Exploring a More-than-Human Approach to Designing with Urban Ecology.

Ronne Wabeke

The trouble is, we've all let ourselves become part of the killer story, and so we may get finished along with it. Hence it is with a certain feeling of urgency that I seek the nature, subject, words of the other story, the untold one, the life story." - Ursula K. Le Guin

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PREFACE

During the last half year I delved into the world of ecology and more-than-human design. As a person who recharges her energy outside in nature I felt honoured to take on the posthuman perspective and share my care for ecology with others around me. It was not easy to overcome my own insecurities as I learned that I, a simple designer, do not understand the intricacies of ecology at all. Now that has changed to being confident in the fact that I know what I don't know and can keep learning and exploring my practice as a more-than-human designer. Most of all I am grateful for all the people who invested their time in this project and me.

First of all, I want to thank ***Denis*** *from* ***Refunc*** *for allowing me to learn this much about his practice, involving me in projects and being open to my project. I am happy to say that we have both learned a lot along the way. Refunc has inspired me to keep thinking about circularity and the way I can interrupt the system as a designer.*

Next, I want to thank ***Thomasz*** *and* ***Bregje****. We have had many meetings in which you helped me along, inspired me and reassured me. The graduation project was not an easy process for me and I am thankful for the way you supported me. The way you take in and synthesise information helped me find clarity within my sometimes fuzzy brain.*

Thanks to the experts and participants in research and co-designing activities. I have gained a rich understanding of the matters in this thesis and learned many unexpected things. ***Frederike Bloemers*** *en* ***Reinder de Boer*** *from the AVN with their detailed knowledge about policies and inspiring care for urban species. Petra van Leeuwen, a real dedicated nature enthusiast.* ***Jaz Choi*** *who is an expert on MTHD and was open to share it with me.* ***Jan Körbes*** *who gave me another perspective on Refunc.*

I would like to thank all of my ***friends*** *and* ***family*** *for everything. Helping out with making prototypes, giving feedback, helping me transcribe, proofreading, taking care of me, taking my mind off graduation and much more. I couldn't have done it without you guys. Lastly, I would like to thank* ***De Pit*** *for being my alternative reality during the summer, my second home where I could just be. And all of the* ***nonhuman species*** *that helped me reframe my perspective.*

I hope you enjoy reading about my journey and if you have any questions or remarks,
reach out to me and let's chat!

GLOSSARY

Some of these terms are used in multiple ways in different types of literature. In this Glossary I specify the definitions of terms used in this report (Braidotti & Hlavajova, 2018).

ABBREVIATIONS

MTH	more-than-human
MTHD	more-than-human design

DEFINITIONS

Actor network	In the actor-network theory, an actor is something that acts within a system of interconnected relations. An actor can literally be anything provided it is granted to be the source of action. It can be a thing, a species, weather, etc.
Anthropocene	Geological epoch in which human activities have lasting effects on earth's geology and ecosystems.
Art of noticing	A concept by Anna Tsing about learning to notice and appreciate the complexities of entanglements within the more-than-human world (Tsing, 2021).
AVN	Algemene Vereniging voor Natuurbescherming Den Haag en omstreken
Broedplaats	Creative hub or literally translated, a breeding ground or hatchery
Ecology	The relationships between the air, land, water, animals, plants, etc., usually of a particular area. In more-than-human design, the term ecology can also be used to describe entangled systems (Wakkery, 2021). In this project, it will be used to describe the ecology of flora and fauna.
Entanglements	The complex interrelations between actors.
Ecosystem	Ecosystems are dynamic networks of relationships (of coexistence and interconnectedness) between species.
Intervention	Seeing a design as something that intervenes with the context it lives in, leading to a change in the context.
Maakhaven	A makerspace in Den Haag
Matters of care	A concept by Maria Puig de la Bellacasa, about extending caring beyond human-centred perspectives. Recognise and enact care for the well-being of nonhumans and ecosystems because we are all interconnected (De La Bellacasa, 2017).
Multispecies	Presence, interaction and collaboration of multiple species within a specific ecosystem.
Nonhumans	Any actors that are not humans, they can also be called other-than-human. In this project, I will refer to species other than humans as nonhumans. In general more-than-human theory, the term also includes non biological actors.
Practice	The customary procedure or way of doing something.

EXECUTIVE SUMMARY

Ecology as an equal user of the city

The city is designed to be human-centred. In the multispecies urban environment humans take on roles of management and ownership over flora and fauna. This leaves the richness and biodiversity of urban habitats in the hands of humans (Denters, 2020). Ecology is often treated as a second class citizen and given opportunities according to human preferences.

