step back into their normal self memory token of experience finding the right audience or setting to talk about their experience?
Needs and Pains What does the visitor want to achieve or avoid? *Tip: Reduce ambiguity, e.g. by using the first person narrator.*									
Touchpoint What part of the service do they interact with?	Description by organisation, mentioning of ESI activity (name/short explanation and reason for ESI)	Overview of steps/ instructions ESI map and chalkboard ESI explanation by head inspector	Case pictures map Head inspector's case introduction	Chalkboard with writing materials Head inspector's expertise	magnifiers, mirrors and other visual support tools detailed instruction cards Head inspector's expertise	Marker signs tape measure Identification booklet detailed instruction cards Head inspector's expertise	map with pins magnetic chalkboard with magnets thermoprinter thread and scissors chalk (marker) Head Inspector's expertise	speculation scenario cards questions asked by the head inspector Permaculture intervention cards	ESI kit contents list to check completeness pictures taken during ESI
Visitor Feeling What is the customer feeling? *Tip: Use the **emoji app** to express more emotions*									
Backstage									
facilitator (farmlead) actions	Plan moment to host ESI Check for potential activities happening at the farm and what the relation to permaculture principles can be (theme) Take pictures of some illustrative example traces for the theme. Ensure ESI is complete and ready for use Install thermo printer app and connect with them to print illustrative pictures of example traces found. Ensure there is a big map on the board for ESI	General introduction of what is to be done that day Explain the purpose of ESI (sharing viewpoints, awareness for tension motivation for sustainability) Introduce self as Head Inspector and shortly explain the steps taken in ESI Share WhatsApp contact with participants as well as provide via QR code in app.	Talk about local ecosystem Introduce walk theme Explain own role as head investigator (expert in) answer questions and role of participants (investigators)	Ask guiding questions when it remains silent Answer audience questions Tell audience about species that are local Do not correct all wrong assumptions, as this will happen naturally	Handing out tools and ensuring people work together walking around giving hints where necessary answering questions Working at the farm Directing people to what to work on	answer questions help naming species Lend out identification booklet to determine species' names gather group for discussing findings download whatsapp pictures	connect with thermo printer by turning on bluetooth and opening the app print whatsapp pictures in thermoprinter app Go one by one over the pictures the participants wrote them explain and place pictures, values and emotions Connect the location and picture with a piece of red thread ask guiding questions about the connections between species and draw with chalk answer questions/ confirm suggested connections	use speculation scenario cards (if needed Use permaculture intervention cards to educate about permaculture practices Asking reflective questions about the human role & impact Answering questions	Mention option of writing personal theory on ESI in guest book Some concluding words listen to people's take away message Collect and store materials
Role of Technology	internet digital planning/ calendar thermo printer app installation & bluetooth printer google maps	WhatsApp & QR scanners (camera) on phone		search internet for information when necessary?		Use identification app Use Google Maps to remember locations smart phone for taking pictures whatsapp and wifi/4G for sending pictures to the head inspector	thermoprinter bluetooth google maps to check saved locations	search internet for information when necessary?	whatsapp? other digital communication
Design requirements to support the process & experience	Title 1 sentence description instructions for setting up ESI Example cases to take inspiration from in setting up a new case	Casing that allows for transporting all tools to site Storyboard with steps to be taken	Chalk marker to write theme title printed visual evidence Allowing the participants to come close to and touch the collected pictures Pins on map to indicate locations	listing space for speculations chalk(marker) examples?	noticing explanations/ guidance	instructions for how to capture and collect evidence How to share evidence with head inspector (instructions)	printer pins and magnets thread and scissors chalkmarker	illustrative examples of ecosystem interventions illustrative examples of permaculture methods	Guestbook format for ESI theories

Z) Costs for ESI

Type of costs		Purchased amount/ amount of hours	Price	Mimimal required amount	Minimal amount price	ideas to reduce	with reduction
	Outer fabric	1 m x 1,40 m	10		6.5		6.5
	Lining fabric	1 m x 1,40 m	5		3.25		3.25
	Accent fabric	0,70 m x 150 m	10		4.9		4.9
	D rings	4	4.8	4	4.8	recycle from old bags	4.8
	Snap hooks	2	4.58	2	4.58	recycle from old bags	4.58
	Slider	2	3.7	2	3.7	recycle from old bags	3.7
	Big buttons	3	3.27	3	3.27	recycle from old bags	3.27
	Small buttons	6	3.5	4	2.33	recycle from old bags	2.33
	Broad band	4 m	9	2,50 m	5.5		5.5
	Small band	5 m	2.95	1,20 m	0.71		0.71
	Thin elastic band	6 m	1.65	0,90 m	0.25		0.25
	Broad elastic band	4 m	4.6	2,50 m	2.88		2.88
	Black thread	500	2.89	~ 50 m	0.29		0.29
	Beige thread	500	2.89	~ 60 m	0.35		0.35
	Zipper	1,20 m	7.95	1,20 m	7.95	recycle from old bags	7.95
	Rope for handles	10 m	4.33	0, 40 m	0.17	recycle from old bags	0.17
Materials bag	Rope for attaching boards	110 m	9.99	1,00 m	0.1		0.1
	Magnetic chalk board	1	17.75	1	9.95		9.95
	Pin board	1	14.75	1	14.75	use 2 magnetic chalkboards	9.95
	Magnets	32	13.99	32	13.99		13.99
	Pushpins	40	13.95	40	13.95	use magnets for both	13.99
	tube	1		1		not super necessary	
	Chalk	8	1.25	1	0.16	not super necessary	
	Chalk marker	1	3.99	1	3.99		3.99
	Scissors	1	6.84	1	6.84	reuse old ones	
	Red embroirdery thread	1,60 m	2.99	1,60 m	2.99		2.99
	Thermoprinter	1	26.99	1	26.99		26.99
	Magnifying mirror	1	1.59	1	1.59	not super necessary	
	Magnifiers	5	7.49	5	7.49	Use phone camera magnification	
	IVN Speuren & Zoeken booklet	1	20.95	1	20.95	not super necessary	
	Measurement tape	1	2.3	1	2.3	use old one	
	Felt for protectionsheets	2	2.2	2	2.2	not super necessary	
	Petridish	1		1		not super necessary	
	Wooden sticks	100	0.54	10	0.05		0.05
	Wooden labels	20	3.79	10	1.9		1.9
	Chalkboard paint	250 ml	7.99	10 ml	0.32	could also be a permanent marker	
	A3 with instructions laminated	2	2.5	2	2.5		2.5
	A5 laminated (elaborate instructions)	6	2.5	6	2.5		2.5
Materials bag content	1x content card laminated	1	0.5	1	0.5		0.5
			245.95		187.44		140.83
	Sewing machine	1		1			
	Fabric scissors	1		1			
	Normal scissors	1		1			
	Printer	1		1			
	Laminating device	1		1			
	Ruler	1		1			
	Paper cutter	1		1			
	Paint brush	1		1			
	Pins	1		1			
Production tools	Needle	1		1			
	Sewing machine						
Production tool maintenance	Printer ink						
	Cutting fabric	2,67 hours		1?			
	Sewing bag	~ 35 hours		25 hours?			
	Purchasing materials	5 hours		1 hours			
	Making marker sticks	1 hour		0,25 hour			
Work hours	Making laminated cards	2 hours		1,5 hour?			
	Prototyping materials						
development costs	Development hours						

