

Sharing Non-Human Appreciation

M2.1 Project by Luna Snelder
Coached by Daisy Yoo

10/01/2024

Wordcount: 8454

Photo by Lucas Loorbach

ABSTRACT

We, humans, are dependent on non-humans for our resources to survive. Yet, our actions often harm them and are therefore unsustainable for every life on earth. This project aims to intrinsically motivate people to behave more environmentally sustainably, by raising their appreciation for non-humans. The volunteers at Stadsakkers Eindhoven already demonstrate this non-human appreciation in their work. In this project, I explored how non-humans are appreciated, and how we can design for sharing non-human appreciation, through literature and community involvement. This resulted in four main kinds of non-human appreciation in the forms of taking care, being in the moment, capturing beauty and gaining understanding. These dimensions were integrated into designs that enabled non-human appreciative experiences, whose sharing is supported by (sub)consciously collecting non-humans that form tangible memories. This project contributes to inspiring alternative strategies for environmental sustainability and includes numerous insightful challenges.

INTRODUCTION

85.000 Dutch people marched for climate and justice in November 2023, which is more than the double amount of previous protests [1]. People want change and also need to change themselves. "Humanity is on a deeply unsustainable trajectory." [2] We, humans, need to realise that our existence is entirely dependent on countless non-humans and that we need to take care of them to take care of ourselves [3, 4]. By appreciating these non-humans we can establish personal and planetary vitality [5].

In this report, I build my design upon the idea that sustainable behaviour can be intrinsically motivated by appreciation for non-humans. Ways to develop people's intrinsic motivation for environmental protection need to be developed as it results in more durable behaviour change than extrinsic motivations [6]. Within non-humans, I focus on natural non-humans, such as weather and animals. This idea is based on exposure to nature, gratitude for nature and encouraging appreciation of nature being associated with greater pro-environmentalism [7, 8, 3]. The area is relatively underexplored, but we need an alternative to technological solutions that individualize the pathway to sustainability [9]. Instead, this project focuses on giving people an experience that can impact their value system and enabling the sharing of that experience and value.

People already appreciate non-humans at Stadsakker Eikenburg (Stadsakkers Eindhoven) [10]. This is a local community of volunteers that grow food for the local foodbank in an ecological manner. In a previous research project situated there, I explored the meaning of dirt through sensory ethnography, which also revealed the volunteers' love related to the work, place and nature [11]. This love can be seen as appreciation. Inspired by this appreciation, this project aims to explore non-human appreciation, how it is experienced and how it can be shared beyond the volunteers. In this report, I define non-human appreciation, elaborate on the design process and discuss its challenges and limitations. This project contributes to approaches and ideas for intrinsically motivated behaviour change for sustainability by designing them from within the community and acknowledging the role of non-humans in this process.

RELATED WORK

Defining Non-Human Appreciation

In literature, there is little to find about non-human appreciation. However, nature appreciation is more common. This term is used in combination with environmentalism, nature connectedness and mental well-being. Nevertheless, extensive definitions of nature appreciation are limited and inconsistent. Greatly overlapping with my perspective on non-human appreciation is Rosen's definition of noticing [12]:

"To notice 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."

Aesthetic Appreciation of Nature

Historically, nature has often been appreciated for its picturesqueness, which is criticized by environmentalism, for it fails to be acentric, environment-focused, serious, objective and morally engaged [13]. These qualities are seen as necessary by Carlson to ensure that e.g., choices about nature preservation are not solely based on its "looks". In his essay, he describes how non-cognitive and cognitive ways of aesthetic appreciation of nature combined can support environmentalism. The non-cognitive method of engagement states that immersion in nature and interaction is necessary to experience a true appreciation of nature. The cognitive methods call for considering scientific disciplines to understand how certain phenomena came and continue to be, next to experiencing through local stories and traditions. We need to understand the ecosystem and look beyond what we find pretty. Climate change affects our aesthetic appreciation and leaves less room for wonder with increasingly worrying circumstances [14]. Mikkonen considers non-scientific appreciation to be more effective in confronting our rapidly changing world, as it leaves more room for wonder and can provide insight into post-human futures.

Appreciation and Environmental Protection

Although there is literature stating a positive relation between appreciation and pro-environmentalism, there is also a further exploration into the division between appreciation of nature as something passive in contrast to actively giving back and protecting it. A study during COVID-19 demonstrated an increased interest in the natural environment for recreational appreciative experiences, but this did not stretch to environmental protection [15]. According to Manley et al., gratitude towards nature consists of appreciation and reciprocity [3]. They see appreciation as something nature provides people with, while reciprocity is giving back and taking care of nature, which can be associated with pro-environmentalism. Their study shows that the amount of reciprocity mentioned by their participants is greatly outnumbered by mentions of appreciation, illustrating a value-action gap that could be overcome by being held accountable, evaluated, or by nature expecting something back for what they give us. I believe this last part is interesting, because in a way we could interpret the extreme disasters that arise with climate change as nature telling us to give back. By giving the non-humans a voice, we can express that nature expects something back.

Nature Appreciation and Mental Well-being

An enormous number of studies state that it is beneficial for humans to be in contact with nature. It supports mindfulness [16] and positive psychology [17], is stress-reducing [18], and according to Michel Le Van Quyen, it even charges us and speeds physical recovery [19]. These findings are amazing but do not necessarily help for sustainability. Nevertheless, they can be the first incentive for more people to start appreciating nature, opening up the opportunity to let them engage in moments of sharing non-human appreciation as meant in this project.

Non-Human in Design

How can we include the value of non-humans in our designs and let them have a voice? Literature on more-than-human design is filled with more or less concrete suggestions to let non-humans participate. These include a wide variety of methods. Some rely on imagination (combined with knowledge), such as speculative futuring, roleplay, design fictions and storytelling [20, 21, 22, 4]. Others focus on gaining a better understanding through certain actions and experiences, involving specialised parties, and using technologies. Actions and experiences can include living more explicitly with non-humans and becoming aware of their rhythms and flows [4, 23], and attending to needs beyond yourself [24]. Involving specialised parties concerns consulting experts for the correct representation of non-humans [20], and learning from places and positions that speak of more-than-human sentience [4]. Furthermore, technologies such as AI, sensors and IoT can play a role in understanding other non-humans [20, 22]. In this project, the technological methods do not play a role due to the low-tech context that does not support these technologies. The project involves a combination of the other methods, mainly focusing on the involvement of specialised parties and creating experiences that evoke non-human appreciation.

METHOD

Inspired by work in more-than-human participatory design and value-sensitive design, I zoomed out attempting to consider all stakeholders and how they are affected by this work.

Over the semester eight different volunteers from Stadsakkers participated, of which four multiple times. They were part of unstructured interviews, focus groups, brainstorms and ideations. Functioning as experts in non-human appreciation, they contributed to the design decisions.

PROCESS

Initial Scope

This project started with a question from Stadsakkers in July 2023. How did the clients of the foodbank in Eindhoven [25] like the vegetables they received from Stadsakkers? Stadsakkers grows some "forgotten" vegetables like kohlrabi. The volunteers expressed fear that people would not know how to prepare these vegetables and maybe throw them away for that reason. I considered this an opportunity for a design project to reinforce the connection between Stadsakkers and the foodbank. Could there be a system that supported the foodbank in gathering feedback and insight from their clients' preferences regarding the vegetables, and that allowed Stadsakkers to share how their appreciation for the non-humans?

Check-in with Stadsakkers

I visited Stadsakkers (18/09/2023), and helped harvest beans meanwhile, talking with some volunteers about how they experienced the relationship with the foodbank and how they liked the visit there over the summer, what they learned, and about the movie "Onder het Maaiveld" (under the ground level) [26]. This visit helped nourish my relationship with Stadsakkers but also gave me some more insights.

The volunteers enjoyed their visit in which they learned that the foodbank would transition to a store concept this semester to open in January. A store concept entails replacing fixed packages by enabling clients to choose their groceries. Stadsakkers' volunteers still had some remaining questions about feedback regarding the vegetables for the foodbank. These were gathered in an email and sent to the chair of the foodbank in Eindhoven. The responses were rather short, showing that they were busy and did not consider the kind of vegetables a problem. This is very understandable as there are many other organisations that they also receive food from, meaning that Stadsakkers exists due to the foodbank, but that they are only one small part of the foodbank's food supply. Nevertheless, this was somewhat disappointing for the volunteers at Stadsakkers.

Many volunteers at Stadsakkers had watched the movie “Onder het Maaiveld” together over the summer. This movie is about the importance of the biodiversity in our soil and shows what cannot be seen from above ground [26]. Volunteers stated that this movie made them much more aware of what is in the soil and how it works. They were also amazed by the beauty that was captured. To me, this illustrated the non-human appreciation that the volunteers at Stadsakkers experience.

Contact with the Foodbank

I had first contact with the chair of the foodbank on 5/10/2023 via phone and email. In the short conversation, I learned that the chair was very busy, but that he would like to meet me to further discuss the project. After the appointment was moved twice due to the circumstances of the chair, we could meet at the location of the foodbank in Eindhoven on 25/10/2023. I had prepared well for this meeting by making an overview of what I envisioned and listing what I would need from the foodbank. This included the opportunity to get to understand the foodbank through observations, interviews, and maybe participation, some volunteers of the foodbank that would think along in the design process to facilitate participatory design, and the opportunity to evaluate designs in context. Besides, I wanted to explain that the transition to the store concept was an opportunity, as this would make keeping track of what clients prefer more visible. However, I experienced during the conversation that there was limited attention. I learned that there was very little time at the moment due to the transition also resulting in little enthusiasm for something extra. The conversation was over quite abruptly and concluded with me having to send a short email explaining what I needed so that the chair could try to find someone to look into it further. After having sent that email the same day, I never received a response. Four weeks later, I decided that this would not work and adapted my focus.

First Iteration Value Flow

Meanwhile, I learned about more-than-human participatory design to investigate how non-humans could have a voice and how they could be heard beyond Stadsakkers (as described in related work). Furthermore, I gathered information to create a value flow for all the stakeholders

involved. The value flow was informed by the yearly report of the foodbank (2022), Stadsakkers’ website and what I had heard and learned from volunteers and observed there since March 2023 [25, 10]. It includes an organisational, human and non-human level (Figure 1). The non-human level was limited to the site of Stadsakker Eikenburg. Through making the value flow I became aware of new relationships. It helped in illustrating the connection that I wanted to strengthen and the parties that could be affected by the project.

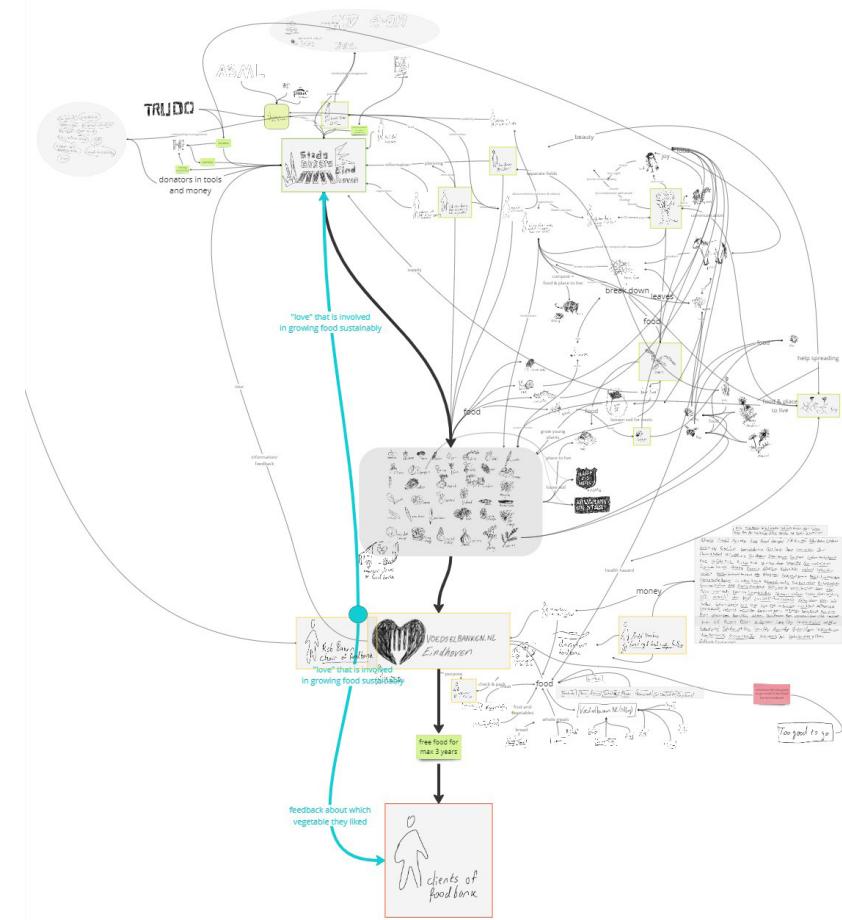


Figure 1: First iteration of the value flow.

Focus Group at Stadsakkers

A week after the conversation with the foodbank (1/11/2023), I visited Stadsakkers for input on my project. I first helped with removing some plants and cleaning some beds. This ensured that I give back. It also allows for some small introductions to what I am working on, besides it being relaxing to work in nature (appreciation). I was amazed by the aesthetics of the cabbages and how they grow (Figure 2). During the coffee break in the greenhouse, there was time for some conversation and also giving input on my project. I prepared by exporting the value flow (in Miro) to an image (as there is no internet connection at Stadsakkers) and charging my laptop. Unfortunately, the image was of low quality and my laptop limited the number of people whom I could show the value flow simultaneously. By bringing sticky notes and pens and all physical drawings of the stakeholders, I enabled more people to participate. I made notes and they could add ideas and new stakeholders via the sticky notes.



Figure 2: Appreciating the growth of a cabbage.

The execution was more chaotic than planned, due to an organisational meeting taking place at the same time and space. Four volunteers participated in the session and one person walked in midway but did not participate. The volunteers appreciated the detail in the value flow and the drawings of all stakeholders. They had a few more animals to add including extensive knowledge about their functions in the ecosystem, such as the springtail. A very small animal (1 mm), that is stressed in low-quality soil and therefore indicates it due to decreased population. Through the expertise of the volunteers, I improved the representation of the non-humans in the design process [20]. I also asked the volunteers about what they would like to share beyond Stadsakkers regarding non-human appreciation. Especially towards the foodbank they had ideas. They had suggestions about sharing information about how to eat certain vegetables or about giving insight into the origin of food via stories or small games that could be collected for children (Appendix A). Based on these ideas I made a new iteration of the value flow that included the suggested stakeholders (Figure 3). At this point, I also realised that the value flow would never be complete and that it could in a way overshadow certain aspects that I had failed to capture [27].

Brainstorm & Ideation

Before continuing on the ideation with Stadsakkers, I improved my understanding of appreciation by brainstorming questions about what it is, and how we express and experience it (Appendix B). I concluded that appreciation is the acknowledgement that something is valuable. We experience it when we are in the moment by actively noticing our environment both sensory and mentally (similar to mindfulness). This resembles Carlson's idea of combining non-cognitive engagement aesthetic appreciation of nature with cognitive aesthetic appreciation [13]. This action of being in the moment can go hand in hand with expressing appreciation through taking care, gaining understanding and capturing beauty, which all require spending time. These dimensions of appreciation informed my later designs.