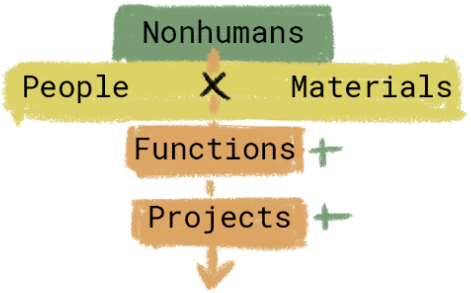

Figure 1. Refunc framework

In collaboration with material-centred design agency Refunc, this project explores the way designers can work with the entanglements around local ecology and facilitate equal and just treatment of ecology as an added client of otherwise human-centred design.

More-than-human perspective

In the first stage of the project, practices from more-than-human-design theory, Refunc, nature-inclusive building and ecologists are collected and urban human-ecology relations are explored by noticing entanglements (Tsing, 2021) and multidisciplinary collaboration. To allow more opportunities for ecology to be revitalised in urban environments the main objectives are to create space and facilitate agency for ecology.

Decentring through experimentation

In the following stage of the project designing, making and co-creation are used as knowledge generation tools. Through multiple design experiments the application of more-than-human design and Refunc's practices is explored and more practices are collected and defined.

The main challenges of adopting the more-than-human perspective are:

- The lack of knowledge and understanding of ecology and the complexity of entanglements.
- Decentering the human in the design process.

Play and multidisciplinary collaboration can support the designer in finding new multispecies uses for objects.

Added to Refunc's framework are lively materials, nonhuman functions and more-than-human clients (see figure 1). As well as a change in perspective from projects that are finished once they are produced to interventions that are ever changing.

A (never) complete journal of practices for designers of urban ecology

A journal is created to provide support to beginning more-than-human designers. The design goal is to introduce them to MTHD practices and inspire them to experiment in a project with urban ecology.

The journal is filled with 29 practices, examples of interventions and activating questions. It is a collection of the work of this project and a starting point for another designer going on a similar journey. They are recommended to be applied and explored one by one in a reflective and iterative design process. After the designer has mastered its contents, the journal can be planted and create space for ecology by itself.

Lastly, the journal and this project are an invitation to every designer to experiment and explore how their projects can involve more-than-human ecology.

Find the digital version of the journal here!

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Chapter 1

PROJECT SCOPE & APPROACH

1.1 INTRODUCTION

We share our cities with many other species. Many of us are not even aware of the fact that we as humans often decide where these other-than-human beings can reside in our built environment. We make and design things that create a pleasant environment for us, but the impact it has on other-than-human beings is generally overlooked.

Current design processes have had a great impact on the anthropocene. With issues like the decline of biodiversity and waste pollution being a result of the way we designed our world. New methods are needed to come up with new non-exploitative relations between human and other-than-human.

A more-than-human challenge

The field of more-than-human design is exploring how we could design an intervention that is both good for humans and other-than-humans alike (Coşkun et al., 2022). In involving both of these stakeholders in the design process, it strives to minimise negative effects on those who are currently left out (Forlano, 2017). Aiming for an overall positive impact on the system that we are a part of. In short, the goal of more-than-human design (MTHD) is to step out of the anthropocentric view, decentre the human, and look at systems with a more holistic view (Forlano, 2017).

Refunc; reconnecting people and material

Currently, independent design studios are exploring how to approach the standard design process differently to have a positive impact on the world. They are at the front of the paradigm shift towards a more sustainable society.

This project is done in collaboration with Refunc; a design studio which creates circular design projects and plays with waste materials. Denis Oudendijk and Jan Körbes run the material-centred studio together (Refunc, n.d.). With Denis, we explore Refunc's and MTHD practices through cross-pollination. While they started listening to materials a long time ago, they are not yet accustomed to listening to nature or ecology. (Refunc, n.d.)

1.2 PROJECT SCOPE

In this project, I explore designing with more-than-human urban ecology through multiple designing and making experiments. In these experiments, I come up with interventions that benefit both the MTH (more-than-human) local ecology and humans that are a part of it through playing with Refunc's approach. The experiments don't exist in a vacuum, rather they are connected to the context that they are living in.

Project goal

Currently many MTHD projects are research or speculative projects, rather

than design projects that live in a real context. This project provides tangible examples of what it looks like when designers start to get familiar with, adopt and execute MTHD. It is an alternative to the story of human destruction hoping to inspire and speak to the imagination (Guin, 2019). I tell this story through the materialisation of the theoretical to help designers imagine what this alternative story could look like.

The project aims to answer the following research questions:

1. What methods, tools and knowledge can support designers in designing with MTHD urban ecology?
    a. What opportunities and challenges present themselves in the adoption of MTHD for Refunc?
    b. What opportunities and challenges do I, as an educated designer, experience during the project?
2. How can Refunc's methods, tools and knowledge contribute to the challenges and opportunities of MTHD?