Ethical Review Form

(Version 2.1)

This Ethical Review Form should be completed for every research study that involves human participants or personally identifiable personal data and should be submitted to ethics@tue.nl. For more information about how this process works please click here. Please check if you are using the correct form: Ethical Review Form (version 2.1). Please click here to obtain this latest version.

Part 1: General Study Information

1	Project title / Study name	Sharing Non-Human Appreciation
2	Name of the researcher / student	Luna Snelder
3	Email of the researcher / student	l.c.snelder@student.tue.nl
4	Supervisor(s) name(s) *Additional explanation: Please write down the name of your direct supervisor. You can mention several supervisors if appropriate, but at least one supervisor should be mentioned.*	Daisy Yoo
5	Supervisor(s) email address(es) *Additional explanation: Please give the email address of the supervisor(s) mentioned in question 4.*	d.yoo@tue.nl
6	Department / Group *Additional explanation: Please specify group if relevant e.g. JADS or HTI*	Industrial Design
7	What is the purpose of this application?	☐ Scientific study ☐ Bachelor education. Course:…….. ☒ Master education. Course: Final Master Project ☐ Other (e.g. external, following external regulations):……..…
8	Research location *Additional explanation: Where will the data collection take place? On campus, in a company, in public space, online, etc.*	☒ Eindhoven University of Technology campus ☒ Other, name organization(s): IVN Veldhoven-Eindhoven-Vessem, Nieuw Zwanenburg, Phoodfarm, Brabants Landschap ☒ Public space ☒ Online
9	Start date data collection *Additional explanation: Please state when your data collection will start. Please note that you do not have to provide information about your complete (PhD) project, but only on this particular sub-study that you are submitting for approval in this form.*	24/10/2024
10	End date data collection	1/2/2025
11	Does your project receive external funding (e.g., NWO, relevant for special regulations from funders)?	☐ Yes. Name Funder: ☒ No

Ethical Review Form

12	Which internal and external parties are involved in the study? Think about sharing data or information between TU/e and other universities, commercial companies, hospitals, etc. *<u>Additional explanation</u>: Describe all internal and external parties that are involved in the study or project, including:* • *researchers or research groups at the TU/e who participate in the study;* • *(Researchers at) other universities/institutions that provide data/services, help analyzing the data, etc.;*	Internal parties • Researcher(s): Luna Snelder • Supervisor: Daisy Yoo • 2nd assessor: Lenneke Kuijer

Ethical Review Form

	• *(commercial) partners, companies, government bodies, municipalities, consultancy firms, hospitals or care institutions that provide data (e.g., contact details of participants, data for further analysis).* *Indicate which role each party plays: who defines the means and purposes in the study, who will supply the data (external parties?), who will process/handle the data, who will be able to access the data during and after research (only researchers at TU/e or also others)?*	External parties • Other universities/institutions: • Others: Organisations that are involved in nature education, nature preservation, or have sustainable ideals and practice some form of agriculture, such as: IVN Veldhoven-Eindhoven-Vessem, Nieuw Zwanenburg, Phoodfarm, Brabants Landschap • These organisations will be studied, facilitate as locations, and will learn (intermediary) results of studies. ☐ ☐
13	Have any special agreements already been made with an external party, such as a Non-Disclosure Agreement (NDA) or a data sharing agreement?	☐ Yes, namely: ☒ No
14	Has your proposal already been approved by an external Ethical Review Board or Medical Ethical Review Board? *Additional explanation: For example, when you are collaborating with another university and the project has been approved by their Ethical Review Board, or when you received a WMO-waiver from a Medical Ethical Review Board.*	☐ Yes ☒ No
15	If yes: Please provide the name, date of approval and contact details of the ERB. Please also include the registered number for your project approval. Additionally, please send in the Ethical Review Form upon which ethical approval was granted together with this form.	
16	If you process personal data that are likely to result in high privacy risks for participants, you need to perform a Data Protection Impact Assessment (DPIA). Have you done this for this or a very similar project? ***Please read the information below: a DPIA is not the same as a regular privacy impact assessment. More detailed questions on privacy will follow in the section below.*** *Additional explanation: A Data Protection Impact Assessment (DPIA) is a formal document that must be drafted under the guidelines of the General Data Protection Regulation (GDPR). Think of research with vulnerable people, high-risk medical research,* *The Dutch DPA (Autoriteit Persoonsgegevens) and our website provides more information about a DPIA.*	☒ Not applicable (no high privacy risks) ☐ Yes (the form is attached to the application) ☐ No