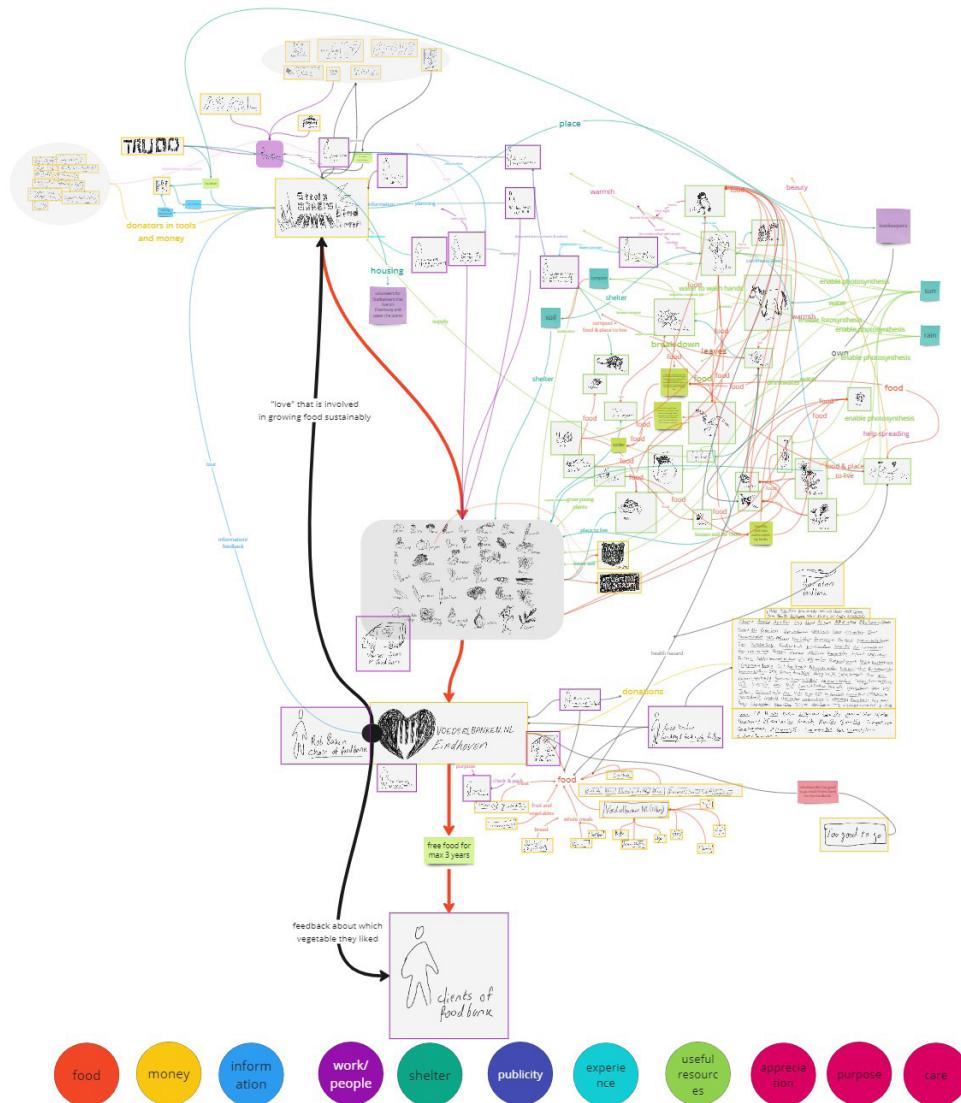


Figure 3: Second iteration of the value flow.

How might we design for sharing non-human appreciation? (Appendix C) Based on the above clarification, I imagined things that could guide people to be in the moment, such as activities of sketching and photographing or describing non-humans. This idea in combination with experiencing first-hand and living more explicitly with non-humans improving more-than-human participation [9, 4], resulted in ideas like discovery kits for soil. Also, speculative and storytelling ideas emerged regarding the ecosystem and representing the non-human perspective. A more commercial idea focussed on the sharing aspect would be to create merchandise from Stadsakkers and spread that in the network. However, this would be more superficial and not allow for being in the moment. Because these concepts needed to be integrated into an ecosystem dependent on volunteers and donations, the design should require minimal resources (time, costs). This meant that a digital design, durable design or something that people could make themselves would be preferable for it to sustain. However, the latter would result in a higher threshold to engage in the appreciative experience. An exploration in this direction was how well AI could generate stories about the non-humans at Stadsakkers (Appendix D). This appeared to be rather superficial and did not have much to do with the actual place.

Rescope

As the weeks progressed, it appeared I needed to move away from the foodbank, making it even more unclear who to design for and therefore stagnating the process, as it became difficult to generate concrete and suitable concepts. To continue the project, I decided to work out the idea for a game that could teach people about the relations and functions of actors in the ecosystem. This idea incorporated the game aspect suggested by the volunteers at Stadsakkers in combination with the ecosystem in the value flow. By creating a prototype, I would make the non-human part of the value flow more tangible and I could show something physical to the volunteers at Stadsakkers, which supports communication.

Ecosystem Game

The ecosystem game was made from MDF by laser cutting and finishing it with stain (Figure 4). The game could be played in multiple ways both competitive and not competitive, some allowing for additional actors, others for blocking them. The game facilitates people with ecosystem actors and different kinds of rope that indicate a certain relation. The game is won by making the most connections. For a full overview of the rules see Appendix E.

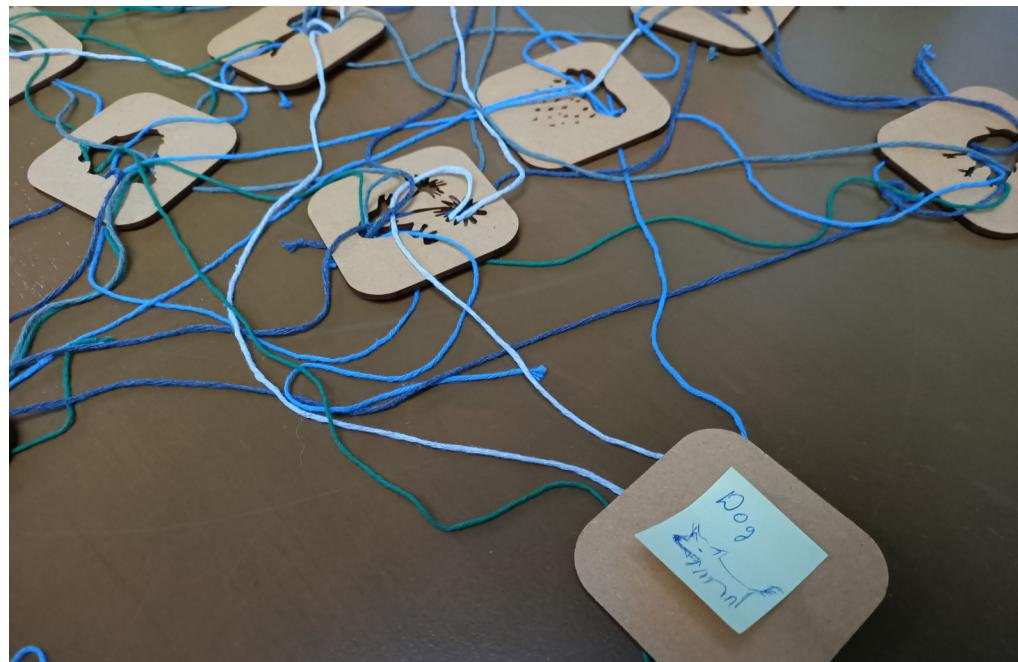


Figure 4: Playing the Ecosystem Game.

To add the aspect of being in the moment into the experience, I imagined that the game would be used in combination with going out in nature. This could mean that it would allow the users to look at their environment from a more relational perspective, or that only the observed actors could be used during the game (Appendix F). I also did a small exploration on using the positives from the game cards as stamps to see if they could play a role as illustrations to tell stories with (Figure 5). This worked somewhat but would need further refinement.



Figure 5: Stamp experiment with lasercut positives.

Feedback from Stadsakkers

I revisited Stadsakkers to try the game with them and ask about their ideas for an alternative context. Stadsakkers was very busy at that time with moving as their initial building needed to be removed for development and they had another built. That day, tiles needed to be removed for later reuse. I helped for a few hours and during the lunch break I asked for their input, but as they were already quite tired and there was still much to be done, this was rather limited. There was no opportunity to play the game, but five volunteers provided input about how they imagined its context. They considered this as something for children, especially in nature information points. They did not think it was suited for Stadsakkers during e.g. the open day or when external volunteers would visit to help. The necessity of helping people to go outside and be aware of their environment was something they considered important. Why would people play this game? The feedback signalled that this was not the right direction and too complex.

I considered continuing the design for children but felt uninspired and disconnected from the appreciation for nature, as this was mostly focused on education. After a new iteration on the value flow (Figure 6), I decided that the external volunteers have a good opportunity to further share the non-human appreciation with their network.

They experience the same context as the normal volunteers, but due to the limited time they spend they probably do not have the same appreciation for non-humans as them. I would need to design something that could be more easily integrated into the specific activities at Stadsakkers and that supported the external volunteers in sharing their experience of non-human appreciation.

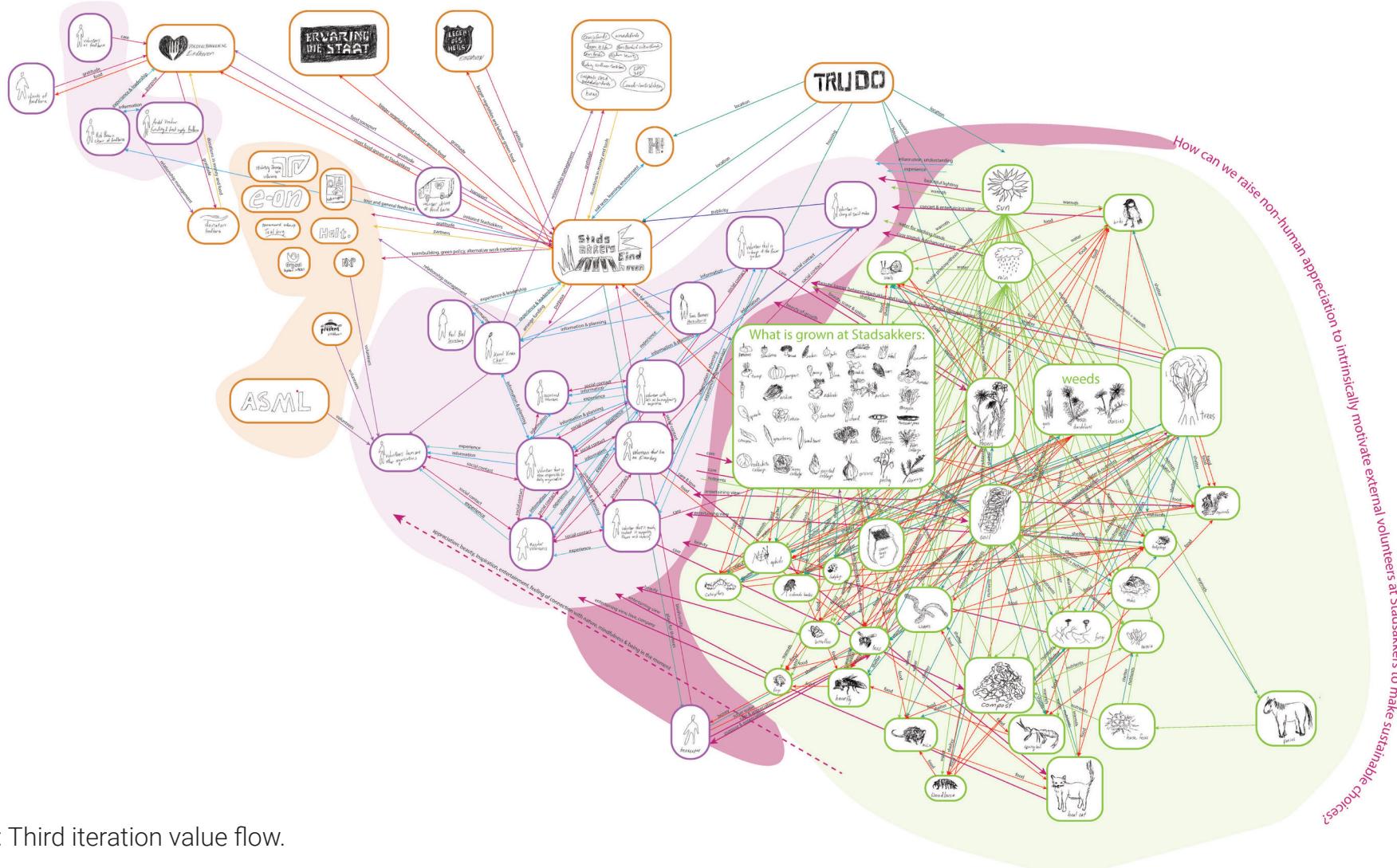


Figure 6: Third iteration value flow.

Tangible Memories

Based on my last project [11], I decided to strive for a sensory-stimulating manner of sharing non-human appreciation through storytelling. To enable that, I brainstormed about the experience of appreciating non-humans in the dimensions of being in the moment, capturing beauty, taking care and gaining understanding (Appendix G). This led to the idea of collecting beautiful things in nature, such as dead leaves, feathers and seeds. This is a very conscious activity in which you notice and study your environment. It should not be done too much, as that would interfere with the local ecosystem. These collected items could illustrate and enable storytelling and stimulate the senses to remember the moment of collection and appreciation. The collected material has become a tangible memory. Inspired by fur (Figure 7), I understood that collection can also happen subconsciously.



Figure 7: Fur inspiration for subconscious non-human collection.

External volunteers help out with many different activities at Stadsakkers. The activities of planting, weeding and harvesting often happen in the same physical position, which is kneeling at the side of a bed, slowly moving from one side to another. This is a perfect context for close observation, as well as relaxing in the pace of the work and enjoying the natural environment. An activity that also often occurs is walking from one place to another to move things or to change to a different task. Here, a lot of terrain is covered. These circumstances inspired the following designs.

Unexpected Non-Human Collectors

This is a set of experiments with textures to mimic fur in a form that could be used to subconsciously collect non-humans while walking (Figures 8-15). They are made mostly from natural materials that are sometimes recycled to not spread microplastics. After trying these prototypes out myself, I found that especially many long, textured and elastic strands capture a lot, but these are a lot of work to make, let alone clean. The prototypes were analysed based on how well they could collect non-humans and how annoying they were to use (Figure 15).

Gardening Kneepad Cover

This design is situated in the context of planting, weeding and harvesting. The gardening kneepad cover touches upon all dimensions of appreciation, allowing the user to choose what activity they would like to engage in (Figure 16). The activities are inspired by earlier iterations and involve cognitive activities including word games and sensory activities, such as close observation through a magnifying glass or questions that guide forest bathing [16]. Making a cover instead of a gardening kneepad itself is less wasteful as Stadsakkers already has kneepads. The pockets for collecting different volumes are placed on the side to ensure content is not interfering with the user's knees. The back of the cover (that touches the soil) has a texture that enables subconscious non-human collection. The repurposed thick white cotton was chosen to create contrast with the non-humans and to last in "rough" circumstances.

Figure 8: Unexpected Non-Human Collector from unravelled T-shirt.



Figure 9: Unexpected Non-Human Collector from crochet and unravelled yarn.







Figure 12: Unexpected Non-Human Collector from crochet wool.



Figure 14: Unexpected Non-Human Collector from crochet hemp.

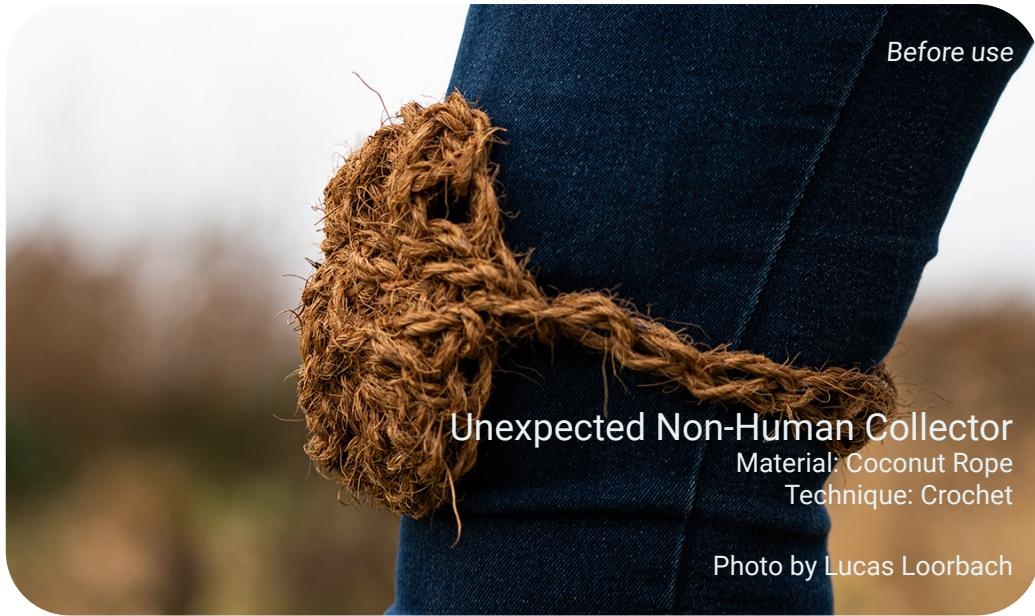
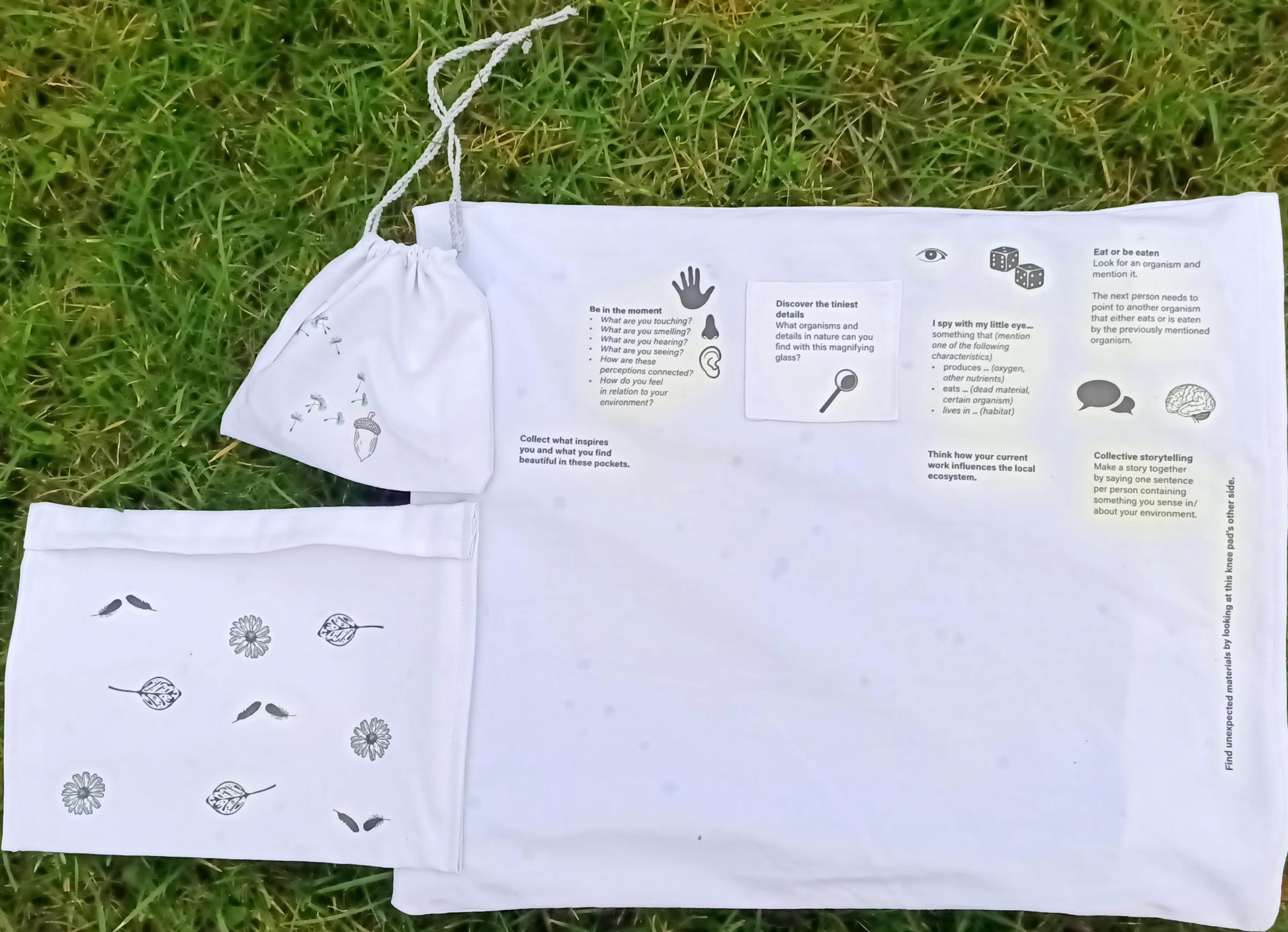