1.3 APPROACH

For both the design and research side of this project multiple approaches are combined. In the chapter specific methodology is further explained.

The project starts with a preliminary research phase in which making activities have immediately been introduced. In the phase that followed, making activities move to the foreground, concluding with a phase in which the project insights are put into a journal and the journal is evaluated with users.

More-than-human design

Practices from posthuman literature and multispecies design are used as a guide for a more-than-human approach. As Forlano (2017) explains in her work; "concepts such as the nonhuman, the multispecies, the anthropocene, the more than human, the decentring of the human—greatly expands our understandings of the multiple agencies, dependencies, entanglements, and relations that make up our world.".

Research through design

This thesis uses a research through design approach. Making and designing are used as knowledge generation tools. The goal of the designing processes is to answer the overarching research questions, as well as allowing new insights to be generated that otherwise would have stayed hidden (Stappers & Giaccardi, 2017). In this process the challenges and opportunities of the adoption of MTHD practices is the focal point.

Co-creation

It is important to keep in mind that even though we design with and for others, we are not the experts. The people we are designing for are (Sanders & Stappers, 2012). Design experiments are supported by the

1.4 READING GUIDE

More-than-human ecology

In chapter 2 to 6 you can read about the multiple topics and fields of knowledge that informed this project. Refunc's methods, the background of MTHD, the context of the project and current approaches to involving local ecology are discussed.

Refunc and the local urban ecology

Next, the different designing and making cycles are explored in chapter 7 to 9. Here is explained how the designs and understanding of more-than-human design progressed over time and what insights they led to.

Designing and making W/ ecology

In chapter 10, the insights from the previous chapters are distilled into a journal for more-than-human designers. The journal aims to help designers get familiar with the practices gathered in this project.

In chapter 11, the evaluation of the journal is described and relayed. The testing with users and feedback from experts inform the recommendations for the final design of the journal.

The final design of the journal can be found in chapter 12.

Keep on practising

In chapter 13 the effectiveness of the methods and approach are discussed as well as how successful we were at creating a more-than-human design in the end.

Lastly, this report ends with some reflection and an invitation to keep exploring for all readers MTHD in chapters 14.

Throughout the thesis multiple practices are gathered that can support designers in creating MTHD. They are answers to the first research question, these practices can be found in these green sections.

II. MORE-THAN-HUMAN ECOLOGY

Chapter 2

MORE-THAN-HUMAN DESIGN

2.1 INTRODUCTION

In this thesis, I explore how to involve the more-than-human actors of the urban ecology in the design process through MTHD. More-than-human design is an emergent practice built in interdisciplinary fields of research and design (Forlano, 2017). In this chapter, I will explain what elements make up my MTH practice and the value of this design approach.

2.2 METHOD

The conceptualisation of MTHD was gathered through literary review. A few of the main works that inspired this project were *Posthumanism and Design* (Forlano, 2017), T*he mushroom at the end of the world* (Tsing, 2021), *Staying with the Trouble* (Haraway, 2016), *When species meet* (D. J. Haraway, 2008) and *Things we could design: For More Than Human-Centered Worlds* (Wakkary, 2021).

2.3 THE MTH DESIGN BASICS

More-than-human theories encompass works such as posthumanism, actor-network theory, feminist new materialism and object-oriented ontology (Forlano, 2017). This perspective hopes to impact designers and the users of design to have a more just and healthy relationship with our planet (Forlano, 2017).

(Urban Reef, n.d.)

Even in our own existence, we already consist of 90% nonhuman genomes including bacteria, fungi and protists. Sharing our bodies with these others means that the experience of being human is always intertwined with the existence of other species. (Haraway, 2008) We are interwoven with the nonhuman on multiple scales, from our own bodies to the effects of climate change. While we like to separate ourselves from our cohabitors, we must acknowledge that there is no human experience without the constant entanglement with all things nonhuman. Humanity is interwoven with interspecies dependencies. (Haraway, 2008, pp. 9-11)

2. Look at a design as a network of intra-actions and interdependencies.

As MTH design studio Superflux (2021) wrote in their manifesto; “We need to remember that we are not just on this Earth: we are of this Earth. The interdependence is real: humanity as ecology, ecology as humanity.”

Instead of looking at a design as a separate object unrelated from its context, designers need to understand that the context and design as inherently intertwined. Design is messy and the larger context will affect a design and will be affected by it. (Foster & Ervin, 2020) Humans and nonhuman are entangled within these networks of things and between those things different types of

relations or interdependencies exist (Wakkery, 2021).