Part 2: Medical study

Ethical Review Form

1	Does the study have a medical scientific research question or claim? *Additional explanation: Medical/scientific research is research which is carried out with the aim of finding answers to a question in the field of illness and health (etiology, pathogenesis, signs/symptoms, diagnosis, prevention, outcome or treatment of illness), by systematically collecting and analyzing data. The research is carried out with the intention of contributing to medical knowledge which can also be applied to populations outside of the direct research population. If your research contains questions about health and health related parameters (such as well-being, vitality, feelings of anxiety or stress) but your research question is not primarily medical, then you can answer 'no' to this question.*	☐ Yes* ☒ No *If yes or in doubt, please contact Susan Hommerson via s.m.hommerson@tue.nl

Ethical Review Form

Part 3: Use of (medical) devices in the study		
1	Does your research include a device? *Additional explanation: A device is a complete piece of physical hardware that is used to compute or support computer functions within a larger system. Devices can be divided into input-, output-, storage-, internet of things-, or mobile device.*	☒ Yes, not self-made ☒ Yes, self-made ☐ No
2	Please describe your device or link to an online description of the device	Not self-made: Smartphone, NFC tags, scanner/printer Self-made: probes that enable users to perceive natural phenomena that require the assistance of a technology to become noticeable for humans. This can involve various sensors (humidity, sunlight, temperature) and visualization of that data through movement/vibration/LED/LCD screen or via a not self-made device.
3a	Will you use a device that is 'CE' certified for **unintended use** (meaning you will use existing CE certified devices for other things than they were originally intended for) or use a device that is not 'CE' certified? *Additional explanation: You can find more information about CE certification here*	☒ Yes ☐ No
3b	If yes: Please explain to what extent the device was assembled according to relevant standards and provide a risk assessment *Additional explanation: You can find more information about a risk assessment here*	The research-though-design approach will involve user testing physical prototypes built by the student. While the resulting devices are not CE certified per se, the electronics components used in the making process (e.g. Arduino, Raspberry Pi, etc) bears CE and/or FCC marks which is tested and certified to comply with the EC directives. Furthermore, the output voltage of devices are limited to 25V, unless exceptional cases approved by e-lab.
3c	If yes: Do you use a device or software that has a medical purpose such as diagnosis, prevention, monitoring, prediction, prognosis, treatment or alleviation of disease or injury?	☐ Yes, my device or software currently has a medical purpose ☐ Yes, my device or software could have a medical purpose in the near future ☒ No ☐ I'm not sure
Part 4: Information about the study		
1	What are your main research questions? *Additional explanation: You need to provide at least one clear research question.*	How can we design a tool to enable people who experience non-human appreciation to share that beyond their community? How can the tool for sharing non-human appreciation be applied in different communities? How can it be scaled? How does the use of the designed tool affect people's perspective/mindset?

Ethical Review Form

2a	Please check the box that indicates the relevant study population *Additional explanation: Please select which persons are eligible for your study.*	☐ Students ☒ General healthy population ☒ General population with a specific feature, specifically, people who appreciate nature ☐ Patients, specifically …….... ☒ Other, specifically people working at/with/participating in the activities of the following organisations or similar organisations : IVN Veldhoven-Eindhoven-Vessem, Nieuw Zwanenburg, Phoodfarm, Brabants Landschap
2b	Age category of participants	☐ Younger than 12 years of age ☐ Older than 11 and younger than 16 years of age ☒ 16 years or older
3	Description of the research method (select all that applies)	☒ (Semi-structured) interviews ☒ Surveys

Ethical Review Form

	Additional explanation: Please specify your research method. Note that you need to provide information about the research method in an additional file that you attach to the ERB form. E.g., for interviews you provide the interview questions, for surveys you provide the survey questions, etc.	☒ Group workshops/roundtable discussions ☒ Diary studies ☒ Behavioral observations ☒ Building sensor data ☐ Wearable device (e.g. Fitbit watch, on-skin sensors) ☒ User testing ☒ Pilot study ☐ GPS tracking/location data ☐ Living Lab ☒ Other, namely contextual inquiry, ethnography, co-creation
4	Description of the measurements and/or stimuli/treatments *Additional explanation: Think about your outcome measures and the variables you will be collecting and describe them in a way such that another person understands what the participant will experience.* *For example: Participants will perform task A and see pictures from database B, and we measure validated Scale 1.*	**Interviews:** Interviews will be held to learn about the interviewee's background related to the topic of nature/design/storytelling, about how their experience in nature affects their perspective, about their ideas and concerns for the design that is developed, and about their use or implementation of the design. **Surveys:** Surveys will involve collecting data about basic demographics, user experience (user evaluation questionnaire), associated ideas, and feedback on concepts. Participants will read descriptions of the proposed design concepts/artifacts, watch a video explaining the design, or see pictures of the design. **Group workshops/roundtable discussions:** In group workshops and discussions, participants will be presented with the context about the project, possibly including prototypes. They will be asked to try these prototypes and/or reflect on their use, voicing their opinions and discussing possibilities. They might also be asked to ideate about improvements or alternatives. **Diary studies:** In diary studies, participants will be asked to take some sort of diary probe with them together with a prototype that functions as/enables making a “tangible memory” (a token that represents a specific non-human appreciative experience). In this diary they will be asked to describe how the “tangible memory” prototype supports them in storytelling about their non-human appreciative experience and how the people they interact with receive that story. **Behavioral observations:** I will observe participants in the context of their communities to gain an understanding of how they work with the nature. I will also observe participants when using/testing a prototype, to understand how they understand the design, and how it can be improved. **Contextual inquiry:** This is a specific semi-structured or unstructured interview method that takes place in a relevant context (in my case in a natural environment for an activity of one of the collaborating organisations). The participant is asked questions while working on the organisation’s activity. These questions concern the work relevant to that activity or location. This allows for more illustrated data, as the context allows the participant to give examples or to

demonstrate specific actions.

Ethnography:
Form of observation and possibly researcher participation to describe practices. The participants will do their activities or participate in a user testing activity and the researcher will take notes and sketches of their behaviour/interaction with the prototypes. The researcher might ask some questions during the work (contextual inquiry). These notes will be worked out into a descriptive story including researcher's reflections.