Figure 15: Unexpected Non-Human Collector analysis.



Figure 16: Gardening kneepad cover with guiding activities for experiencing non-human appreciation.



Feedback

With these prototypes and printed value flow, I revisited Stadsakkers. The four present volunteers appreciated the value flow for it showed life at their site and illustrated their organisation. It was placed in their new building (Figure 17). One volunteer found the Non-Human Collectors interesting and functional as they could also help in pollination. Another considered their use limited and very dependent on seasons. They enjoyed seeing the kneepad cover, but considered it impractical for their context, as it would get dirty easily and they deemed the pockets impractical. They liked the idea of appreciating non-humans by being in the moment and the relation to mindfulness. Nevertheless, these prototypes being used by external volunteers did not seem realistic to them due to the already limited time they spend and the large amount of work that needs to be done. "They come here to do a lot of work and do not need this extra thing." This is the reality of working with volunteers. One of the volunteers who is also a mindfulness coach considered the kneepad cover as something that could be used by grandparents with their grandchildren when gardening together, and made an effort to refer me as a contact for the continuation of this project. Also, the local school's biology teacher might be able to offer a context, although I did not hear any more about this. This visit gave me the insight that Stadsakkers will not continue to be my context, but that they can function as experts and it would be interesting to keep them in the loop.



Figure 17: The value flow at Stadsakkers

Pilot Test with Gardening Kneepad Cover

By doing a pilot test with the kneepad cover, I gained insight into how well some of its aspects work. I made a forest walk with two participants. They chose a place to further explore with the prototype while conveying their experiences through the think-aloud method [28], followed by some unstructured interview questions relating to their experience (Appendix H). Due to having one prototype, the games and talking aspects were not tested. Overall the participants considered the experience to be giving them new perspectives (literally different perspectives when kneeling and alternative perspectives on sustainability in the Western world). Furthermore, they easily interacted with the magnifying glass and it may have encouraged exploration, but the current version only provides a magnification of 3x. The aspect of turning the cover around for the subconscious collection worked surprisingly. Small animals covered it as it had not been moving (springtails and slugs) (Figure 18). The white helped to spot them. Besides, the texture caught a seed and some leaves (Figure 19). The pockets were used to collect a seed and a decaying can (Figure 20). Participant 2 indicated that they would not use this design to take walks by themselves, but they would together with a child, confirming Stadsakkers' suggestion.



Figure 18: The animals that were collected on the bottom of the Gardening kneepad cover.



Figure 19: The dead material that stuck to the punchneedled texture at the bottom of the Gardening kneepad cover..

Figure 20: A decaying can that was collected in a collection pocket of the Gardening kneepad cover.



DISCUSSION

The project encountered related challenges regarding working with volunteers, project involvement and ownership, and the changing design contexts, resulting in limitations in the validation of the designs.

Working with volunteers is great. They are intrinsically motivated for their cause and willing to help when they can. However, one must realise that this voluntary work is something they do extra besides their normal job and responsibilities, which limits their ability to do extra work. Both the foodbank and Stadsakkers had already extra work going on with a change in concept and moving to a new building. This resulted in limited capacity to be involved in this project. Some things that designers can do when they want to work within these communities is ensure that their work is aligned with the work of the community so that it supports them, next to actively investing time and resources in the community [29]. These are humble traits of a social entrepreneur. By helping with work in the community before asking for input, I reduced the effect of asking for the volunteers' time. In this project the goals were initially aligned with Stadsakkers, but not relevant enough for the foodbank. By focusing on sharing non-human appreciation, the goal moved further away from Stadsakkers too. This, in combination with the unclarity that the situation with the foodbank brought, and the somewhat chaotic situations, resulted in limited input from Stadsakkers' volunteers. It is in these moments that the dependency on the social entrepreneurial ecosystem becomes a disadvantage [30]. The social designer/entrepreneur needs to find a balance between investing in the community and achieving project goals.

Due to the goals and priorities drifting apart, the ownership of the project was not taken up that much by the community, which is necessary for it to become a sustainable venture. Being the only person who actively works on the project with limited enthusiasm from the others involved can result in the stagnation of the process and questioning its continuation. These doubts were increased by the constant unclarity of the design context. Who was I designing for? This continuous insecurity and the input from Stadsakkers resulted in the decision to look for an alternative

context, which is a shame as I have invested in this relationship. The contact with Stadsakkers in this project started as citizen control, but unfortunately dropped to consultation and almost informing, according to Arnsteins's Ladder of Citizen Participation [31].

Due to the above-described challenges, the evaluation of the designs suffered. The designs were evaluated by discussing them with volunteers at Stadsakkers, by very small pilots and the Non-Human Collectors I tested myself. This severely limits their validity, as there is hardly any data. Fortunately, the literature includes examples of methods and similar values and qualities that support decisions, as can be seen at the beginning of this report.

Future work

The incompleteness of this project leaves many terrains to be explored in my final master project. This entails finding a new context and adapting the concept of non-human appreciation to that context after studying it. This would be followed by an extensive evaluation of the design and its effect on the social environment. Furthermore, a plan for sustainable implementation of the concept within the context is required.

CONCLUSION

This project explored the intrinsically motivating route to sustainability by designing for the sharing of a local community's non-human appreciation beyond the community. It resulted in designs that enable appreciative experiences and involve the collection of non-humans forming tangible memories that can assist in sharing those experiences. These concepts and underlying ideas can inspire more initiatives that strive for environmental sustainability. The project involved numerous challenges, which could be insightful for similar initiatives and practices.

FMP PROPOSAL

In my FMP I will continue sharing non-human appreciation. This represents my vision of intrinsically motivating people for inclusive and sustainable behaviour, and allows my professional identity to flourish by involving empathetic and collaborative skills in combination with experimenting through making to find new connections to enable sharing and experiencing non-humans. It combines creativity, with two of my sources of inspiration: Nature and (human) behaviour.

In my M2.1 I explored what non-human appreciation is and I would like to focus more on the sharing aspect by designing tools that support engaging less experienced people in non-human appreciating activities and sharing those experiences.

Activities of Non-Human Appreciation

Noticing & Understanding

This includes learning about the ecosystem and how all life is interdependent; learning to understand species' behaviour and properties; recognising different species; and understanding your impact on the ecosystem. This kind of activity is often cognitive and involves senses to support further learning. I think this kind of appreciation is crucial in empathising with the non-human perspective. It precedes actions of non-human care.

Caring for non-humans

These actions include creating shelters, nourishing, healing, removing threats, watering, etc. They support biodiversity and are reciprocating actions towards nature. They can be conflicting when different non-humans require care threatening for another (non-)human.

Experiencing & collecting beauty

Activities of experiencing and collecting beauty can be an inspirational first step in encouraging people to learn about the non-humans involved. They can be amazed by the aesthetics and living qualities of nature, collect small non-human tokens relating to moments of awe (in a non-damaging manner), and enjoy observing non-human behaviour.

Being in the moment

Being in the moment means doing something that connects you to that specific time and place. When situated in a natural environment this can be forest bathing, feeling the nature around you and feeling part of it, stimulating your senses and focusing on what you experience. These activities are focused on human well-being but can initiate interest in surroundings and transform into the above-described non-human-focused activities.

Engaging Entities in Non-Human Appreciation

In this project, I aim to increase human appreciation of non-humans by connecting people of different levels of experience with non-human appreciation and letting them connect with non-humans through my design. I distinguish the following categories:

Experienced non-human appreciators are people who regularly engage in activities in nature that involve caring for it, e.g. gardening. These people have often developed skills, knowledge and awareness of non-humans supporting them in non-human appreciation while working/caring. I imagine these people learn from non-human experts and play a role in the sensemaking of the non-human appreciative experiences of less experienced non-human appreciators.

Non-human experts are people who have experience in mainly the cognitive component of non-human appreciation due to environment-related education (e.g. biology). These people can also be experienced non-human appreciators. I imagine they support the other categories in sensemaking and learning about non-humans that they encounter.

Less experienced non-human appreciators are people who perceive nature but can still deepen their experience of non-human appreciation by taking a conscious moment to feel nature connectedness and learn about non-humans. These people can be children, people engaging in outdoor (sports) activities and people who commute through natural environments. They are already situated in a natural environment but have room for further development in their non-human appreciation.

Besides humans, there are also non-humans involved. With this, I mainly focus on life and slightly on environmental phenomena (sun, waterbodies, etc.). These together form what we often refer to as nature/natural environment. I aim to raise human appreciation for these entities to increase the respect and care with which we treat them.

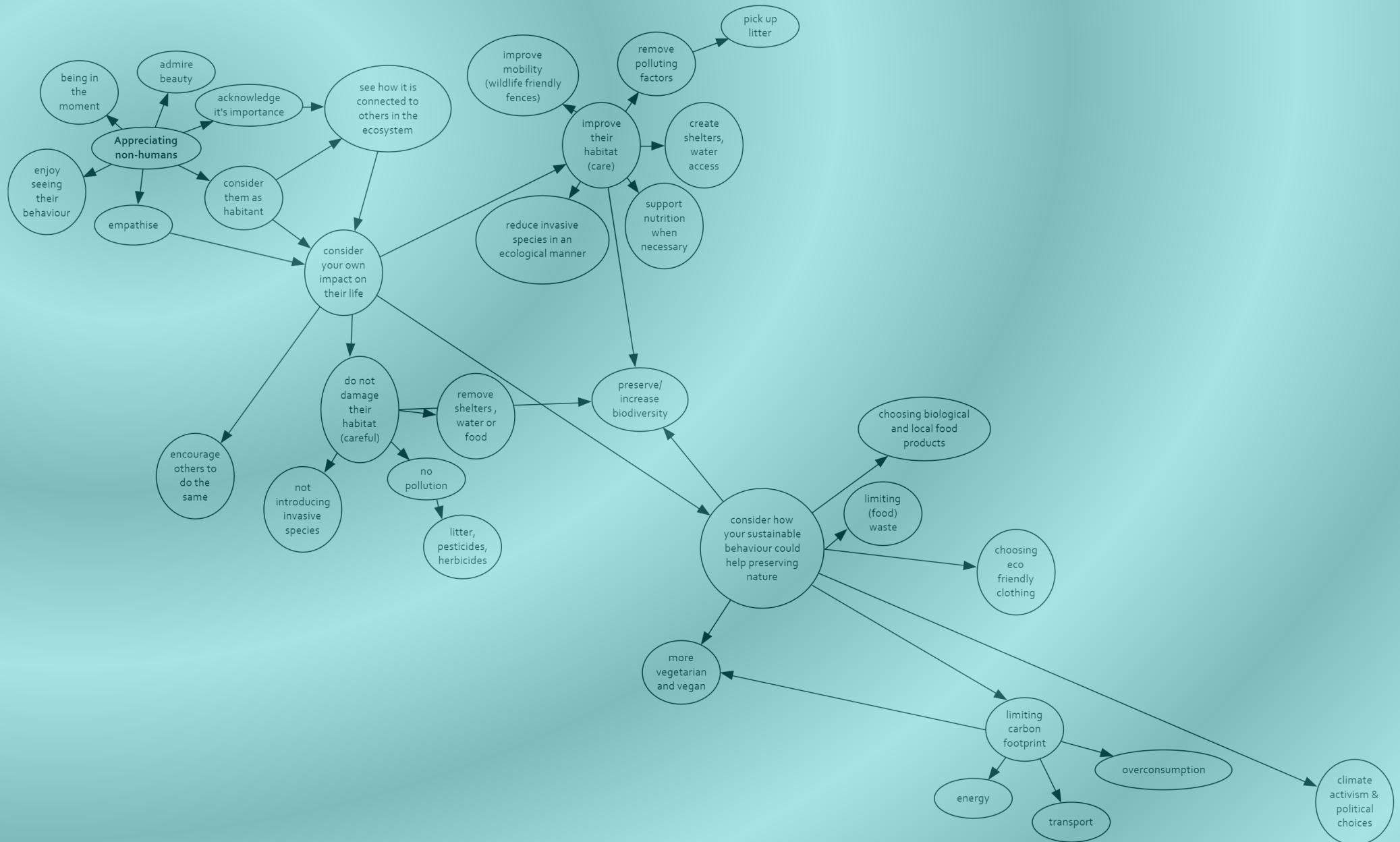
Sustainability Outcome

I aim to stimulate the above-described non-human appreciative activities with my design. The care aspect can develop into sustainable behaviours (Figure 21). Possibly leading to the consideration of how human acting impacts non-humans in your environment. If people develop care for non-humans around them, they can engage in behaviours to improve the non-human habitat (e.g., creating shelter) and not damage it (e.g. not using pesticides), supporting biodiversity. The next level is to consider the impact on the global environment, which entails e.g., choosing biological food or using less polluting transport. Political choices and climate action could also result from treating non-humans with more respect. These sustainable behaviours are dependent on how motivated people are and whether good treatment of non-humans is their priority. I imagine increasing non-human appreciation as the first drop that develops a wave of sustainable behaviours.

The following questions arise regarding this project, of which some are already touched upon in my M2.1:

1. How can we intrinsically motivate people to make sustainable choices by sharing non-human appreciation?
 - a. How can we design for experiencing non-human appreciation?
 - b. How can we design for sharing non-human appreciation?
 - c. How do tangible memories of experiencing non-human appreciation influence how we tell stories about this experience?
 - i. How do tangible memories influence how others experience those stories?
 - ii. How do stories about experiencing non-human appreciation with tangible memories influence the listener to behave environmentally aware and sustainably?
 - d. How can sharing non-human appreciation (project result) be sustained in its context?

Question a is mostly explored in my M2.1 project and b is touched upon with the concept of tangible memories. However, as I will be operating in a different context, these questions remain relevant as different requirements will be set for the design dependent on the context. Question c is already implying direction for question b. It is a research-through-design question, which is interesting for assessing the value of sharing non-human appreciation. The sub-questions of c may be difficult to study but could give depth if there is an opportunity to answer them. Question d is important from an entrepreneurial standpoint. This is about the implementation of a design in society so it can make an impact. This is not easy to answer in one semester which must also include the development of new designs and implementation often being the last step in a process. By working from within society during the process, we can already tailor design to society for smooth implementation. However, a designer cannot achieve this alone and needs to collaborate with the community of their context. In this process, social design emerges from social entrepreneurship. Whether I will be able to achieve this stage depends on many factors and people, and is therefore difficult to control. This is a good learning opportunity for me.