3. We are shaped by our human experience.

We will always be dependent on our bodies and subjectivities and these subjectivities are shaped by our cultural backgrounds and experiences. (Forlano, 2017). We can never say that we know what it feels like to be someone or something else. This means that we should be aware of our subjectivities while researching and designing. We can also try taking on different perspectives by using practices of noticing and imagining (Tsing, 2021).

4. Start decentring the human.

Human-centred-ness has caused blatant disregard for other life and degraded the conditions of earth, decentring is about not placing the human above other species but creating new paths forward in kinship (Haraway, 2016). This means that we need to think beyond our own species and respect the forms of intelligence and creativity of other species (Superflux, 2021).

5. We should explore how to stimulate more liveliness in the city.

Many relations with ecology designed by humans are extractionist, like the way we farm the land. Forming new relations that are not about extracting resources from nonhumans will allow for justice and equality for humans and nonhumans (Forlano, 2017). In forming these new relations we need to find ways to pay attention to the experience and agency of the nonhumans in ecology (Wakkery, 2021). Designing to address the needs of nonhumans requires sensitivity towards nonhuman species (Metcalfe,2015). In this thesis, I will use the term liveliness as a way of involving the wellbeing of general ecology. Instead of focussing on the needs of a single species. An active ecological system consists of liveliness (and decay).

2.4 MTH IN THIS PROJECT

The 5 elements of a MTH approach can be tackled from different perspectives.

1. Being human means to be entangled with all things nonhuman.
2. Look at a design as a network of intra-actions and interdependencies.
3. We are shaped by our human experience.
4. Start decentring the human.
5. We should explore how to stimulate more liveliness in the city.

Figure 2. Embassy of the north sea.

Some more-than-human projects highlight the political and systematic representation of the more-than-human actors, see figure 2 (*Embassy of the North sea*, nd; *The River speaks,* 2018). Others focus on the relations between human and nonhuman

(*Becoming an ocean carer*, 2023; *Metamorphic, 2022*).

This project focuses on the act of designing with the urban ecology from a bottom-up perspective. It is not about reworking current structures around design with urban ecology but about conceptualising MTHD practices, a practical approach. Anne Galloway writes: “Complementary ways of thinking, doing, and making emphasise the practice of care and imagination—and the challenge is to work with, not against, vulnerability, humility and interdependence.” (Superflux, 2021).

Refunc makes projects that might inspire others to look at material differently (Refunc, n.d.). This project is approached in a similar manner by designing small scale examples of how you could design with ecology. Through designing and making we can start to identify the shortcomings or challenges that will appear in a MTHD process. I reflect on the practices, challenges and opportunities that I ran into during the project so they can be spread and built upon.

2.5 KEY INSIGHTS

The holistic approach of More-than-human design offers a new perspective and the opportunity to create just and healthy relationships with ecology.

In designing with ecology using a MTH approach being human means to be entangled with all things nonhuman, and seeing things as a part of a network of intra-actions and interdependencies. While accounting for the subjective human experience we should start decentring the human in design. In this thesis, I aim to support the local ecology by focussing on creating/supporting liveliness in the city.

More-than-human design is about adopting these mindsets and applying them to your work. In this thesis, I will do so through creating small scale designs examples hoping to inspire and inform others with the opportunities and challenges I experienced.

The next chapter will take a look at current MTHD projects with urban ecology.

2.6 DISCUSSION

More-than-human design is an emergent practice offering, an alternative to the dominantly human-centred field of design (Forlano, 2017). There is no set definition or approach for more-than-human design yet. I composed my own list of rules as guidance for the project but another designer might create a different list.

In this project, I focus on the application of MTHD into actual design practices. I acknowledge that there also is a need for designers to tackle systematic change in the way humans relate to urban ecology and the way it is generally designed with.

The term liveliness is used through the project to express the wellbeing of the ecological system, however we might not be able to observe all liveliness or understand if it has a positive or negative effect on the ecological system. We have to stay apprehensive and open to observing the effects humans have on the ecological systems.

Chapter 3

MTHD PROJECTS

3.1 INTRODUCTION

Now that we have an understanding of what MTHD involves we can look at the application of MTHD. In this chapter a collection of MTH projects are analysed to get a better understanding of how MTH actors currently get represented in design processes and what opportunities are exploited or missed in the MTHD field.

3.2 METHOD

In the beginning of the thesis, I collected multiple projects and made a selection based on them involving urban ecology and MTHD principles. The projects were found through social media, recommendations from my personal network or Refunc and references in MTH literature. I analysed what MTH actors were involved in the design process and compared the designs to the elements of MTHD mentioned in the previous chapter. The projects originate from different fields of design; speculative design, design research, design for sustainability and more-than-human design. Next, I identified key qualities of the projects and what gaps and opportunities they leave for creating a MTHD with urban ecology.