Building sensor data:
The prototype for noticing & sharing (described in Part 3 question 2) can involve sensors that capture parts of the ecological context (seasons, temperatures, animals, etc.). This data enables participants to notice parts of nature that they cannot perceive with their human senses at that time and place. This data might also be transformed into some form of "tangible memory" as described above, which can be shared with other people.

User testing:
For user testing, the participants will be asked to use the designed prototypes as intended by the designer. This means that they will use the provided prototypes to guide them in noticing nature and their phenomena and that they will capture some form of tangible memory using the prototype. Possibly, they will be asked to share this experience with someone else, using the tangible memory as support.

They will be observed, possibly fill in a survey about their experience or answer questions. They can also be asked to think aloud during the procedure to let the researcher understand the interaction between the design and the user on a deeper level. The focus is on usability and user experience.

Pilot study:
In a pilot study, an initial test is done for user testing or a diary study, but with a smaller or diverging population or in an alternative setting. The goal is to prepare for a bigger study based on initial insights such as time estimates and procedure order.

Co-creation:
The participants will be asked to ideate/prototype along with the researcher and provide their opinions and ideas. They can be asked to draw or craft with basic materials like scissors and tape. They can also be asked to map data collected about their organisation/activity and reflect on it.

All research activities are aimed at evaluating and improving the quality of the design and giving the participating organisations and individuals agency in its development and format. Depending on what stage the development of the design is in, a suitable research activity (described above) will be utilised.

Group Workshop at DDW 2025 (event title: DU dialogue Thriving Planet):
The participants in the workshop will be asked to walk around a location (for example, the area around Natlab or Strijp-S) and find a place to make observations. They will be instructed to kneel on a provided towel and use cards

		with instructions for observing nature in that environment more closely through a magnifying glass, games or sensory exploration in duos. They are free to choose which card they want to use and how they want to use it, based on what interests them. The focus is on noticing non-humans. They will engage in this activity for about 15 minutes, followed by a discussion on how this affected their perspective and what things they noticed differently. If they give consent, I will observe them and photograph their actions in an unidentifiable manner (e.g., image focusing on hands or pictures taken from the back (no faces)). These observations and pictures will be potentially used in reports or presentations with proper anonymisation.
5	Describe and justify the number of participants you need for this study. Also justify the number of observations you need, taking into account the risks and benefits. *Additional explanation: Think about if you need 3 or 30 participants for example, and why? Do they need to provide their input once, or several times, and why? If relevant, specify the duration of the study per participant and the compensation that is needed for the study.*	**Interviews:** 5-15 in total. At least one per participating organisations, and more for other participants outside of organisations or to obtain a more thorough perspective of the members of the organisations. **Surveys:** 20-500. This is targeted at quantitative data e.g., for design evaluation. **Group workshops/roundtable discussions:** 3-35 participants per session. Sessions will occur at least 4 times, but the size will be depend on different needs and availabilities of the participating group/organisations. **Diary studies:** 3-10 participants in total. To give initial insight in how the tool affects storytelling about non-human appreciative experiences. **Behavioral observations:** 3-20 participants per session. Some contexts will involve a group of up to 20 people, which means that that is the maximum of people that will be observed in a single session. **Contextual inquiry & ethnography:** 3-20 participants per session. Some contexts will involve a group of up to 20 people, which means that that is the maximum of people that will be observed in a single session. **Building sensor data:** 3-20 participants per session where the prototype is used to capture and share natural phenomena. Sessions will occur at least 4 times, but the size will be depend on different needs and availabilities of the participating group/organisations.. **User testing:** 1-20 participants per session where the prototype is used to test its usability and functioning in context. Sessions will occur at least 4 times, but the size will be depend on different needs and availabilities of the participating group/organisations. **Pilot study:** 2-10 participants per session, I will do probably up to 3 pilot studies in this project. **Co-creation:** 3-20 participants per session. Sessions will occur

		approximately 4 times, but the size will be depend on different needs and availabilities of the participating group/organisations..
6	Explain why your research is societally important. What benefits and harm to society may result from the study? *Additional explanation: What benefit will the results of your study have to society in general?*	When people are supported in sharing their non-human appreciation, this could result in more people treating the environment with more care and making more sustainable lifestyle choices. It could result in a movement that grows and increases intrinsic motivation for sustainable behaviours, rather than the sometimes negative feelings people experience around that transition.
7	Describe the way participants will be recruited *Additional explanation: How will you recruit participants for your study? For example, by using flyers, personal network, panels, etc.*	☒ Survey link posted online, e.g., social media platforms ☐ On campus flyers ☒ Personal network ☐ Via a company, namely …….. ☐ Via a hospital, namely …….. ☒ Via an organization: IVN, Nieuw Zwanenburg, Phoodfarm, Brabants Landschap ☐ By a Consortium Partner, namely …… ☐ Other, namely ……..
8	Provide a brief statement of the risks you expect for the participants or others involved in the study and explain. Also take into consideration any personal data you may gather and associated privacy issues. *Additional explanation: Risks for the participants can be anything from risk of data breach to risk of safety or well-being (think about stress, extreme emotions, visual or auditory discomfort). Describe these possible risks and describe the way these risks are mitigated.*	This study is minimal risk. No risk in this study will be more uncomfortable than what participants experience in their daily lives. Participants may feel interrupted at work. I will first check with potential participants informally and verbally, asking them if they mind if I interview/observe them and act accordingly. Then upon verbal consent, I will also formally inform the participants with an informed consent form upfront before entering the research. There is also a slight risk of a data breach if the MS OneDrive account is hacked. Participants will be informed when that happens. I will only collect minimal personal information to ensure that limited sensitive information will be shared. All the personal data collected during the study will be processed confidentially and research subjects will never be recognizable in publications, academic material or any other means. The data collected during the study are voice recordings and pictures. After the interviews are transcribed, the voice recording will immediately be deleted. The pictures that can be taken will have no recognizable person in them or will be anonymized. The un-anonymized pictures will immediately be deleted.