State of the art:

Expert Perspectives

Expert perspectives are used to support people in environmental educational activities. In my FMP, I would like to enable experienced non-human appreciators to share their wisdom with less experienced, to encourage learning, nature connectedness and intrinsic motivation for pro-environmental behaviour. This sharing aspect resembles how GreenHat provides students with expert perspectives through an interactive location-sensitive map and videos on smartphones to encourage expert-like observation of their environment for supporting engagement in debates on nature preservation [32]. Smartphone use is common in platforms that provide more information when in nature. The Plantnet app supports identifying plants by allowing users to upload a picture and search for identified similar pictures [33]. Plantnet supports quick and accessible learning of new plant species, which increases people's cognitive appreciation of plants. Also in citizen science the use of smartphones to support capturing observations through pictures is common. This article describes opportunities for HCI to support biodiversity-focused citizen science initiatives [34]. Platforms of citizen science like iNaturalist or iSpot Nature could offer an expert perspective on what people encounter when appreciating non-humans [35, 36]. This offers the opportunity for indirect contact between experts and people with less non-human appreciation experience, which is relevant when no local non-human appreciator is available or when people prefer solitude. Similarly, the nature mentoring website educates people on how to understand nature around them through videos, books and consultation [37]. The accessibility level and adult-targeted approach are inspiring.

A study observing sociality and skill-sharing in the garden includes a more direct expert perspective [38]. The skill-sharing aspect relates to the sharing between more and less experienced non-human appreciators. A part of this appreciation is care, which can be in gardening skills and knowledge about the species and ecosystem. This paper expresses that learning by doing is crucial, which motivates designing activities that appreciators can do together. Furthermore, it illustrates learning

indirectly from traces of the gardening of others. Can we learn non-human appreciation through traces?

Gamification and Creativity

Many projects encouraging nature engagement include play and creative freedom for an attractive interaction, especially when it targets children. The potential is shown in a study seeding through children to engage more people in environmental stewardship and conservation practices [39]. Children are curious and playful which makes engaging in new activities engaging in nature easier than targeting adults. Through children, surrounding adults become involved. According to a literary overview of engaging children with nature through environmental HCI, children's nature engagement is vital for a long-term sustainable future and requires exploration in HCI [40]. It argues designing to engage people with the environment on its own terms lets them uncover the beauty and wonder it offers, fostering intrinsic interest in nature engagement. I think engaging people in experiencing non-human appreciation through tools supporting understanding, collecting and taking care of non-humans, besides appreciation for their aesthetic quality and through being in the moment, offers people the opportunity to uncover the beauty and wonder of nature. These activities support intrinsic interest through room for creativity and freedom in how to interact by providing multiple options and tools that inspire, rather than dictate how people connect with non-humans.

Some projects include digital technologies to support playful learning. A study used a quiz format on mobile devices to guide students' observation of zoo animals from an evolutionary perspective [41]. This led to a deeper understanding of the animals. Using questioning to guide observation was incorporated into the gardening kneepad prototype and could be explored for different age groups. Other studies use audio and video recordings of animals. The ambient Birdhouse included additional information cards and guessing games supporting recognition and engagement by sparking creativity and curiosity [42]. Another ethnographic study including acoustic technologies for wildlife conservation recommended the exploration of playful and socially

engaging designs for learning about nature conservation [43]. These designs inspire low-threshold and enjoyable tools for non-human appreciation.

Technology can support playful design, but can also distance people further from nature [44]. A non-technological playful method is Sharing Nature, a worldwide nonprofit organization that tries to stimulate nature connectedness (mainly children) through playful embodied interactions according to the Flow method of awakening enthusiasm, focusing attention, offering direct experience, and sharing inspiration [45]. The website sells cards and books with example activities for each phase to be used in nature. I could explore implementing this educational structure in my designed tools for experiencing and sharing non-human appreciation.

Personal Connection

Studies show that personal connection with non-humans can benefit people's interest in them and feelings of nature connectedness. This can be established by letting people explore non-humans in their nearby surroundings and making them aware of cohabitation. A study asked people to make their own wildlife cameras to promote engagement with nature and digital making, showing these people see the recorded animals as their neighbours which increased their connectedness [46]. Another study provided adults with wildlife cameras for citizen sensing to understand how they explored their urban gardens, what they were interested in and what they did with the found knowledge [47]. It revealed giving people insight into the non-human life in their gardens supports making more-than-human favourable decisions. This demonstrates non-human appreciation can result in pro-environmental behaviour. The personal connection people have through the place where the animals appear and creating their own tools for non-human noticing could be used in designing to increase non-human appreciation. A step towards this is the Nature Collections app, which encourages children's nature connectedness by stimulating them to annotate and study their pictures [48]. This resulted in increased curiosity and nature-based conversations in comparison to a generic photo app where pictures were mainly taken

for aesthetic qualities. The study suggests further exploring non-screen-based technologies to connect children to nature. Allowing for freedom in choosing a subject of observation incorporates intrinsic interest and can be powerful.

The Bristle Whistle Challenge teaches people different bird calls through contextual audio encounters and playful interactions for awareness of nature sounds and supporting wildlife conservation through citizen science [49]. It appeared that people's personifications of birds increased their empathy towards them. It is anthropocentric to project human motivations on animal behaviour, although it might be a first step towards learning more.

A different approach to empathy is shown in IPANDA [50]. An artificial pet that includes sensing technology to teach young children about wildlife conservation through interactions with the pet and an accompanying digital game. The concept of pet adoption and corresponding responsibilities resulted in enthusiasm and curiosity about wildlife raising and an emotional relationship. The care that comes with adoption can be inspirational for designing for reciprocity towards non-humans.

Tangible Memories

My concept of tangible memories (people keeping physical evidence of non-human encounters), is also present in related literature. In a study using Biodesign toolkits to educate children about collaborating with and caring for other species, the children are left with mycelium objects reminding them of this experience [51]. The care aspect of this toolkit is very interesting in combination with stimulating creativity and learning by doing. It makes education intuitive and fun. However, using mycelium as a resource to create a product is anthropocentric and in contrast with how I believe people should consider non-humans.

A study that consciously gathers tangible memories explored personal experiences of the natural world through egocentric POV video and Nature Probes [52]. The latter is similar to the collection pockets on the gardening kneepad. I take inspiration from how the researchers notice

the object's effect on the participant's storytelling and how its tangible quality supports illustrating, understanding and remembering for both the participant and researcher. I aim to include this aspect in my design with prompts that stimulate conversation about collected objects and consider a particular setting for that conversation. The Spore Stepper prototype collects non-human material while walking and allows for later analysis and discovery [53]. This resembles my unexpected non-human collectors gathering tangible memories.

Non-Human Stakeholder

In Western societies, non-humans are mostly treated as resources for humans, resulting in a disbalance [54]. Providing non-humans with rights is an upcoming strategy for environmental protection and preservation [55]. The act of acknowledging non-human rights and representing them is non-human appreciation. How are they represented and can we learn from that strategy to let them participate more in our designs? The Embassy of the North Sea proposes to first listen to the North Sea through scientific and artistic research, followed by representing and eventually integrating it into democracy [56].

Similarly, the recognition approach in stakeholder theory for sustainability [57]. Here, non-humans are regarded as stakeholders and partners of an organisation. Furthermore, Ecosystemas, a tool representing the ecosystem as a stakeholder in design (persona), attempts to stimulate more-than-human consideration in the design process [58].

Shannon Rodgers et al. explore gardeners' relation to nature and their non-human perspective. Nature Fictions is a method for exploring problems in a MtH-centred context through relations of human and non-human stakeholders by combining MtH thinking with co-design fiction [59]. This resulted in exploring the tension between decisions in the garden benefitting the human goal vs. considering the non-human perspective. The relational and ethical thinking achieved in this method inspires consideration to implement it into my design process. In another study, they used phenology probes as prompts for dialogue about non-humans [60]. They encourage designing technologies for noticing nature

differently and looking beyond the context of gardeners. This relates to fostering intrinsic motivation for sustainable behaviour by sharing and experiencing non-human appreciation. I consider the phenology probes as a tool to highlight more-than-human perspectives and experience appreciation.

Sensing

People need sensing (through technologies and themselves) to gain an understanding of non-humans' needs. Being in nature is essential to forming attitudes and behaviours that are sustainable, in which sensory engagement is helping [61].

IVN, an institute for nature education, sells various low-tech tools and toolboxes for nature exploration supporting education in a practical sense [62]. These are mainly focused on children, made of plastic, and allow for separating non-humans from their environment to study them, which is ethically questionable. I support nature education by engaging in practical activities but aim to do so in a manner that is more considerate of non-humans and includes tools made of eco-friendly materials. An example is the Hand-Substrate Interface prototype for mushroom foraging, which affords touching non-humans as a sensor that incorporates our bodily senses [53]. I also want to encourage this because it stimulates nature connectedness. Less technologically advanced methods are described in this field study observing individuals (who routinely worked with non-humans) to gain an understanding of how they used traditional sensing techniques and biomarkers to understand them. The study expresses the importance of this type of sensing for its limited strain on the environment in contrast with creating and disposing of digital sensing technologies [63]. It also argues the imprecision of this non/low-tech sensing encourages inquiry in natural environments. These statements support the exploration of non/low-tech sensing technologies to be used for noticing and understanding non-humans, which I plan to include in the upcoming design process.

Design

All the above-mentioned aspects (experts – sensing) are ingredients for my design (process). I aim to design tools for experiencing non-human appreciation by encouraging actions like noticing and caring for non-humans. They involve senses, stimulate playful interaction and reflection on your relationship with non-humans. The tools are part of a method inviting users to discuss their experiences with experienced non-human appreciators and share them with their network. Possibly this is part of a service offered by experienced non-human appreciating communities.

Process

My design processes resemble travelling without paved paths. They involve many unexpected encounters, but also a numerous options and struggle with direction. This allows me to adapt to the circumstances. It relates to the notion of drift as described by Krogh et al. [64]. These context-dependent projects increase insecurity, tackled through contact with multiple contexts and diverting directions. This is also visible in my planning (Figure 22a,b), taking into account the level of participation of stakeholders [31]. I aim for a high level of participation, as I wish to develop skills and an attitude for such a process.

Context

My design process starts with finding a context. The main requirement is that people are engaging in activities in nature and they could still benefit from experiencing non-human appreciation. E.g. communities of experienced non-human appreciators offering others a place to connect with nature. Currently, I have contacted several parties to increase my chances of succeeding (Figure 23). Some were unsuccessful (grey), others were (green), some did not respond yet (yellow) and others I still need to reach out to (orange). I have contact (green) with three people who are knowledgeable in designing with non-humans and storytelling. I plan to connect with several Eindhoven-based communities of experienced non-human appreciators (light orange). I might also be able to be in touch with people in education, which might result in being able to directly connect less experienced with more experienced non-human appreciators.

Collaboration

When parties are interested in collaboration, I want to explore them through ethnography and/or interviews and map the stakeholders to increase my understanding. I will further define my target group and involve the stakeholders according to their ability in the design process. The work of Bertran et al. offers inspiration for codesigning in a natural environment [65]. I will add to the foundations made in my M2.1 project. I plan to make iterations involving stakeholders in at least the evaluation stage, but preferably in more. In the evaluation, I want to focus on the design and how it enables sharing non-human appreciation with qualitative methods.

Outcomes

At demoday, I hope to present a well-iterated environmentally responsible design that is the joined effort of me and the community. I hope it can speak for itself to ensure an aesthetic interaction and therefore easier use. If the design is then also developed it can (and will?) be implemented in the community in a self-sustaining manner. I aim to have this entrepreneurial aspect worked out.

In the report, I hope to convey a for stakeholders suitable coherent and engaging process that is well supported by literature and thoroughly discussed.

In my reflection, I want to demonstrate further learning in social entrepreneurship, participatory design and storytelling & presentation, besides increased confidence.

In my portfolio, I want to demonstrate the development in Creativity and Aesthetics, User and Society, and Business and Entrepreneurship through courses and throughout the projects, as well as further nuanced perspectives on my professional identity and vision.

Figure 22a: Visual overview of planning.

February March April May June

Communication



Exploration



Ideation



Prototyping



Evaluation



Analysis/Reflection



Implementation



No participating community

Tokenism

Citizen Power

Demoday

Figure 22b: Content planning.

No participating community



1. 1PP exploration of how non-humans perceive me .
2. Ideation on existing work & Develop a way to test the effect of story-telling and tangible memories.
3. Contact potential participants & arrange ERB.
4. Further test the concept with contacts during walks in nature. Ask participants to share stories about their experiences with others, using collected non-humans.
5. Analyse results testing.
6. Iterate on prototypes and adapt them to be taken on walks.
7. Design for further support in sharing with more and less experienced non-human appreciators.
8. Prototype ideas.
9. Testing of the support .
10. Elaborate on design from an entrepreneur's perspective.
11. Analysis and reflection.
12. Review idea.
13. (New prototype/adapt).
14. Work out business perspective.
15. Ask experts in the field for validation.
16. Invite stakeholders for Demoday.

Tokenism as starting point



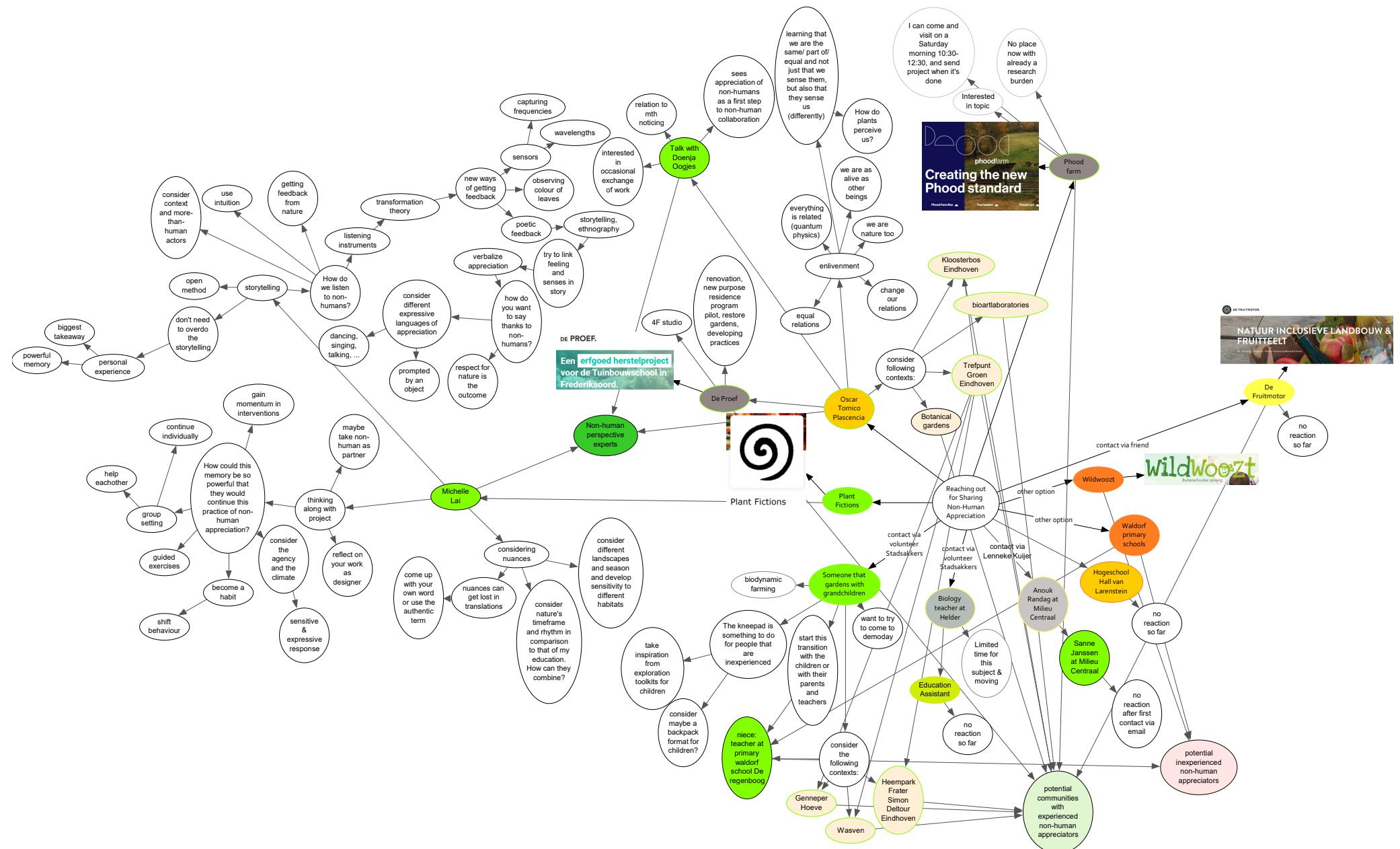
1. Reaching out to communities. Some form of contracting to ensure explicitly aligned visions and clear expectations (also about communication and planning).
2. Get to know the community in a suitable way. (planned interviews)
3. Gathered data
4. Analysis including value flow of stakeholders.
5. The first iteration is based on insights from the community and the past project. (ideation)
6. Prototyping.
7. Plan evaluation.
8. Moment for evaluation with community.
9. Analysis
10. Explore possibilities for implementation.
11. Second iteration based on input and my interest. (ideation)
12. Prototyping
13. Plan evaluation
14. Evaluation.
15. Maybe trying (step to-wards) implementation.
16. Analysis and reflection.
17. Invite stakeholders for Demoday.
18. Tiny improvements in concept.
19. Improved prototype.
20. Step towards implementation

Citizen Power as starting point



1. Reaching out to communities. Some form of contracting to ensure explicitly aligned visions and clear expectations (also about communication and planning).
2. Get to know the community through e.g. ethnography and be a part of it.
3. Analysis of gathered data and including in value flow of stakeholders.
4. Make value flow with community?
5. Plan out meetings for the first iteration.
6. The first iteration: brainstorming.
7. Ideation. Develop shared aesthetic. -> Design the process that they go through and inspire them with in-sights M2.1 project
8. Lo-fi prototypes (involves the community in the different steps).
9. Plan meetings for evaluation.
10. Evaluation of prototypes with community.
11. Analysis and reflection.
12. Plan next iteration.
13. Second iteration including or facilitating community: exploration.
14. Ideation.
15. Improve quality of prototypes based on skills within community.
16. Plan evaluation
17. Evaluation of prototypes.
18. Analysis and reflection.
19. Plan next meeting
20. Work on implementation with community.
21. Further iteration concept/prototype
22. Plan next evaluation and invite community to Demoday.
23. Evaluation.
24. Analysis and reflection.