3.3 MTHD PROJECTS

The projects discussed in this section are made by design agencies Terreform ONE, Space 10, Studio Ossidiana and Urban Reef.

The cyclical

Existence in ecology is cyclical. This means that a design with ecology will be everchanging, see figures 3 & 4 (Terreform ONE, n.d.). It might need attention over time so the design can adapt to the new state of being or the start of a new cycle. Not all projects pay attention to the start of a new cycle or the growth and change that will occur with time and multiple cycles but it will inevitably influence your design.

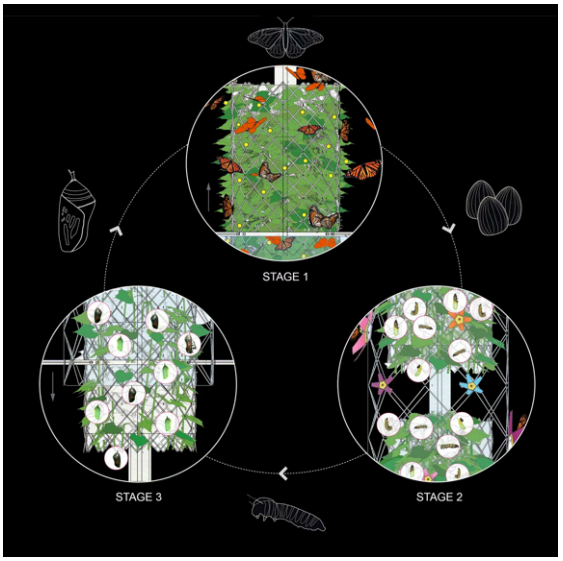


Figure 3. Monarch Sanctuary (Terreform ONE, 2019)

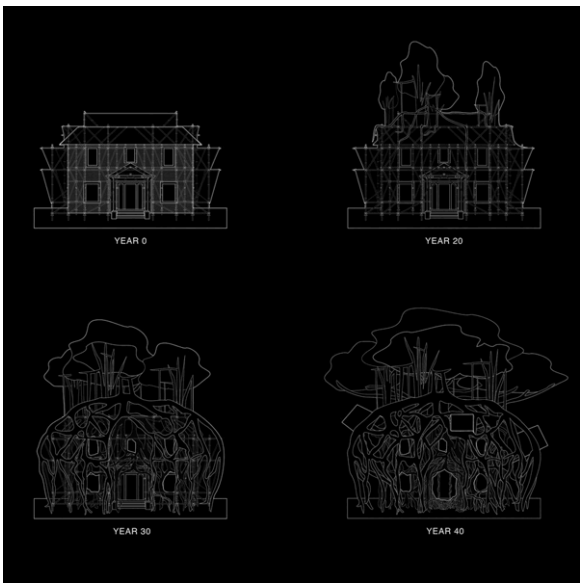


Figure 4. Home Alive (Terreform ONE, n.d.)

Practice (MTHD)| Temporality
Think of the way time and change influence your design and how your design will create change.

The speculative

Projects are speculative, they are driven by poetic expressions of questions about the future (see figure 5 & 6).


Figure 5. Seedbed by Studio Ossidiana

How could we take care of ecology with the endless production of materials (Studio Ossidiana, 2023)? What would regenerative futures look like (Fatima & Fatima, 2023)? Designers create projects that evoke people to speculate about possible futures and make them aware of tensions (Dunne & Raby, 2013). A friction like the extractionalist behaviour of humans and the often mentioned solution of a relationship of taking care is highlighted (De La Bellacasa, 2017). These projects are not made to be a lasting interventions but are only intended to stimulate speculation.


Figure 6. Wombhome (Fatima & Fatima, 2023).

Practice (MTHD)| Speculate
Use design to evoke speculation on MTH futures.

The experimental

Explores a real context or materialisation for a new collaboration between human and nonhuman. The urban reef experiment exists in a small vacuum (Urban Reef,

n.d.). Both designs are placed to interact with their context but do not originate from the current multispecies needs and interaction in the local ecosystem, see figures 7 & 8. As described in the previous chapter this is important for the design to connect with the MTH users.

Figure 7. The Birds' Palace by studio Ossidiana (Studio Ossidiana, 2023b)

Figure 8. Prototype of an Urban Reef (Urban Reef, n.d)

Practice (MTHD)| play & experiment
Experiment to see how your design will affect its context.

Practice (MTHD)| Design an intervention
Experiment to see how your design will affect its context.

Human - nonhuman relations

The projects shown in this chapter show explorations of different relations with nonhuman ecology. Some exclude humans and place them as observers like the Birds' palace (Studio Ossidiana, 2023b) Others focus on making humans use their environment more like nonhumans and look for the affordances of the places instead of building whatever we need, wherever we want (Fatima & Fatima, 2023).