Ethical Review Form

Part 5: Self-assessment checklist

	Note: answers in the blue boxes indicate that your research is eligible for fast-track approval	Yes	No
1a	Does the study involve human material? (e.g., surgery waste material derived from non-commercial organizations such as hospitals)		X
1b	Will blood or other (bio)samples be obtained from participants? (e.g., hair, sweat, urine or other bodily fluids or secretions, also external imaging of the body)		X
2	Will the participants give their consent – on a voluntary basis – either digitally or on paper? Or have they given consent in the past for the purpose of education or for re-use in line with the current research question?	X	
3	Are the participants, outside the context of the research, in a dependent or subordinate position to the investigator? Additional explanation: Think about doing research on your own students or on your own employees. When there is a dependency or power imbalance between you and the research participants, you need to answer 'yes' to this question.		X
4	Does the study involve participants who are particularly vulnerable or unable to give informed consent? (e.g., children (<16 years of age), people with learning difficulties, patients, people receiving counselling, people living in care or nursing homes, people recruited through self-help groups)		X
5	Will participating in the research be burdensome? (e.g., requiring participants to wear a device 24/7 for several weeks, to fill in questionnaires for hours, to travel long distances to a research location, to be interviewed multiple times)?		X
6	May the research procedure cause harm or discomfort to the participant in any way? (e.g., causing pain or more than mild discomfort, stress, anxiety or by administering drinks, foods, drugs, or showing explicit visual material)		X
7	Will financial inducement (other than reasonable expenses and compensation for time) be offered to participants? Additional explanation: For an explanation of what is considered a reasonable compensation, see the topic participant fees from the HTI group		X
8a	Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (e.g., covert observation of people)		X
8b	If yes: Will you be observing people without their knowledge in public space? (e.g. on the street, at a bus-stop)		
9	Will the study involve actively deceiving the participants? (e.g., will participants be deliberately falsely informed, will information be withheld from them, or will they be misled in such a way that they are likely to object or show unease when debriefed about the study)		X
10	Will participants be asked to discuss or report sexual experiences, religion, alcohol or drug use, suicidal thoughts, or other topics that are highly personal or intimate? Additional explanation: Think about your research population. For some participants, particular topics can be considered sensitive or intimate, whereas the same topics will not be perceived as such by other participants.		X
11	Elaborate on all boxes answered outside of the blue boxes in part 5. Describe how you safeguard any potential risk for the research participant.		

Ethical Review Form

Part 6: Self-assessment on privacy

The following questions (1-11) concern privacy issues, as laid down in the General Data Protection Regulation (GDPR). The Data Stewards and – if necessary – privacy team of TU/e will assess these questions. In some cases, more information is required to assess the privacy risks. If this is the case, you will be notified that the Data Stewards team will contact you.

The GDPR defines 'personal data' as any information relating to an identified or identifiable natural person ('data subject'). Personal data also includes data that indirectly reveals something about a natural person. Personal data can lead to the physical, physiological, genetic, mental, economic, cultural or social identity of a natural person. There are two main categories of personal data: regular personal data and special category personal data.

If you are not sure whether some of these questions below should be answered with a Yes or No, please contact a Data Steward first through rdmsupport@tue.nl.

	Note: answers in the blue boxes indicate that your research is eligible for fast-track approval	**Yes**	**No**
1	Will the study involve discussion/collection/processing of **regular** personal data, or will you collect and (temporarily) store video or voice recordings for the purpose of conducting interviews? *Additional explanation: For example, name, address, phone number, email address, IP address, gender, age, video or interview recordings? If you are not sure whether your data contains personal data, please contact the Data Stewards Team (rdmsupport@tue.nl).*	X	
1A	If yes: Please describe which regular personal data you will collect in this study?	Name, occupation, gender, age	
2	Will the study involve discussion/collection/processing of **special category** personal data or other **sensitive data**? *Additional explanation: Examples of special category personal data are race, religion, health information, political views, genetic or biometric data for the unique identification of a person, sexual preference, etc. Health information concerns personal data of the physical or mental health of persons, including the provision of health care. Examples of other sensitive data is information such as communication data, financial records or credit scores, camera surveillance data, location/GPS data, internet-of-things data, employee monitoring, observing or influencing behaviour, criminal records, data of vulnerable persons (children, people with disabilities, refugees), BSN number etc. Please be aware that the use of special category personal data in research requires extra security measurements in order to safeguard the privacy of data subjects and to comply with the GDPR. Processing of this special category data is prohibited, except for specific purposes and under certain circumstances. If you need to process special category data, please consult the data stewards at rdmsupport@tue.nl.*		X
2A	If yes: Please describe which special-category personal data and/or sensitive data you will collect in this study?		

If you answered yes to either question 1 or 2, please answer the questions below. If you answered no to both questions, you can skip this part and continue onto part 7. Also, if an answer to any of the following questions is 'yes', please contact a Data Steward at rdmsupport@tue.nl

		Yes	**No**

3	Will your project involve the processing of personal data on a **large scale**? *<u>Additional explanation</u>: In general, any processing that involves more than 10.000 data subjects should be considered "large scale". However, if the data of approximately 1000 persons (or more) are involved, the data processing may still be considered large scale. In that case, besides the number of persons involved in the study, one should also assess (i) the amount of data collected from these persons taking into account the type/risk level of the personal data, (ii) the duration of the data processing, (iii) the geographic scope or extent of the processing. For example, if you would collect and process data across several European countries with 10+ socio-economic data items of 1200 individual persons for several years in a row, that is likely "large-scale processing". Other examples of a large-scale processing activity are:* • *Monitoring driving behavior of road users on Dutch highways* • *Collecting data of Covid patients* • *A hospital that processes patient data as part of its usual operations*		X