Figure 23: Reaching out for a context..



REFLECTION

This project did not go according to plan, resulting in difficult situations from which I was able to learn. I am happy I already experienced these struggles this semester, so that I can improve on how to tackle these situations more effectively in my FMP.

I wanted to do a multi-stakeholder collaboration in this project and learn participatory design. Eventually I collaborated with Stadsakkers and considered their ecosystem. From this experience I learned that I was very dependent on them and that this stagnated the design process. In my FMP I do not want to have such a tunnel vision and make multiple connections. This is essential and I need to step over my insecurities and keep looking for opportunities. To succeed, I will also need to work on my communication skills. This concerns expectation management and contracting in collaborations, the organisation of feedback and how I present my work, and the ownership of a project.

Looking back, I am disappointed in how limited the collaboration was. I should have organised a session at the beginning of the project to clarify expectations and contract. This can come off as very formal and I do not really have experience in this. Being seen as a young girl by the community can make you feel silly when talking to people that are much wiser in this aspect.

I experienced difficulty with gathering feedback according to plan. I think this is partially due to the busy reality of volunteers and the limited commitment, but also due to how I positioned myself and communicated. I think I can also improve on how I talk about vague concepts. It did help a lot when I brought something physical. Maybe I could have organised these moments of feedback a little more formally by specifically inviting people and planning it more in advance and sharing an agenda upfront and asking for additions or arranging a location. I did not do these things because I wanted to keep the threshold to participation low as the volunteers were busy and I wanted to be inclusive to the whole community. When I tried to plan something in advance I did not get

a response. Looking back, I think I should have been more physically present to plan this and ensure the agenda included the volunteers' input more. However, you are then dependent on the circumstances. This means that you don't have control over when and how people take part and that is on the one hand very good, as you want them to be on an equal or maybe even higher level in the decision making process for design, but in practice it also turns out as a lack of commitment, because they did not take ownership of the process.

As designer it is my role to have a focus on the process, the volunteers have many other things that prevent them from taking such a role. For them doing a project is extra. However in participatory design you want the stakeholders to also have ownership. I think that the fact that this project is also part of my personal learning, makes it more important for me to have some control of the process. The volunteers might have viewed the project as owned by me rather than a collaborative effort, due to this reason. The stakes are unequal, but will that ever be different? Only in situations where there is a desperate need for help can really compensate for my dependency on these organisations. I think commitment and taking initiative from the volunteers would have been less of a problem if there had been better goal alignment [29]. I learned that I want to ensure this and keep checking this in my next collaborations. When hearing negative feedback, I should also consider that this might be the case and ask for further clarification.

In this semester I neglected the expressive part of my professional identity, which is making and exploring through materials. I did not invest in this as I was focussed on the collaboration, absorbing information for the value flow, and I wanted to include stakeholders' perspectives. The act of making felt useless without good concepts, which would not arrive without creativity. I was too critical and this only blocked me. To prevent repetition, I plan to create something related to my FMP every week, without pressure. Through this activity I hope to keep my creativity flowing. I plan to recycle materials in this process to prevent consumerism, as I want to maintain integrity as a designer for sustainability.

Throughout the semester I gathered a lot of knowledge. I learned about the psychology of behaviour change in a course and about its relation with nature appreciation. This helped verify my vision of achieving a sustainable society by intrinsically motivating people. I learned about more-than-human participatory design methods, which inspired me in how I envisioned sharing non-human appreciation and how they could be represented. I also gained a better understanding of what social entrepreneurship is, which helps in positioning myself in the DLE track. I would like to learn more about this and compare the literature to my limited experiences to help me learn from them more.

REFERENCES

1. 2023. Klimaatdemonstratie in Amsterdam grootste ooit in Nederland, opstootje op podium. NOS.nl - Nieuws, Sport en Evenementen. Retrieved January 8, 2024 from <https://nos.nl/collectie/13871/artikel/2497565-klimaatdemonstratie-in-amsterdam-grootste-ooit-in-nederland-opstootje-op-podium>
2. Kai M. A. Chan, David R. Boyd, Rachelle K. Gould, Jens Jetzkowitz, Jianguo Liu, Barbara Muraca, Robin Naidoo, Paige Olmsted, Terre Satterfield, Odirilwe Selomane, Gerald G. Singh, Rashid Sumaila, Hien T. Ngo, Agni Klintuni Boedhijhartono, John Agard, Ana Paula D. de Aguiar, Dolors Armenteras, Lenke Balint, Christopher Barrington-Leigh, William W. L. Cheung, Sandra Díaz, John Driscoll, Karen Esler, Harold Eyster, Edward J. Gregr, Shizuka Hashimoto, Gladys Cecilia Hernández Pedraza, Thomas Hickler, Marcel Kok, Tanya Lazarova, Assem A. A. Mohamed, Mike Murray-Hudson, Patrick O'Farrell, Ignacio Palomo, Ali Kerem Saysel, Ralf Seppelt, Josef Settele, Bernardo Strassburg, Dayuan Xue, and Eduardo S. Brondízio. 2020. Levers and leverage points for pathways to sustainability. *People and Nature* 2, 3 (July 2020), 693–717. DOI:<https://doi.org/10.1002/pan3.10124>
3. Kelly E. Manley, Diana M. Hackenburg, Tatiana Marquina, and Rachelle K. Gould. 2022. Gratitude for Nature: Abundant Appreciation and Rare Reciprocity in Free Response Reflections. *Ecopsychology* (July 2022). DOI:<https://doi.org/10.1089/eco.2022.0022>
4. Yoko Akama, Ann Light, and Takahito Kamihira. 2020. Expanding Participation to Design with More-Than-Human Concerns. *Proceedings of the 16th Participatory Design Conference 2020 - Participation(s) Otherwise - Volume 1* (2020). DOI:<https://doi.org/10.1145/3385010.3385016>
5. Christopher Wolsko and Kreg Lindberg. 2013. Experiencing Connection With Nature: The Matrix of Psychological Well-Being, Mindfulness, and Outdoor Recreation. *Ecopsychology* 5, 2 (June 2013), 80–91. DOI:<https://doi.org/10.1089/eco.2013.0008>
6. Florian G. Kaiser, Alexandra Kibbe, and Oliver Arnold. 2016. Self-Determined, Enduring, Ecologically Sustainable Ways of Life: Attitude as a Measure of Individuals' Intrinsic Motivation. *Handbook of Environmental Psychology and Quality of Life Research* (August 2016), 185–195. DOI:https://doi.org/10.1007/978-3-319-31416-7_10
7. Ian Alcock, Mathew P White, Sabine Pahl, Raquel Duarte-Davidson, and Lora E Fleming. 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, (March 2020), 105441. DOI:<https://doi.org/10.1016/j.envint.2019.105441>
8. Florian G. Kaiser, Adrian Brügger, Terry Hartig, Franz X. Bogner, and Heinz Gutscher. 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 (November 2014), 269–277. DOI:<https://doi.org/10.1016/j.erap.2014.09.001>
9. Sebastian Prost, Irina Pavlovskaya, Kahina Meziant, Vasilis Vlachokyriakos, and Clara Crivellaro. 2021. Contact Zones. *Proceedings of the ACM on Human-Computer Interaction* 5, (2021), 1-24. DOI:<https://doi.org/10.1145/3449121>
10. Stadsakkers Eindhoven. Retrieved June 11, 2023, from <https://stadsakkerseindhoven.nl/in-de-stad/>
11. Luna. C. Snelder. 2023. *Dirt Stories: A Sensory Dimension To Ethnography At Food-Growing Communities*. Unpublished Master Research Project. Eindhoven University of Technology (TU/e), Eindhoven, Netherlands.
12. Anton Poikolainen Rosén. 2022. Noticing Nature.
13. Allen Carlson. 2011. Aesthetic Appreciation of Nature and Environmentalism. *Royal Institute of Philosophy Supplement* 69, (September 2011), 137–155. DOI:<https://doi.org/10.1017/s1358246111000257>
14. Jukka Mikkonen. 2022. Aesthetic Appreciation of Nature and the Global Environmental Crisis. *Environmental Values* 31, 1 (February 2022), 47–66. DOI:<https://doi.org/10.3197/096327121x16245253346567>
15. Sandra Rousseau and Nick Deschacht. 2020. Public Awareness of Nature and the Environment During the COVID-19 Crisis. *Environmental and Resource Economics* 76, 4 (July 2020), 1149–1159. DOI:<https://doi.org/10.1007/s10640-020-00445-w>

16. William Van Gordon, Edo Shonin, and Miles Richardson. 2018. Mindfulness and Nature. *Mindfulness* 9, 5 (January 2018), 1655–1658. DOI:<https://doi.org/10.1007/s12671-018-0883-6>

17. Holli-Anne Passmore and Mark D. Holder. 2016. Noticing nature: Individual and social benefits of a two-week intervention. *The Journal of Positive Psychology* 12, 6 (August 2016), 537–546.

18. Curtis Craig, Chloe V. Menon, and Martina I. Klein. 2015. A positive relationship between nature appreciation, emotional functioning, and perception of work value. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* 59, 1 (September 2015), 1061–1065

19. Michel Le Van Quyen. 2022. *Cerveau et Nature*. Flammarion.

20. Sara Heitlinger, Lara Houston, Alex Taylor, and Ruth Catlow. 2021. Algorithmic Food Justice: Co-Designing More-than-Human Blockchain Futures for the Food Commons. *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (2021). DOI:<https://doi.org/10.1145/3411764.3445655>

21. Anuradha Reddy, Iohanna Nicenboim, James Pierce, and Elisa Giaccardi. 2020. Encountering ethics through design: a workshop with nonhuman participants. *AI & SOCIETY* 36, 3 (2020), 853–861. DOI:<https://doi.org/10.1007/s00146-020-01088-7>

22. Rachel Clarke, Sara Heitlinger, Marcus Foth, Carl DiSalvo, Ann Light, and Laura Forlano. 2018. More-than-human urban futures. *Proceedings of the 15th Participatory Design Conference: Short Papers, Situated Actions, Workshops and Tutorial*. 2 (2018). DOI:<https://doi.org/10.1145/3210604.3210641>

23. Oscar Tomico, Ron Wakkary, and Kristina Andersen. 2023. Living-with and Designing-with Plants. *Interactions* 30, 1 (2023), 30–34. DOI:<https://doi.org/10.1145/3571589>

24. Anton Poikolainen Rosén. 2022. Relating to Soil: Chromatography as a Tool for Environmental Engagement. *Designing Interactive Systems Conference* (2022). DOI:<https://doi.org/10.1145/3532106.3533503>

25. 2023. Schakel tussen verspilling en armoede. Voedselbank Eindhoven. Retrieved June 11, 2023 from <https://www.voedselbankeindhoven.nl/>

26. Onder het maaiveld film: Officiële Website: Trailer en tickets. Onder het maaiveld film | Officiële Website | Trailer en tickets. Retrieved January 8, 2024 from <https://www.onderhetmaaiveldfilm.nl/>

27. Josina Vink. 2023. Embodied, Everyday Systemic Design - A Pragmatist Perspective. *Design Issues* 39, 4 (2023), 35–48. DOI:https://doi.org/10.1162/desi_a_00731

28. Helen Sharp, Jennifer Preece, and Yvonne Rogers. 2019. *Interaction Design*. John Wiley & Sons.

29. Philip T. Roundy and Thomas S. Lyons. 2022. Humility in social entrepreneurs and its implications for social impact entrepreneurial ecosystems. *Journal of Business Venturing Insights* 17, (2022). DOI:<https://doi.org/10.1016/j.jbvi.2021.e00296>

30. Anne De Bruin, Michael J. Roy, Suzanne Grant, and Kate V. Lewis. 2022. Advancing a Contextualized, Community-Centric Understanding of Social Entrepreneurial Ecosystems. *Business & Society* 62, 5 (2022), 1069–1102. DOI:<https://doi.org/10.1177/00076503221121820>

31. John Gaber. 2019. Building “A Ladder of Citizen Participation”. *Journal of the American Planning Association* 85, 3 (2019), 188–201. DOI:<https://doi.org/10.1080/01944363.2019.1612267>

32. Kimiko Ryokai, Lora Oehlberg, Michael Manoochehri, and Alice Agogino. 2011. GreenHat: exploring the natural environment through experts’ perspectives. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI ‘11)*. Association for Computing Machinery, New York, NY, USA, 2149–2152. <https://doi.org/10.1145/1978942.1979254>

33. Home - Pl@ntNet. plantnet. Retrieved February 19, 2024 from <https://plantnet.org/en/>

34. Jennifer Preece. 2016. Citizen Science: New Research Challenges for Human–Computer Interaction. *International Journal of Human–Computer Interaction* 32, 8 (June 2016), 585–612. DOI:<https://doi.org/10.1080/10447318.2016.1194153>

35. A Community for Naturalists · iNaturalist. Retrieved February 19, 2024 from <https://www.inaturalist.org/>

36. Home | iSpot. iSpot nature. Retrieved February 19, 2024 from <https://www.ispotnature.org/>

37. Brian Mertins. Nature Mentoring. nature mentoring. Retrieved February 19, 2024 from <https://nature-mentor.com/>

38. Hanuma Teja Maddali and Amanda Lazar. 2020. Sociality and Skill Sharing in the Garden. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20). Association for Computing Machinery, New York, NY, USA, 1–13. <https://doi.org/10.1145/3313831.3376246>

39. Tshering Dema, Margot Brereton, Michael Esteban, Alessandro Soro, Sherub Sherub, and Paul Roe. 2020. Designing in the Network of Relations for Species Conservation: The Playful Tingtibi Community Birdhouse. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20). Association for Computing Machinery, New York, NY, USA, 1–14. <https://doi.org/10.1145/3313831.3376713>

40. Riga Anggarendra and Margot Brereton. 2016. Engaging children with nature through environmental HCI. In Proceedings of the 28th Australian Conference on Computer-Human Interaction (OzCHI '16). Association for Computing Machinery, New York, NY, USA, 310–315. <https://doi.org/10.1145/3010915.3010981>

41. Mariko Suzuki, Itsuo Hatono, Tetsuo Ogino, Fusako Kusunoki, Hidefusa Sakamoto, Kazuhiko Sawada, Yasuhiro Hoki, and Katsuya Ifuku. 2009. LEGS system in a zoo: use of mobile phones to enhance observation of animals. In Proceedings of the 8th International Conference on Interaction Design and Children (IDC '09). Association for Computing Machinery, New York, NY, USA, 222–225. <https://doi.org/10.1145/1551788.1551835>

42. Alessandro Soro, Margot Brereton, Tshering Dema, Jessica L. Oliver, Min Zhen Chai, and Aloha May Hufana Ambe. 2018. The Ambient Birdhouse: An IoT Device to Discover Birds and Engage with Nature. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18). Association for Computing Machinery, New York, NY, USA, Paper 397, 1–13. <https://doi.org/10.1145/3173574.3173971>

43. Jessica L. Oliver, Margot Brereton, David M. Watson, and Paul Roe. 2019. Listening to Save Wildlife: Lessons Learnt from Use of Acoustic Technology by a Species Recovery Team. In Proceedings of the 2019 on Designing Interactive Systems Conference (DIS '19). Association for Computing Machinery, New York, NY, USA, 1335–1348.