Another project approaches ecology with a caring attitude and explores the materialisation of structures for nonhumans (Urban Reef, n.d.). Lastly, there are also explorations of buildings that are designed for nonhumans just as much as for humans. (Terreform ONE, n.d.) These projects all express different perspectives of what a human-ecology relationship could look like. It is not that one perspective is better than another, all of these perspectives are interesting to explore and help stimulate the discourse about MTHD.

Practice (MTHD)| redefine relations
Think of what relations you want to accommodate between humans and nonhumans.

Practice | aesthetically interesting
All designs are aesthetic expressions, the designers aim to create something aesthetically interesting.

3.4 KEY INSIGHTS

MTHD projects are centred around speculation or experimentation, this graduation project is experimental.

The analysed projects did not inherently originate from the context that they are placed in. I want my design to be inherently connected with the context it is living in.

Not all analysed projects pay attention to cycles and nonhuman time and design for change growth and death'

Current attitudes will push human needs above nonhuman needs, as the designer you can choose how you want to redefine the relations with ecology.

Aesthetics are important for designers and humans to attach to a design.

Only a few projects are discussed in this section, these were chosen for their crossover with local urban ecology. There are many more expressions of MTHD. For example, there are projects that focus on the performative and immersive practices around care, noticing entanglements and decentring with urban ecology (Liu, 2023; Choi et al., 2023). These are not analysed because they show no examples of design interventions with local ecology.

The value of situating the design in the local context can be discussed. I argue that it will make the design align better with the needs and opportunities of the local ecology for revitalisation. However, any intervention where nonhumans are involved in the design process might have a positive effect on the ecosystem.

Throughout the time of this project I came across many more projects which I will reference at later moments in this thesis.

3.5 DISCUSSION

Chapter 4

MAKE PLACE FOR ECOLOGY

4.1 INTRODUCTION

Now that I have an understanding of the way ecology is viewed and designed within MTHD, I take a look at the current practices with ecology outside of this emergent field of design. Currently people are trying to involve the needs of nonhumans in building and design processes. Ecologists, city planning and nature inclusive building methods are putting in their efforts to create an urban environment beneficial to not only the human. In this chapter you will read about how humans think to include the wellbeing of nonhumans. What relations are formed and what practices are currently used to involve nonhumans as stakeholders of the city.

4.2 METHOD

I looked at three different perspectives to get an understanding of the current practices with ecology. Nature inclusive building, city ecology and the municipality of Den Haags plans. Besides reading literature about ecology in the city and how it is included in projects, I conducted semi structured interviews with a project developer and a representative of a nature interest organisation (AVN) (see appendix 9). I had email contact with a nature educator (see appendix 7) and some examples originated from my and Refunc's observations on human-ecology relations during the project.

4.3 EMPTY BEE HOTELS

In the beginning of this project, the question came up: are there actually any bees living in all of those bee hotels? I think they are more of a gimmick than an actually valuable product.

Figure 9. Bee hotel.

According to EIS (insect knowledge centre) 70% of Dutch bees nest in the ground. They would not move into a bee hotel. Besides, many beehotels are produced wrongly and do not even have the right qualities, sometimes they are not even placed in the right place (see figure 9) (EIS Kenniscentrum Insecten, n.d.). Large beehotels can affect the ecosystem negatively by favouring some species and creating food competition with other species (EIS Kenniscentrum Insecten, n.d.). Though the intention was good and there is value in spreading awareness about the need for space for bees, it had little effect on the deterioration of the Dutch bee fauna (EIS Kenniscentrum Insecten, n.d.).

As a matter of fact, the main need for mining bees is a pile of sand for them to build their holes (appendix 7). You could say that adding sandpiles throughout the city would be a way more effective design, connecting to the actual needs of dutch bees. Sadly, the sandpile doesn't have the same appeal as a cute bee hotel, can’t be bought in the store and is often overlooked.

Figure 10. A pile of sand for the bees.

Now we have only mentioned the need for nesting places but bees need more than that, one of the things being food.

4.4 ECOLOGISTS: WHAT DO SPECIES NEED?

Like humans, all nonhuman species ecology need to have multiple things in their environment for them to be able to live there. Humans have housing, shops, work and recreation and the urban landscape is planned to make sure these facilities are close enough to all residents. The same counts for fauna, ecologists use the list of food, reproduction, safety, connection to check if all needs are met (Synchroon, 2022).

Like humans, nonhumans have specific preferences; many bee species are connected to one specific plant and this plant needs to be in the right place and not too far away (Synchroon, 2022).