Ethical Review Form

	• *A transport company that processes travel information of people who travel by public transport in a certain city. For example, by tracking them through travel maps.*		
4	Does this processing activity involve the use of new or innovative technologies? *Examples of a new technology: combining fingerprints and facial recognition for physical access control, the use of bodycams in public spaces, the use of new technical methods in conducting research such as AI. This question also refers to new technologies that have not been deployed by TU/e so far.*		X
5	Does your study involve systematic (c.q. automated) monitoring of persons? *Additional explanation: Consider data processing activities that have the purpose of observing, monitoring or controlling individuals, for example in circumstances where the individuals are not aware by whom their personal data is collected and how it is used. Examples of such activities are using camera systems to monitor driving behavior on highways, monitoring email inactivity or employee phone use, certain applications of machine learning and artificial intelligence.*		X
6	Does the study involve collaborations (with third parties) in which data are shared or exchanged in order to link or combine data? *Additional explanation: This may often apply in a collaboration between the university and a commercial party, contract research, etc. It is important to assess this for all data in the entire project, not just your own data.* *An important consideration in this situation is whether the person whose data is involved could have expected that data from these different databases or sources of information were to be combined. For example, it is less likely for data subjects to expect that databases from different parties will be combined and the results are used for different purposes than one could reasonably expect; this may apply for example in a collaboration between the university and a commercial party.*		X
7	Will the study include data processing activities that prevent data subjects from exercising their rights or using a service or contract? *Additional explanation: Examples include processing operations carried out in public places that people cannot avoid (train station, airport, shopping mall, public university premises, etc.) or processing operations whose purpose is to allow or not allow data subjects to use a service or enter into a contract (examples: by refusing to pay a benefit, not being able to apply for a loan, etc.).*		X
8	Will the study process personal data to score, rank or profile persons? *Additional explanation: Examples: monitoring (highway) roads to give road users a "score" based on their detected driving behavior, a bank assessing its customers based on their creditworthiness, or an organization building behavioral and marketing profiles based on use of their website or navigating their website.*		X
9	Does your data processing include activities that involves composing "**blacklists**" – and, in particular, in relation to sensitive or special category data, such as communication data, financial records or credit scores, genetic data, biometric data, health data, camera surveillance data, location/GPS data, internet-of-things data, employee monitoring, observing or influencing behaviour, etc. *Additional explanation: This situation will not be a common occurrence in research, but you may indirectly be involved in this. In general, this typically concerns processing operations involving personal data relating to criminal convictions and offences, data relating to unlawful acts, data concerning unlawful or annoying behaviour or data concerning bad payment behaviour by companies or individuals are processed and shared with third parties (blacklists or warning lists, as used, for example, by insurers, hospitality companies shopping companies, telecom providers as well as blacklists relating to unlawful behavior of employees, for example in the healthcare sector or by employment agencies, etc.).*		X
10	Will personal data be transferred or shared outside the EU/EEA? EU data protection rules apply to the European Economic Area (EEA), which includes all EU countries and non-EU countries Iceland, Liechtenstein and Norway. *Additional explanation: The GDPR has drafted additional requirements for transfers data outside of the EU/EEA. Typically, additional safeguards must be implemented to protect the personal data of residents in the European Union. For example, if you collaborate with an American, Indian or Chinese university or other third party outside the EU/EEA, you must first check whether this is allowed and under which conditions this is allowed. Another typical example is storage of data on American providers of cloud (storage) services. Please contact the data stewards first to discuss this.*		X

Ethical Review Form

11	Will any raw or anonymized personal data or any other sensitive data or research results from the project possibly be transferred to a high-risk country*? ***High risk countries**: China, Russia, Iran, Turkey, and North Korea.* *If personal data or other potentially sensitive data is exchanged with one of these countries, or if part of the data processing takes place in one of these countries: **an advice from the Data Protection Officer, the kennisveiligheidsteam (Knowledge Security team), and the CISO (Chief Information Security Officer) is ALWAYS required.***		X

Ethical Review Form

Part 7a: Processing of research data		
1	Is consent your legal basis for processing the personal data in your study? *Additional explanation: What is a legal basis? One of main principles in the GDPR is to ensure that personal data is processed lawfully, fairly, and transparently. To comply with this principle, the processing of personal data also requires that you have a valid legal basis for the personal data processing activity.* *In research projects, the legal basis is often but not always consent. However, it is possible that it is not clear or not possible to establish whether to use consent as a legal basis.* *Some examples where consent may not be applicable as legal basis are covert research, data collection in public spaces, secondary data analysis of existing data, data that are transferred to you by a third party, consent is not possible or would require disproportionate effort, etc. In that case, please indicate which legal basis you think that applies or (preferably) contact a data steward first.*	☒ Yes and it will be obtained via …… An informed consent template* is attached to this application. ☐ No, I will use another legal basis to process the data. Namely, …….. * You can download a suitable template **here**.
2	Where will the data come from?	☐ Data obtained from another party (secondary data use) ☒ New data collected only by my research team ☐ New data collected together with collaborators
3	Which of the following tools will you use to process personal data?	**Surveys** ☐ Qualtrics ☐ Limesurvey ☒ MS Forms ☐ Other, namely …….. **Interview/workshop recordings** ☐ Voice/video recorder ☒ Phone in a flight mode ☒ MS Teams ☐ Other, namely …… **Transcription** ☒ Manual transcription ☒ Microsoft Office software (e.g. Word, Teams) ☐ Other, namely …… **Statistical analysis** ☐ SPSS ☐ R ☐ Other, namely …… **Other tools**, specifically Inspiration (offline mindmapping tool)

Ethical Review Form

4	Where will the data and in particular the personal data be stored during and after completion of the study? If you have already uploaded your Data Management Plan, you can refer to your Data Management Plan.	☐ SURF drive ☒ Onedrive ☐ Research Drive ☐ Network Drive