44. Sarah Webber, Ryan M. Kelly, Greg Wadley, and Wally Smith. 2023. Engaging with Nature through Technology: A Scoping Review of HCI Research. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23), April 23–28, 2023, Hamburg, Germany. ACM, New York, NY, USA, 18 pages. <https://doi.org/10.1145/3544548.3581534>

45. 2021. Flow Learning. Sharing Nature. Retrieved February 19, 2024 from <https://www.sharingnature.com/flow-learning.html>

46. William Gaver, Andy Boucher, Michail Vanis, Andy Sheen, Dean Brown, Liliana Ovalle, Naho Matsuda, Amina Abbas-Nazari, and Robert Phillips. 2019. My Naturewatch Camera: Disseminating Practice Research with a Cheap and Easy DIY Design. In CHI Conference on Human Factors in Computing Systems Proceedings (CHI 2019), May 4–9, 2019, Glasgow, Scotland UK. ACM, New York, NY, USA, 13 pages. <https://doi.org/10.1145/3290605.3300532>

47. Kellie Vella, Bernd Ploderer, and Margot Brereton. 2021. Human-Nature Relations in Urban Gardens: Explorations with Camera Traps. In CHI Conference on Human Factors in Computing Systems (CHI '21), May 08– 13, 2021, Yokohama, Japan. ACM, New York, NY, USA, 13 pages. <https://doi.org/10.1145/3411764.3445438>

48. Saba Kawas, Nicole S. Kuhn, Mina Tari, Alexis Hiniker, and Katie Davis. 2020. “Otter this world”: can a mobile application promote children’s connectedness to nature? In Proceedings of the Interaction Design and Children Conference (IDC '20). Association for Computing Machinery, New York, NY, USA, 444–457. <https://doi.org/10.1145/3392063.3394434>

49. Jessica L. Oliver, Selen Turkay, Margot Brereton, David M. Watson, and Paul Roe. 2021. Engaging with Nature Sounds & Citizen Science by Designing for Creative & Contextual Audio Encounters. In CHI Conference on Human Factors in Computing Systems (CHI '21), May 08–13, 2021, Yokohama, Japan. ACM, New York, NY, USA, 14 pages. <https://doi.org/10.1145/3411764.3445390>

50. Yang Chen, Yuyu Lin, Junwu Wang, Lijuan Liu, Cheng Yao, and Fangtian Ying. 2019. IPANDA: A Playful Hybrid Product for Facilitating Children's Wildlife Conservation Education. In Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems (CHI EA '19). Association for Computing Machinery, New York, NY, USA, Paper LBW1611, 1–6. <https://doi.org/10.1145/3290607.3312884>

51. Isabel Correa and Nathan R. Holbert. 2021. Myco-kit: Towards a design for interspecies creative learning. In Interaction Design and Children (IDC '21), June 24–30, 2021, Athens, Greece. ACM, New York, NY, USA, 5 pages. <https://doi.org/10.1145/3459990.3465178>

52. Nicola J Bidwell and David Browning. 2006. Making there: methods to uncover egocentric experience in a dialogic of natural places. In Proceedings of the 18th Australia conference on Computer-Human Interaction: Design: Activities, Artefacts and Environments (OZCHI '06). Association for Computing Machinery, New York, NY, USA, 229–236. <https://doi.org/10.1145/1228175.1228216>

53. Jen Liu, Daragh Byrne, and Laura Devendorf. 2018. Design for Collaborative Survival: An Inquiry into Human-Fungi Relationships. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18). Association for Computing Machinery, New York, NY, USA, Paper 40, 1–13. <https://doi.org/10.1145/3173574.3173614>

54. Michelle Chang, Chenyi Shen, Aditi Maheshwari, Andreea Danilescu, and Lining Yao. 2022. Patterns and Opportunities for the Design of Human-Plant Interaction. In Proceedings of the 2022 ACM Designing Interactive Systems Conference (DIS '22). Association for Computing Machinery, New York, NY, USA, 925–948. <https://doi.org/10.1145/3532106.3533555>

55. Femke Oosterbaan Martinus. 2024. Het toekennen van rechten aan de natuur maakt opmars - Animals . animals today. Retrieved January 10, 2024 from <https://www.animalstoday.nl/rechten-aan-de-natuur-opmars/>

56. Route 2030 - Embassy of the North Sea. Embassy of the North Sea. Retrieved February 20, 2024 from <https://www.embassyofthenorthsea.com/route-2030/>

57. Teea Kortetmäki, Anna Heikkinen, and Ari Jokinen. 2022. Particularizing Nonhuman Nature in Stakeholder Theory: The Recognition Approach. *Journal of Business Ethics* 185, 1 (2022), 17–31. DOI:<https://doi.org/10.1007/s10551-022-05174-2>

58. Bill Tomlinson, Bonnie Nardi, Daniel Stokols, and Ankita Raturi. 2021. Ecosystemas: Representing Ecosystem Impacts in Design. In CHI Conference on Human Factors in Computing Systems Extended Abstracts (CHI '21 Extended Abstracts), May 8–13, 2021, Yokohama, Japan. ACM, New York, NY, USA, 10 pages. <https://doi.org/10.1145/3411763.3450382>

59. Shannon Rodgers, Kellie Vella, Bernd Ploderer, and Margot Brereton. 2023. Nature Fictions: Designing for a Sustainable Future through Nature Relations. In Designing Interactive Systems Conference (DIS '23), July 10–14, 2023, Pittsburgh, PA, USA. ACM, New York, NY, USA, 15 pages. <https://doi.org/10.1145/3563657.3595981>

60. Shannon Rodgers, Bernd Ploderer, Kellie Vella, and Margot Brereton. 2022. Phenology Probes: Exploring Human-Nature Relations for Designing Sustainable Futures. In Proceedings of the 34th Australian Conference on Human-Computer Interaction (OzCHI '22), November 29–December 02, 2022, Canberra, ACT, Australia. ACM, New York, NY, USA, 13 pages. <https://doi.org/10.1145/3572921.3572936>

61. Sarah Webber, Ryan M. Kelly, Greg Wadley, and Wally Smith. 2023. Engaging with Nature through Technology: A Scoping Review of HCI Research. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23), April 23–28, 2023, Hamburg, Germany. ACM, New York, NY, USA, 18 pages. <https://doi.org/10.1145/3544548.3581534>

62. IVN Webwinkel: IVN winkel. IVN. Retrieved February 19, 2024 from <https://winkel.ivn.nl/>

63. Stacey Kuznetsov, William Odom, James Pierce, and Eric Paulos. 2011. Nurturing natural sensors. In Proceedings of the 13th international conference on Ubiquitous computing (UbiComp '11). Association for Computing Machinery, New York, NY, USA, 227–236. <https://doi.org/10.1145/2030112.2030144>

64. Peter Gall Krogh and Ilpo Koskine n. 2020. Drifting by Intention. Springer Nature. Retrieved from <https://play.google.com/store/books/details?id=UUHWDwAAQBAJ>

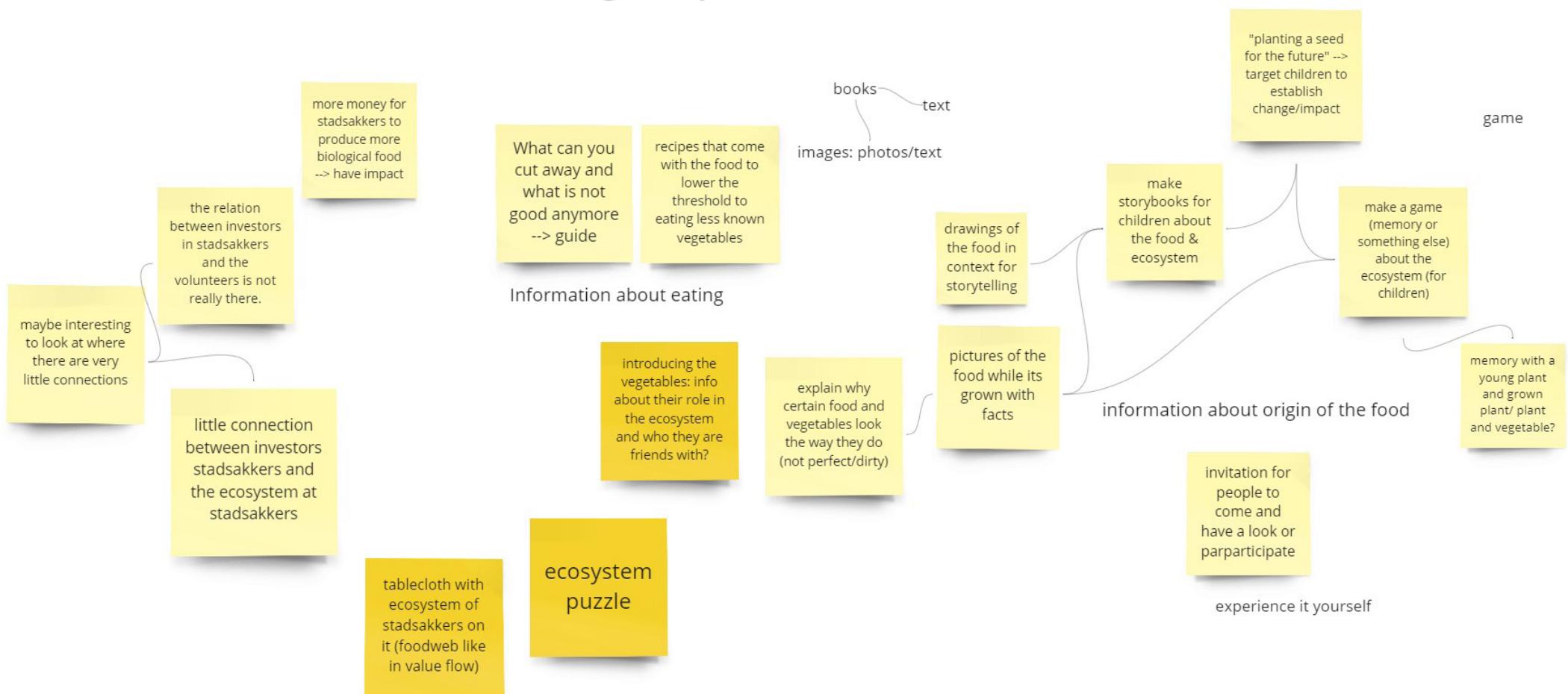
65. Ferran Altarriba Bertran, Oðuz 'Oz' Buruk, and Juho Hamari. 2022. From-The-Wild: Towards Co-Designing For and From Nature. CHI Conference on Human Factors in Computing Systems Extended Abstracts (2022). DOI:<https://doi.org/10.1145/3491101.3519811>

APPENDICES

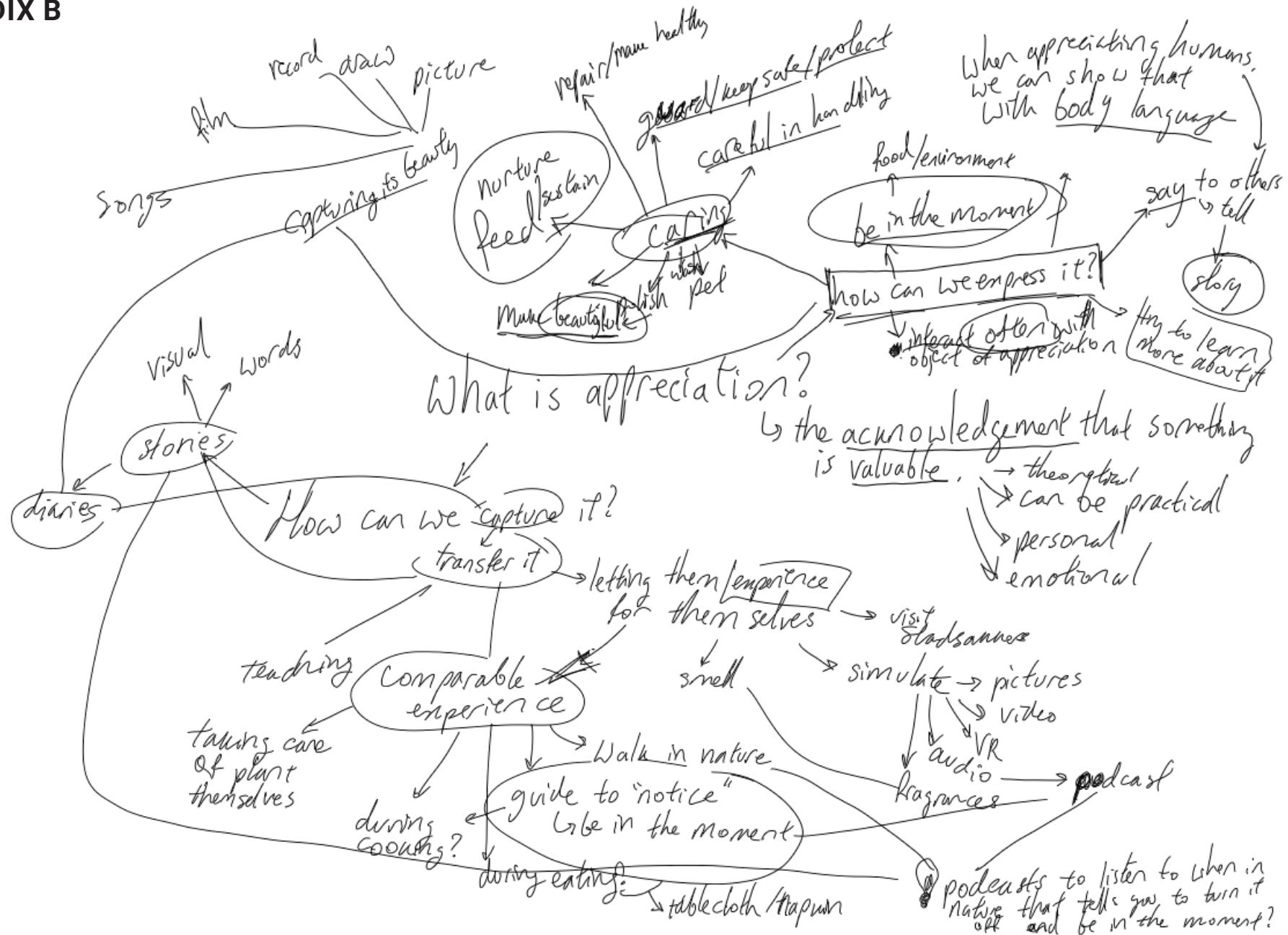
- A. Results focus group with Stadsakkers
- B. Mindmaps about appreciation
- C. Ideation design for non-human appreciation
- D. AI generated story about non-human appreciation
- E. Rules ecosystem game
- F. Ideas for context ecosystem game
- G. Ideation about experiencing non-human appreciation from dimensions
- H. Jottings pilottest with Gardening kneepad cover