The list is completed with the need for variation in ecology, different types of flora grow in different conditions. With more variation more species can meet their specific preferences and this creates a more biodiverse space. (Synchroon, 2022).

Lastly, the presence of light interferes with the species that are active in the darkness in the urban environment (Één voor één groener, 2023).

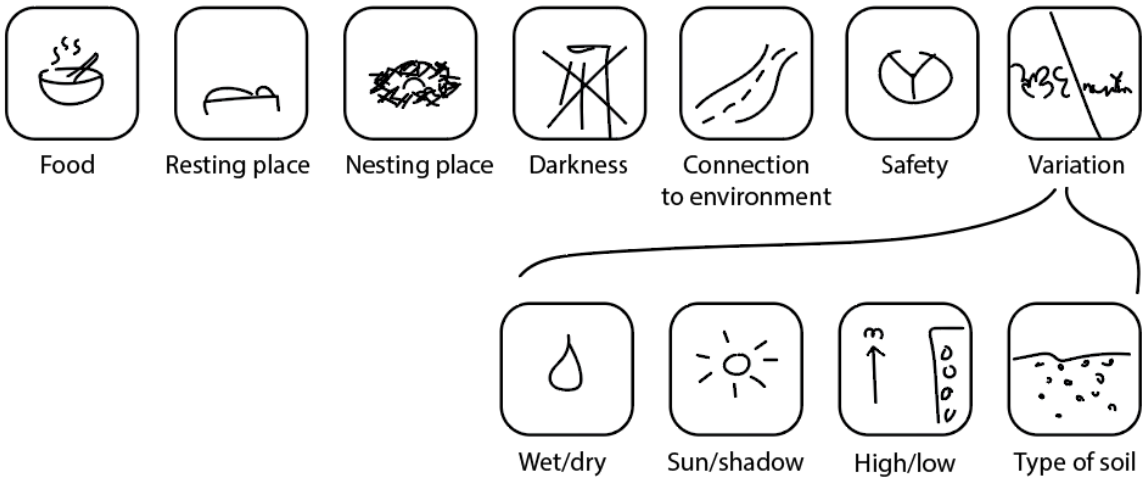


Figure 11. The needs of ecology. (Synchroon, 2022) (van Leeuwen, 2023)

Figure 12. Poster: In the dark I can see more, can you turn off the lights?

4.5 NATURE INCLUSIVE DESIGN

From my conversation with Loulou de Bruijn (a project developer for social housing), I learned that developers are supposed to follow some European laws and city plans regarding green and blue structures (see appendix 5). While ecologists, advocacy groups, landscapers and nature enthusiasts are passionate about the implementation of well considered habitats and care, the reality disappoints. Building 'nature inclusive' in practice mainly encompasses following a checklist made to meet the restrictions of European law (De Bruijn, 2023).

A city without shops

In new construction, the builders have to research what 'housing' they are taking away for endangered species and consequently create the same amount of nesting boxes in the new buildings (De Bruijn, 2023). New projects don't have to fulfil all needs of the species that were occupying the neighbourhood before, since only the nesting boxes are mandatory. While a bat for example, needs trees to forage, they don't have to be included in the plans. It would be like building a whole new neighbourhood with no supermarket or food stores in it.

Endangered species
European law only focuses on endangered species (de Bruijn, 2023). The endangered species are put above non-endangered ones and do receive a bit more care and consideration. As a result not all species are treated equal and not all of them will receive substitute housing in the neighbourhood.

Management
The management of these endangered species is the main focus of most nature inclusive projects (Synchroon, 2022). This reflects the conviction that other species need to be controlled and managed by humans to find their place in the city. This leaves little space in nature inclusive building for ecology to find its own place without human allocation, involvement and management.

4.6 MUNICIPALITY: HUMAN CENTRED INCLUSION

In Den Haag, the municipality created multiple plans for nature in the city and its inclusion. The plans show where the municipality plans to make space and improve the quality of blue and green structures (Gemeente Den Haag, 2020; Gemeente Den Haag, n.d.; Gemeente Den Haag; 2017).

In figure 13, you can see that the municipality focuses on connecting green zones spread out over the city and improving the biodiversity of these zones (Gemeente Den Haag, 2020). The policymaking is centred around patches of ecology that are appointed and mapped out in the interactive maps of the municipality (Gemeente Den Haag, 2020).

Some of them, like parks, share functions with human activities such as recreation.

Every little square metre of 'nature' is planned and organised, although the ecology in areas of unorganised ecology does not seem to count and is not mentioned in the policy making (Gemeente Den Haag, 2020; Gemeente Den Haag, 2017; Gemeente Den Haag 2018). For the municipality, nature is an area of green, a playground, a park or a lane (Gemeente Den Haag, 2017). The plants growing in between buildings and footpaths are seen as weeds. They need get burned away and cleaned up instead of being included as part of the green structures (Gemeente Den Haag, 2020).