	Additional explanation: University supported-storage facilities are SURFdrive, SURF Research Drive, Ceph, departmental drives (this includes BE Project Drive), and the TU/e instance of Microsoft OneDrive. For most personal data, the use of SURF Research Drive, departmental drives (including BE Project Drive) and SURFdrive is required.	☐ Research Manager ☐ Other, namely ……
Part 7b: Safety and security measures		
1	Will you pseudonymize/anonymize the data? *Additional explanation:* *Anonymization: remove all direct identifiers (name, address, telephone number etc.) but also indirect identifiers (age, place of birth, occupation, salary) that, linked with other information, can lead to a person's identification. Anonymization to the point that a data subject is no longer identifiable means that the anonymized data is not considered to be personal data anymore.* *Pseudonymization: replacing the unique identifier of a data subject with an artificial pseudonym. This means that identification is still possible with the identification key. The identification key needs to be stored securely and separately from the pseudonymized data. If the data subject can be identified by combining data with additional information, the data is also called pseudonymous.*	☒ Yes ☐ No If yes, describe how: When participants indicate in their informed consent form that their name should not be mentioned, I will refer to them in my work as P1, etc. **Data Collection:** • Collect direct (e.g., name, email) and indirect (e.g., age, education) identifiers. **Pseudonymization**: • Replace direct identifiers with pseudonyms (e.g., Participant 01). Store the identification key separately and securely from the data. **Data Storage and Security:** • Store pseudonymized data on encrypted servers with access restricted to authorized researchers. Keep the identification key on a different encrypted server. **Data Use:** • Use pseudonymized data for all analyses and reports. Share only pseudonymized data, ensuring no disclosure of the identification key.
2	Is access to (personal) data restricted? (Select all that apply)	☐ No ☐ Yes, via access control ☒ Yes, via password protection ☒ Yes, access only given to TU/e research team ☐ Yes, access only given to research team, including non-TU/e collaborators ☐ Other, specify…….
3	Who will have access to the data during and after completion of the project? (Select all that apply)	☒ Main researcher ☒ TU/e supervisor(s) ☐ External supervisors ☐ TU/e research team ☒ Other, specify: the participating organisations will have access to the parts of research data collected within their own organisations. (IVN Veldhoven-Eindhoven-Vessem, Nieuw Zwanenburg, Phoodfarm, Brabants Landschap)
4	Will you store data for future research?	☒ No ☐ Yes, in a public data repository ☐ Yes, in a public data repository under restricted access ☐ Yes, in a TU/e-recommended storage (SURF Research Drive, Network Drive)

Ethical Review Form

5	Will you share data outside the TU/e?	☒ No ☐ Yes, in a fully anonymized form ☐ Yes, raw or pseudonymized data* *If you selected this box, make sure that a suitable data agreement is put in place. You can contact the Data Stewards for support in preparing such an agreement
6	How long will data be stored after the end of the project?	5 years

Ethical Review Form

Part 8: Closures and Signatures

1	Enclosures (tick if applicable and attach to this form):	☒ Informed consent form ☐ Informed consent form for other agencies when the research is conducted at a location (such as a school) ☐ Text used for ads (to find participants) ☐ Text used for debriefings ☐ Approval other research ethics committee ☐ The survey the participants need to complete, or a description of other measurements ☐ Data Protection Impact Assessment checked by the privacy officer ☐ Data Management Plan checked by a data steward
2	Signature(s)	Signature(s) of applicant(s) Date: 23/9/2024 Signature research supervisor Date: 03 Oct, 2024

Information sheet for research project "Sharing Non-Human Appreciation"

1. Introduction

Eindhoven University of Technology (TU/e) invites you to take part in this research project which aim is to create and study a design tool that can enable people who appreciate nature to share that experience beyond their communities. The data will be used to inform design decisions and will be part of the report. You receive this invitation because you are part of one of the following organisations: IVN, Nieuw Zwanenburg, Phood farm, Brabants Landschap, or because you take part in their activities. Or you receive this invitation because you are knowledgeable on a topic relevant for this project, or because you are interested in learning more about it. For your participation, you will not be compensated.

Joining this research project is your choice. Your participation is completely voluntary and does not pose any physical, legal or economic risks. You are not obliged to answer questions you are uncomfortable with, and you can withdraw from the research at any time without explaining why. Declining or withdrawing will not have negative impact for you.

Before you decide, please read the following information to understand what the project is about, what we expect from you and how we handle your personal data. After reading, you can sign up by completing the attached form.

If you have questions, feel free to contact us (contact details below). You can also discuss this information with people you trust.

2. Who are we?

This research project is conducted by:

Technische Universiteit Eindhoven (TU/e) De Groene Loper 3 5612 AE Eindhoven	Data controller

In collaboration with the following parties:

IVN Veldhoven Eindhoven Vessem Ariespad 5 5503 EZ Veldhoven	No access to personal data
Nieuw Zwanenburg Zwanenburg 1 5688 GT Oirschot	No access to personal data
Stichting Phood farm Hugo van der Goeslaan 2-01 5613 LG Eindhoven	No access to personal data
Brabants Landschap Kasteellaan 4 5076 RE Haaren	No access to personal data

How to contact us?

Luna Snelder	l.c.snelder@student.tue.nl
Privacy Operations	privacy@tue.nl
Data Protection Officer	dataprotectionofficer@tue.nl

3. What will taking part in the research project involve?

In the research project we will collect your personal data using the following methods:

- Interviewing you about your expertise, your experience with non-human appreciation and your feedback/ideas related to the design, and write down your answers/record your answers via audio/video. Also, we will make a transcript of the interview.
- Presenting you a questionnaire about your expertise, experience with non-human appreciation and feedback/ideas related to the design, which you can fill in in writing or online.
- Observation of your work or testing a prototype.
- Group discussion/co-creation for feedback and input in the design process.

4. What personal data from you do we gather and process?

We may collect and process the following personal data which is necessary for the project purpose:

Category and type	**Personal data**	**Purpose**	**Retention period**
Contact data (regular personal data)	*Name, e-mail, home address, city of residence*	*To communicate with you and invite you to events*	*6 months after data collection*
Job profile (regular personal data)	*Job title, years of experience, name and location of employer*	*Analyze data concerning your experience as <job>*	*10 years after research is complete*
Nature experience	*Anecdotes, quotes, years of experience, relevant locations*	*Analyze data concerning your affinity with nature*	*5 years after research is complete*
Digital recordings	*Photos, video and audio recordings*	*Illustrating findings or relevant phenomena, to capture non-verbal data.*	*5 years after research is complete*

Your data is retained only for the time period as specified in the table. Keeping your data for this period helps us to comply with scientific principles, such as producibility and verification.