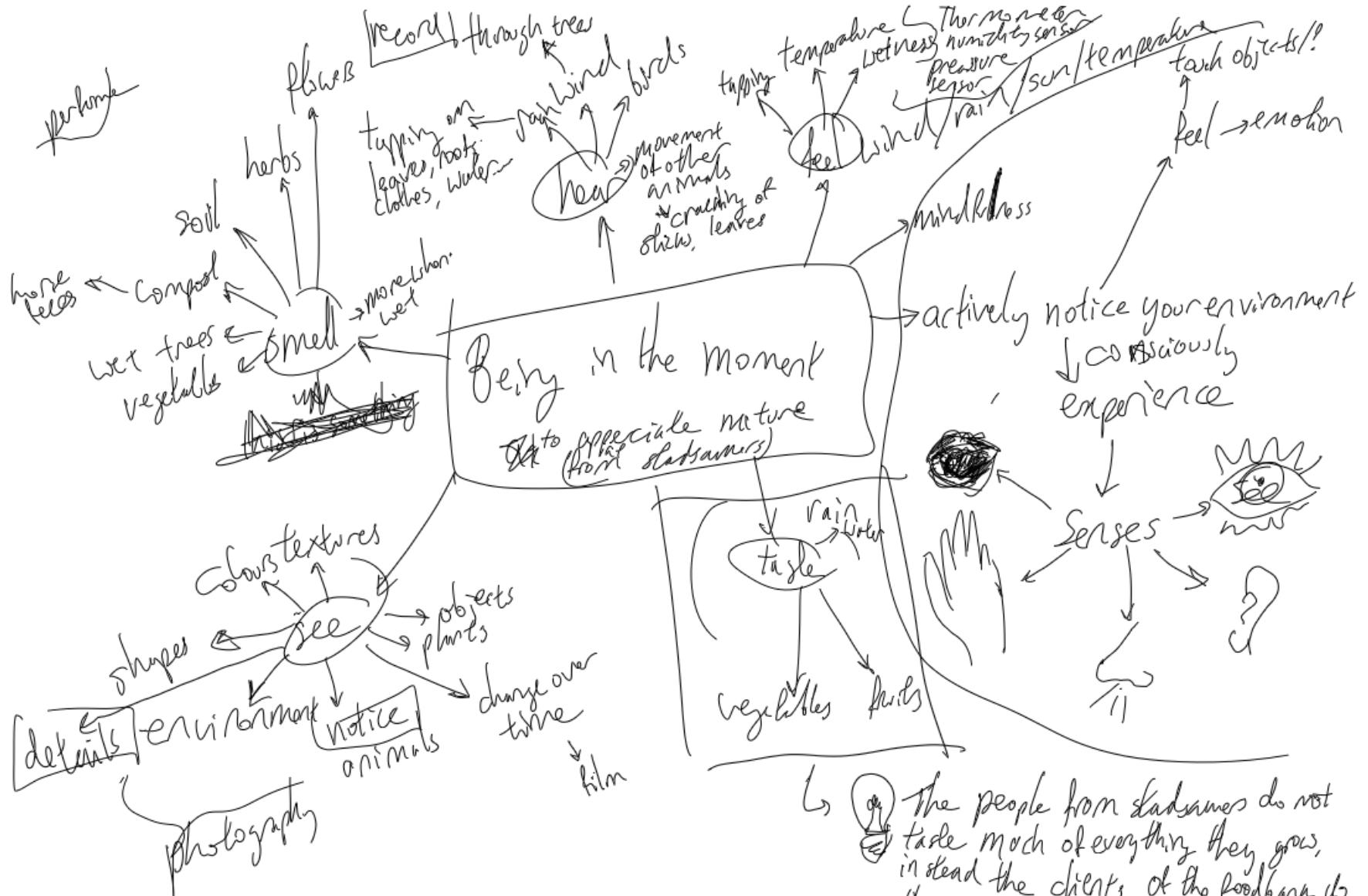
APPENDIX A

Focus group Stadsakkers 1

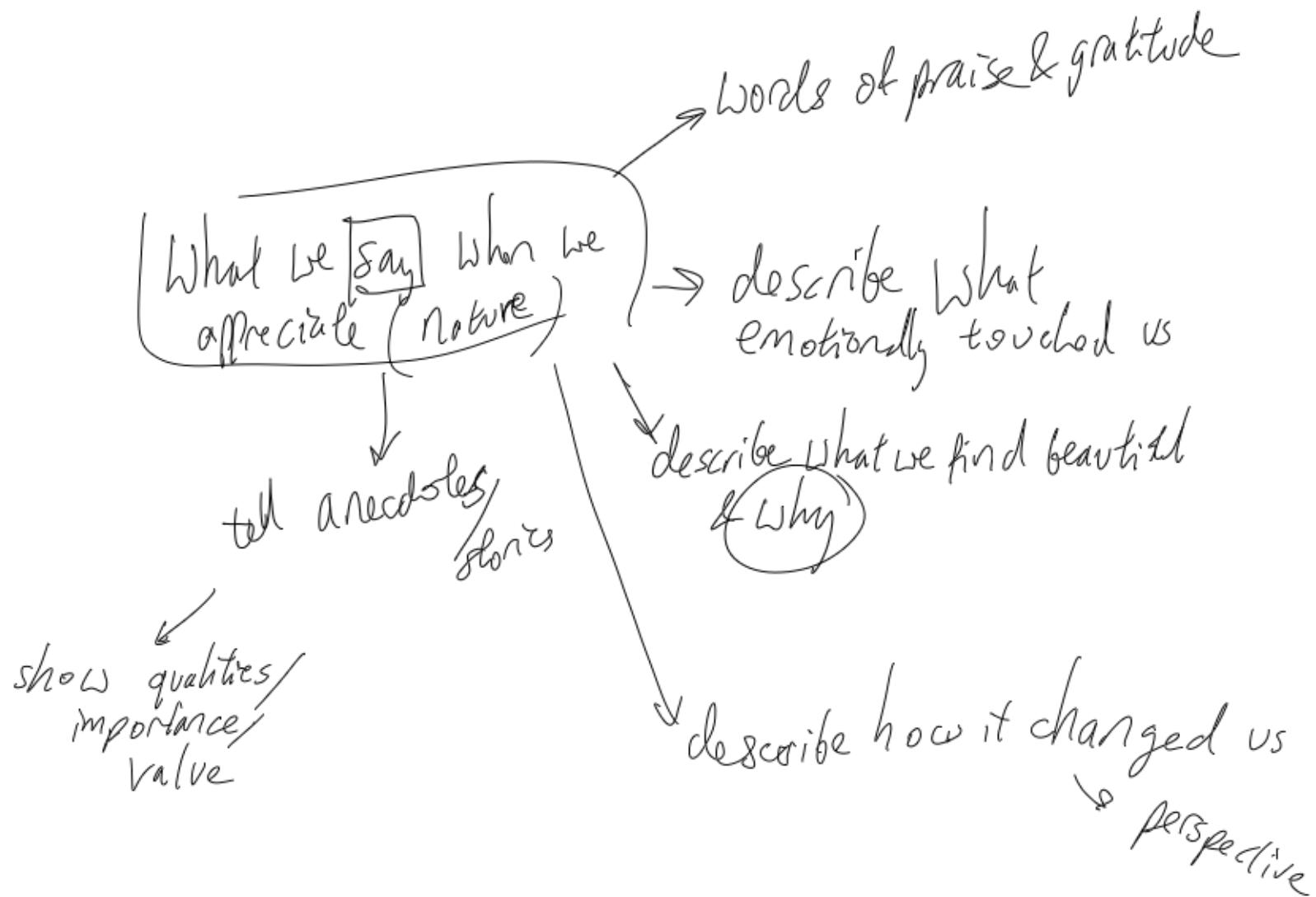


APPENDIX B

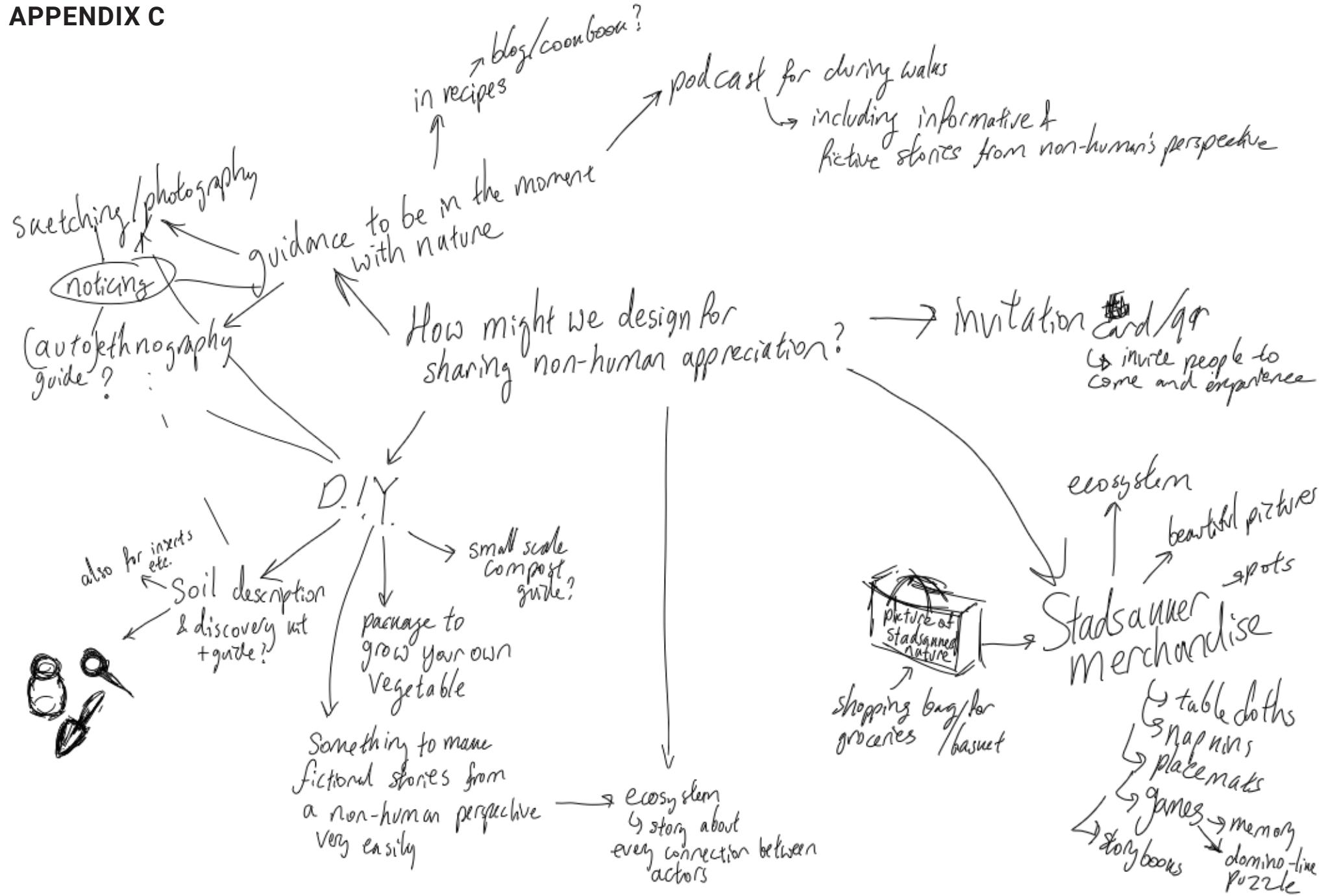




The people from sadasmas do not taste much of everything they grow, instead the clients of the food bank do the tasting. However they miss the other 4 senses that were involved in growing the food, they can only experience through the vegetable.



APPENDIX C



APPENDIX D

Query to dutch chat gpt: Schrijf een kort informatief en fictief verhaaltje over het ecosysteem rondom een paprikaplant bij de stadsakker eikenburg eindhoven. "Write a short informative and fictive story about the ecosystem around a pepper plant at Stadsakker Eikenburg Eindhoven."

Result:

In het bruisende Eindhoven ligt de prachtige stadsakker Eikenburg, waar verschillende planten en dieren een harmonieus ecosysteem vormen. Een bijzondere plek op deze akker is de weelderige paprikaplant, die overal om zich heen leven aantrekt.

De paprikaplant staat in volle bloei, en haar helderrode pepers glinsteren in het zonlicht. Maar de schoonheid van deze plant gaat verder dan alleen haar uiterlijk. Dichtbij de plant cirkelt een kleurrijke vlinder genaamd Julia. Julia heeft een voorliefde voor de zoete nectar van de bloemen van de paprikaplant. Ze fladdert vrolijk van bloem naar bloem en bestuift ze hiermee tegelijkertijd.

Ondertussen is Trudy, de gewiekste honingbij, druk bezig met het verzamelen van stuifmeel voor haar bijenkorf. Ze landt op een van de bloemen en begint het stuifmeel van de meeldraden te verzamelen. Terwijl ze dat doet, wordt er wat stuifmeel op haar harige rug achtergelaten. Wanneer ze naar de volgende bloem vliegt en het stuifmeel afzet, begint ze onbedoeld met het bestuiven van de paprikaplant.

Onder de grond wonen Polleke, de nieuwsgierige regenworm, en haar talloze familieleden. Ze wroeten zich een weg door de vruchtbare grond, terwijl ze organisch materiaal afbreken en verteren. Hierdoor wordt de grond rijk aan voedingsstoffen, wat de paprikaplant helpt om gezond en sterk te groeien.

Terwijl de plant groeit, trekt ze ook verschillende insecten aan die een

heerlijke maaltijd zien in haar bladeren. Een groepje lieveheersbeestjes neemt hun intrek in de dichte bladeren van de plant en begint zich te voeden met de luizen die de plant belagen. De lieveheersbeestjes zorgen ervoor dat de paprikaplant vrij blijft van schadelijke insecten en daardoor optimaal kan groeien.

Al deze interacties tussen de verschillende organismen vormen een perfect ecosysteem rondom de paprikaplant op de stadsakker Eikenburg. Terwijl de plant groeit en rijpe paprika's produceert, zorgt het ecosysteem ervoor dat alle betrokkenen in harmonie met elkaar kunnen leven. Dit kleine stukje natuur midden in de stad is een ware schat, waar biodiversiteit en duurzaamheid hand in hand gaan.

translation:

The beautiful Eikenburg city field is located in bustling Eindhoven, where various plants and animals form a harmonious ecosystem. A special place in this field is the lush pepper plant, which attracts life all around it.

The pepper plant is in full bloom, and its bright red peppers glisten in the sunlight. But the beauty of this plant goes beyond its appearance. A colorful butterfly named Julia circles near the plant. Julia has a preference for the sweet nectar of the flowers of the pepper plant. She flutters happily from flower to flower and pollinates them at the same time.

Meanwhile, Trudy, the savvy honey bee, is busy collecting pollen for her hive. She lands on one of the flowers and begins to collect the pollen from the stamens. As she does so, some pollen is left on her hairy back. When she flies to the next flower and deposits the pollen, she inadvertently starts pollinating the pepper plant.

Polleke, the curious earthworm, and her countless relatives live underground. They root their way through the fertile soil, breaking down and digesting organic matter. This makes the soil rich in nutrients, which helps the pepper plant to grow healthy and strong.

As the plant grows, it also attracts various insects that find a delicious meal in its leaves. A group of ladybugs take up residence in the dense leaves of the plant and begin to feed on the aphids that attack the plant. The ladybugs ensure that the pepper plant remains free of harmful insects and can therefore grow optimally.

All these interactions between the different organisms form a perfect ecosystem around the pepper plant in the Eikenburg city field. As the plant grows and produces ripe peppers, the ecosystem ensures that everyone involved can live in harmony with each other. This small piece of nature in the middle of the city is a true treasure, where biodiversity and sustainability go hand in hand.

APPENDIX E



Contents

1. 28 actor tiles
2. 1 starting tree tile
3. 9 empty actor tiles
4. 6 bundles of relation rope
5. Sticky notes



Instructions

Competitive

Optional extra actor

Preparation

Leave the 28 actor tiles in the box in an unknown order. Put the 9 empty actor tiles on a pile outside the box together with the sticky notes. Take a pen and a piece of paper to keep the score and make a table with the names of all participants as columns. Place the starting tree tile in the middle of the table.

How to play

The player that was last outside can start the game. This is done by taking turns.

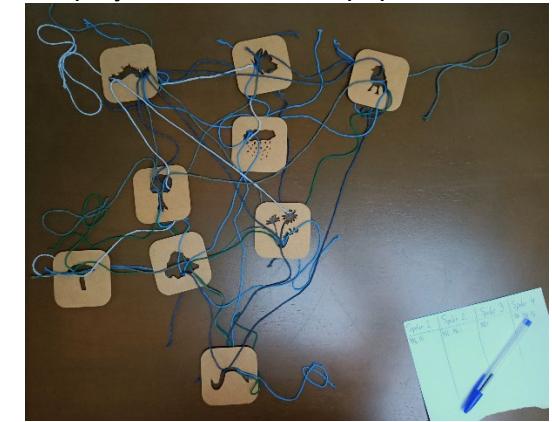
A turn consists of the following steps:

- 1) The player whose turn it is takes an actor tile from the box and places it on the table.



- 2) The player takes the relationship ropes and lays as many connections as possible between the actor tile they just placed and the other actor tiles on the table. For every connection, they get one point, which is indicated by one of the players on the score paper.

just placed and the other actor tiles on the table. For every connection, they get one point, which is indicated by one of the players on the score paper.



- 3) The player gets the opportunity to lay up to three more connections between any tiles. This does not need to be the tile they just placed. These connections also give the player one point per connection. After this, the turn ends and the next player can have a go.

The players keep taking turns until they run out of actor tiles. They can then opt to add actors to the ecosystem using the empty actor tiles and the sticky notes. They can write or draw the new actor on the sticky note and stick it to an actor tile. For each actor that one comes up with 2 points are earned. The same steps in turn are taken with the newly created actor tiles.

The game ends when all actors are placed on the table and no one can make additional connections. The player with the highest score wins.

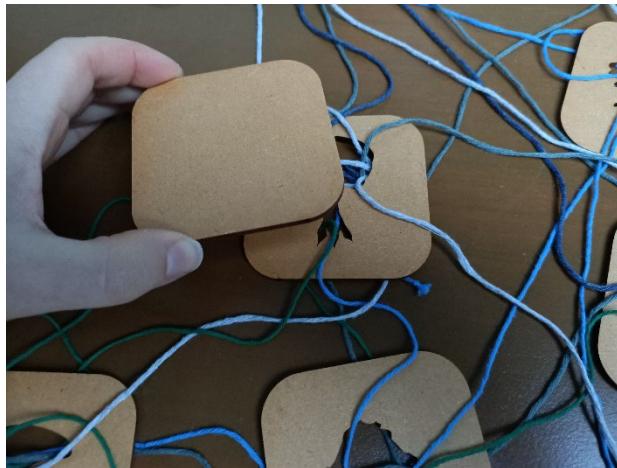
During the game, it can occur that players don't know the relation to an actor. It is encouraged to look up the actors online to learn about their function in the ecosystem. When doing so, this is seen as a learning moment and the player will earn 3 points for the effort of looking up new information, but they cannot deserve points with the connections they make as a result of that new information.

Forced extra actor



In this game, the empty actor tiles are placed randomly between the normal actor tiles. When the game is played, there is a risk that the player grabs an empty actor tile. This means that they need to come up with an extra actor on the spot. If they manage to do so they get five points, but if they don't 5 points are deducted from their score. This makes the game more risky. For the rest of the game, the same rules apply as in the optional extra actor.

Blocking actors



In this variation of the game, the player can opt for something else in the third step of their turn (as in the optional extra actor game). Instead of making up to three extra connections beyond the tile they just placed, they can block it by grabbing an empty actor tile and placing it on top of the played tile. This ensures that they have a monopoly on an actor in the ecosystem. Depending on the stage of the game and the actor, this can prevent other players from gaining a lot of points, giving the advantage to the player that blocks an actor. There is a limited number of empty actor tiles. First come first serve. The game follows the same rules as the optional extra actor game.

Connection madness

A different way of playing this game is by picking a type of relationship rope and using only that one to make as many connections between all actors as possible. The game is prepared by picking a relationship rope and placing all actors in a circle. Then the players can either choose to all start making relationships at the same time and count in the end to see who won or they can decide to take turns and count continuously. The person with the most relations wins.

Relaxed

Place all the actor tiles on the table and try to make connections together. The goal here is to explore the relations in the ecosystem together. This is also a good moment to look up the actors online and to learn about their role in the ecosystem in more detail.



Inhoud

1. 28 actortegels
2. 1 startboomtegel
3. 9 lege actortegels
4. 6 bundels relatietouw
5. Plakbriefjes



Instructies

Competitief

Optionele extra actor

Voorbereiding

Laat de 28 actortegels in onbekende volgorde in de doos liggen. Leg de 9 lege actortegels samen met de plakbriefjes op een stapel buiten de doos. Neem een pen en een stuk papier om de score bij te houden en maak een tabel met de namen van alle deelnemers als kolommen. Neem de startboomtegel en plaats deze in het midden van de tafel.

Hoe te spelen

De speler die het laatst buiten was, mag het spel starten. Dit gebeurt in beurten.

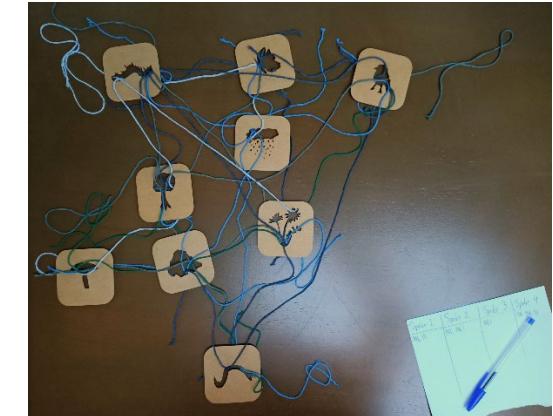
Een beurt bestaat uit de volgende stappen:

1. De speler die aan de beurt is, pakt een actortegel uit de doos en legt deze op tafel.



2. De speler pakt de relatietouwen en legt zoveel mogelijk verbindingen tussen de

actortegel die hij zojuist heeft geplaatst en de andere actortegels op tafel. Voor elke verbinding krijgt de speler één punt, aangegeven door een van de spelers op het scorepapier.



3. Nu krijgt de speler de mogelijkheid om nog drie verbindingen tussen tegels aan te leggen. Dit hoeft niet de tegel te zijn die ze zojuist hebben geplaatst. Deze verbindingen leveren de speler ook één punt per verbinding op. Hierna eindigt de beurt en mag de volgende speler het proberen.

De spelers blijven om de beurt spelen totdat ze geen actortegels meer hebben. Ze kunnen er dan voor kiezen om actoren aan het ecosysteem toe te voegen met behulp van de lege actortegels en de plakbriefjes. Ze kunnen de nieuwe actor op de notitie schrijven of tekenen en deze op een actortegel plakken. Voor elke actor die bedacht wordt, kan de speler 2 punten verdienen. Dezelfde stappen als in een normale beurt worden genomen met de nieuw gemaakte actortegels.

Het spel eindigt wanneer alle acteurs op tafel zijn geplaatst en niemand meer verbindingen kan maken. De speler met de hoogste score wint.

Tijdens het spel kan het voorkomen dat spelers de relatie tot een acteur niet kennen. Het wordt aangemoedigd om de actoren op internet op te zoeken om meer te weten te komen over hun functie in het ecosysteem. Daarbij wordt dit gezien als een leermoment en krijgt de speler 3 punten voor de moeite om nieuwe informatie op te zoeken, maar kan deze geen punten verdienen met de verbanden die gelegd worden naar aanleiding van die nieuwe informatie.

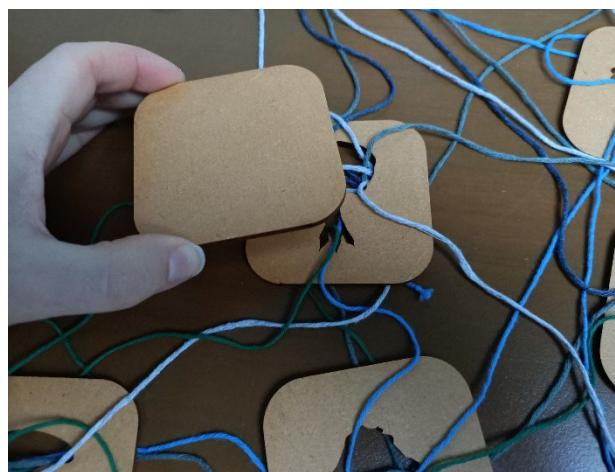
Gedwongen extra actor



In dit spel worden de lege actortegels willekeurig tussen de normale actortegels geplaatst. Wanneer het spel wordt gespeeld, bestaat het risico dat de speler een lege actortegel pakt. Dit betekent dat ze ter plekke een extra acteur moeten verzinnen. Als dat lukt, krijgen ze vijf punten, maar als dat niet lukt,

worden er vijf punten van hun score afgetrokken. Dit maakt het spel risanter. Voor de rest van het spel gelden dezelfde regels als bij de optionele extra actor.

Blokkeer de actoren



In deze spelvariant kan de speler in de derde stap van zijn beurt (zoals in het optionele extra actorspel) voor iets anders kiezen. In plaats van maximaal drie extra verbindingen te maken buiten de tegel die ze zojuist hebben geplaatst, kunnen ze de tegel die ze zojuist hebben geplaatst blokkeren door een lege actortegel te pakken en deze bovenop de gespeelde tegel te plaatsen. Dit zorgt ervoor dat ze een monopolie hebben op een acteur in het ecosysteem. Afhankelijk van de fase van het spel en de acteur kan dit voorkomen dat andere spelers veel punten behalen, waardoor het voordeel wordt gegeven aan de speler die een acteur blokkeert. Er is een beperkt aantal lege actortegels. Wie het eerst komt het eerst maalt. Het spel volgt dezelfde regels als het optionele extra actorspel.

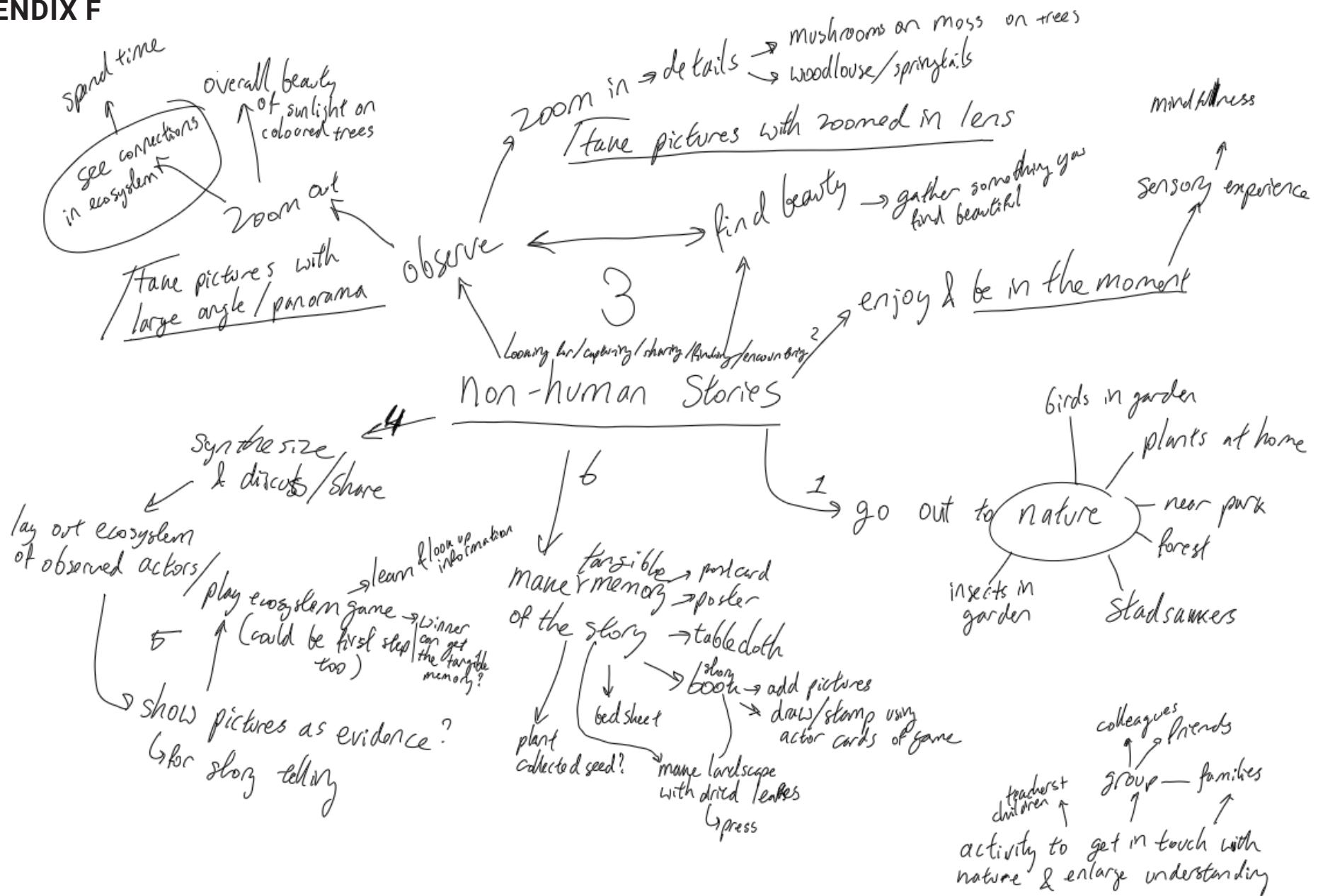
Verbindingsgekte

Een andere manier om dit spel te spelen is door een specifiek relatietouw te kiezen en alleen dat touw te gebruiken om zoveel mogelijk verbindingen tussen alle actoren te maken. Het spel wordt voorbereid door een relatietouw te kiezen en alle acteurs in een cirkel te plaatsen. Vervolgens kunnen de spelers ervoor kiezen om allemaal tegelijkertijd relaties aan te gaan en uiteindelijk te tellen om te zien wie er heeft gewonnen, of ze kunnen besluiten om om de beurt te gaan tellen en continu te tellen. De persoon met de meeste relaties wint.

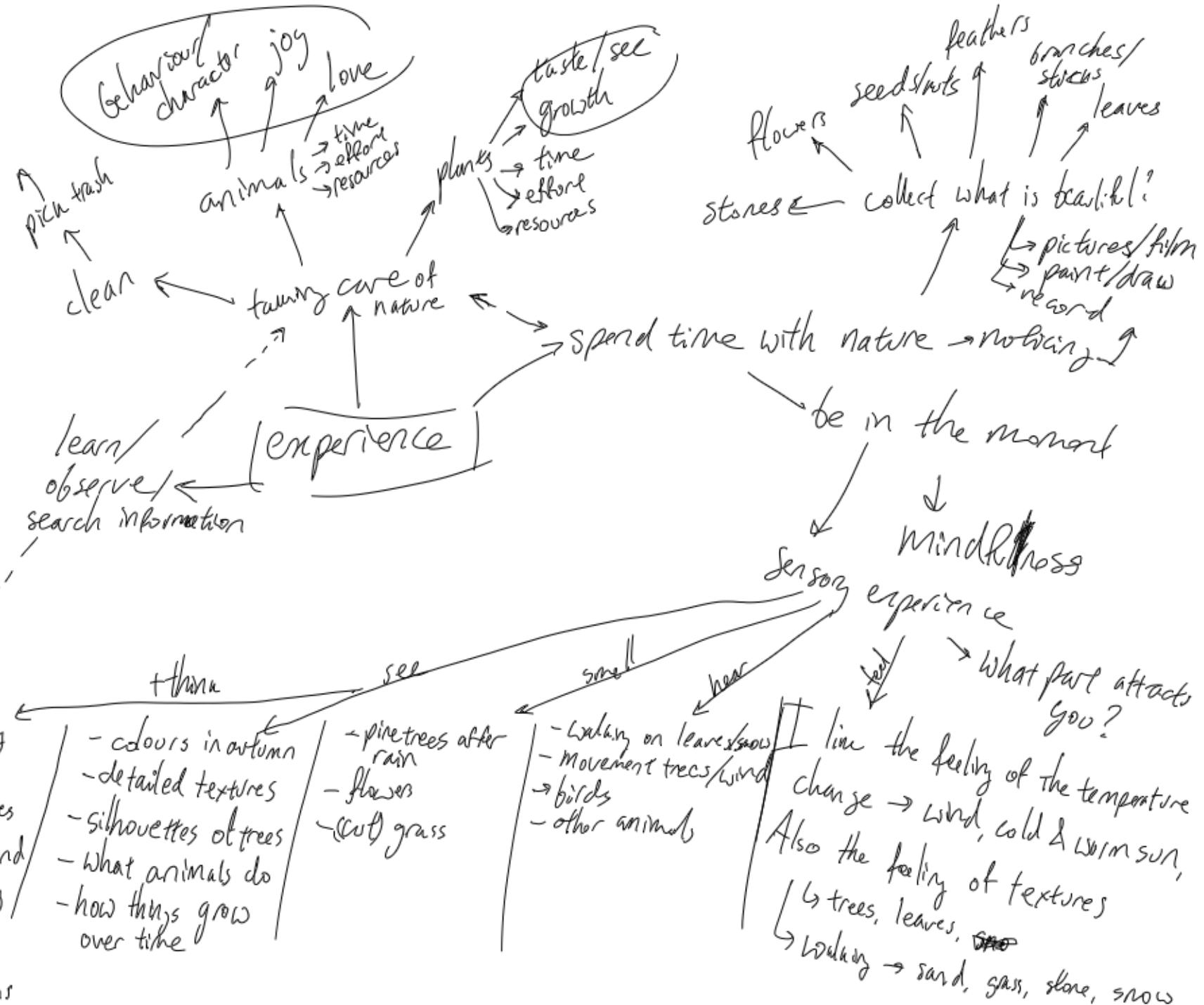
Ontspannen

Plaats alle actortegels op tafel en probeer verbindingen met elkaar te maken. Het doel hier is om samen de relaties in het ecosysteem te verkennen. Dit is ook een goed moment om de actoren online op te zoeken en meer in detail te leren over hun rol in het ecosysteem.

APPENDIX F



APPENDIX G



APPENDIX H

P1:

Kneeling has something religious
What is the white thing on the leaf?
First just exploring the environment more widely
Uses magnifying glass
Something to explore with works
Digging in soil to look for life
What if you would do the games
Would it influence eachother's perspective? Is that positive or negative?

Turned around pillow

Tiny slugs

Bigger slug on hand

springtails

P2:

Look around

Aesthetic perspective

Lines of treetrunks

Wallpaper panorama

Not seeing cars but hearing them

Picking up soil, smelling, digging, smelling

Comparison

Uses magnifying glass, but doesn't see animal

Surprised by finding a nut at this time of year, put in pocket

Turning pillow around

Again slugs and springtails

More seeds

Leaves

Surprise

Observe with magnifying glass

Reflect:

Not grown up in this environment

Looking less focused due to less assumptions, which makes me explore more.

Would not use this to take on a walk herself

Would do this with child

It's an enriching experience

Find decomposing can

In pocket