After this period, your personal data will be deleted or anonymized to ensure it can no longer be linked to you. Unless you explicitly agree to the use of your identifiable information in publications (for example your quotes or your name).

5. Stopping your participation and your rights

If you end your participation in the research we will not use your data anymore from that moment on.

For questions, ending your participation or complaints, please contact the researcher via the contact details as provided in the table under section 2. For concerns or questions about the handling of personal data, you can e-mail the data protection officer as indicated in the table under section 2. You can also file a complaint with the Dutch data protection authority: the Autoriteit Persoonsgegevens. You have the right to request access, rectification, objection, erasure or adaptation of your data. Submit your request through team Privacy Operations via the contact details as provided in the table under section 2.

6. Legal basis for processing your personal data

The TU/e processes your personal data to conduct scientific research, which is the university's public task as stated in article 1.3 of the Dutch Wet Hoger onderwijs en Wetenschappelijk onderzoek. The TU/e always follows the applicable codes of conduct for research integrity and the scientific standards when conducting research.

7. Who has access to your personal data?

Only authorized employees involved in the research have access to your personal data if this is necessary for their tasks. The authorized employees will keep your personal data confidential.

Other parties/processors that have access to the data are listed in the table below:

Party/processor	**Why access?**	**Category**	**Processing within the European Economic Area?**
One Drive / Microsoft (Netherlands)	*Storage solution*	*Contact data, job profile, nature experience, digital recordings*	*Yes*

TU/e has a suitable agreement with these parties to protect your personal data. We will not share your personal data with any other party, unless we are required to do so by law.

TU/e will process your personal data within the European Economic Area (EEA) by storing your data on a server inside the EEA. In addition, TU/e has implemented appropriate technical and organizational measures to protect your personal data. These measures include using centrally managed and verified research- and storage tools.

8. Future research

During the research project, your personal data may also prove useful for new, socially important research. In such case, we would like to reuse your data for the new research. This will only happen if (1) your personal data is truly necessary, (2) the recognized ethical standards for scientific research are followed, and (3) the new research objectives align with the current research objectives. If your personal data is used in future research, we will take all reasonable steps to inform you about this. You can object to the use of your personal data for new research.

We might use anonymized data for new purposes such as research or education. We will ensure the data cannot be linked to you and we will not disclose anything that makes you identifiable.

This research has been assessed and approved by the ethical committee of Eindhoven University of Technology.

***** Scroll down for the form *****

Consent form for participation by an adult

By signing this form, I confirm:

1. I have enough information about the research project from the separate information sheet. I have read it and I had the chance to ask questions, which have been answered to my satisfaction.

2. I take part in this research project voluntarily. There is no explicit or implicit pressure for me to take part in this research project and I understand I can stop my participation at any moment, without explaining why. I do not have to answer any question I do not want to answer.

3. I know my personal data will be collected and used for the research, as explained to me in the information sheet.

Furthermore, I consent to the following parts of the research project:

4. I consent to my personal data, such as footage taken of me, audio taken of me, and answers or quotes I gave during the research, to be used by the researcher in publications and/or in presentations – without including my name.

   YES ☐ NO ☐

5. I consent to my real name being mentioned in the publications and/or presentations with the footage taken of me, audio taken of me, and answers or quotes I gave during the research, as described under 4.

   YES ☐ NO ☐

Name of Participant:	Name of researcher: Luna Snelder
Signature:	Signature:
Date:	Date:

RE: ERB form for FMP

Van: Ethics Ethics@tue.nl
Aan: Snelder, Luna l.c.snelder@student.tue.nl
Verstuurd: vrijdag 4 oktober 2024 14:45

Dear Luna,

Your application (ERB2024ID381) has been approved by the ERB.

We assume that you have answered all questions correctly. We will perform regular spot-checks so you need to keep your documentation (ERB form, informed consent forms, surveys/interview questions, description of experiment/prototype etc.) available for at least 6 months.

Good luck with your research and have a nice day!

Dear regards,

Marjolein Severens
ERB student assistent

From: Snelder, Luna <l.c.snelder@student.tue.nl>
Sent: Friday, October 4, 2024 2:39 PM
To: Ethics <Ethics@tue.nl>
Subject: Re: ERB form for FMP

Dear Maartje,

Thank you! These are my questions (attachment). Please let me know if anything else is missing.

Best,
Luna

From: Mulder, Maartje <m.j.w.mulder@tue.nl> on behalf of Ethics <Ethics@tue.nl>
Sent: Friday, October 4, 2024 10:26:57 AM
To: Snelder, Luna <l.c.snelder@student.tue.nl>
Subject: RE: ERB form for FMP

Dear Luna,

Yes, that would be perfect.

With kind regards,
Maartje Mulder

040-2475032
Secretary Integrity and Ethics Office
Secretary BoE EngD

From: Snelder, Luna <l.c.snelder@student.tue.nl>
Sent: vrijdag 4 oktober 2024 10:15
To: Ethics <Ethics@tue.nl>
Subject: Re: ERB form for FMP

Dear Maartje,

I have not prepared them fully. Is it okay to send you a set of questions that will be used as a starting point for the interviews?

Kind regards,
Luna

Verzonden vanaf Outlook voor Android

From: Mulder, Maartje <m.j.w.mulder@tue.nl> on behalf of Ethics <Ethics@tue.nl>
Sent: Friday, October 4, 2024 10:08:36 AM
To: Snelder, Luna <l.c.snelder@student.tue.nl>
Subject: RE: ERB form for FMP

Dear Luna,

Thank you for this application. To complete the application please send us the interview questions also.

With kind regards,
Maartje Mulder

040-2475032
Secretary Integrity and Ethics Office
Secretary BoE EngD

From: Snelder, Luna <l.c.snelder@student.tue.nl>
Sent: donderdag 3 oktober 2024 16:28
To: Ethics <Ethics@tue.nl>
Subject: ERB form for FMP

Dear Sir/Madam,

I filled out the ERB-form and it was checked by my mentor (see attachment). Please let me know if you approve.

Kind regards,

Luna

Where is my informed consent form?
I can easily get you one from the paper trash.