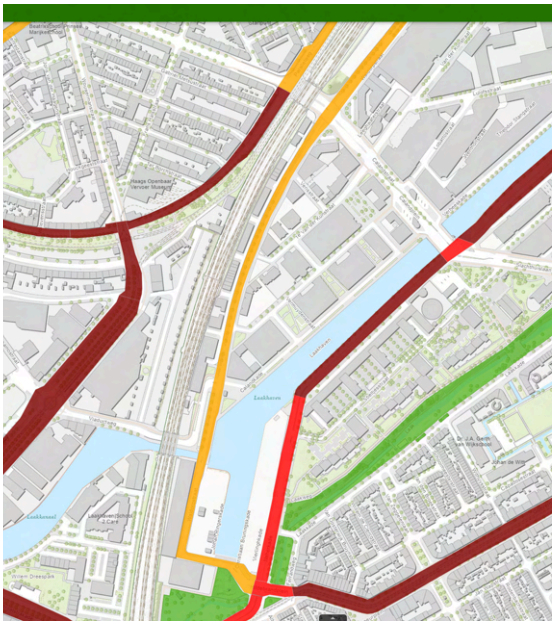


Figure 13. Interactive map of the main tree structure in Den Haag's green network.

No money to do nothing

According to Frederike Bloemers from the AVN, a nature interest group, the municipality makes great plans for the ecology but often does not execute them as intended (*personal communication*, 2023). The argument is that there isn't enough budget to create and/or maintain

the green infrastructures. Interestingly enough, there is sufficient budget for the landscaper to mow the grass of a flower bed (see figure 14). Does this mean that the municipality has no money to do nothing?

Figure 14. A man mowing grass flower beds.

Making beneficial choices for ecology doesn't need to be expensive. Not mowing the grass has more value for insects and ecology than doing so (Schilthuizen, 2022). Not planting anything and waiting for whatever likes to grow there to pop-up is also a free and effective way of creating more space for ecology (Schilthuizen, 2022). Though, it might not look as pretty right away, or have a structured and organised look. The actual issue does not seem to be the budget but the allocation thereof, as well as the current policy of managing ecology.

Human-centred nature inclusion

Improving the inclusion of ecology in city plans is communicated as essential for a climate adaptive, sustainable, and pleasant high quality environment, all things expressing great value for humans (Gemeente Den Haag, 2017). Those fighting for the interests of nonhuman species in the urban environment use the same arguments to convince others of doing the same (AVN, 2018).

The large green structures in the urban environment are allocated by humans for humans. Sometimes this is done with the intent to help a specific species, like planting bee friendly flowers. In those cases, the human places itself as a caretaker of ecology. And do not forget, the bee friendly flowers are selected by humans and still look pretty for those passing by.

Figure 15. Mowing policy (Gemeente Den Haag, 2020)

In the municipality of Den Haag's (2020) mowing plans, it can be seen that choices are made based on human needs first. To guarantee safe and accessible human infrastructures the grass strokes are kept short, nature inclusive mowing policies leave a patch of grass for the insects, while everything else is mowed down (Gemeente Den Haag, 2020).

Human exclusion

To combat the human centred use of space ecologists (Denters, 2020; AVN, 2018) argue that there should be spaces without human access or interference. Instead of finding a balance between human and nonhuman use of ecological spaces, the current practice is to create some areas where humans are not welcome.

Practice| human exclusion
Keep humans separated from areas so they can become nonhuman-centred habitats.

4.7 NONHUMAN AUTONOMY AND ADAPTIVENESS

Instead of thinking about management and allocation, there are alternative relations to harbour with urban ecology.

Adaptive nonhuman designers

The ability of nonhumans to bypass management and control should not be underestimated. The nonhumans are not only well equipped in their personal making processes but also able to adjust to changes in habitats and co-evolve with the city as a result of the anthropocene (see figure 16 & 17) (Hiemstra et al., 2023; Berents & Kutzke, 2022). In the understanding of this we can also take a step to decenter the human and understand that ecology is able to adapt, self manage. The nonhuman species are intuitive designers in the way they use the objects of the anthropocene.

Figure 16. birds nest built out of anti bird spikes (Hiemstra et al., 2023).

Figure 17. A hermit crab with a plastic home (Jagiełło et al., 2024)

Let it grow

The best way to make room for ecology, according to experts, is actually not that difficult (Schilthuizen, 2022; Bloemers, 2023). In the book *Darwin in the city* by Schilthuizen (2022) it is explained how when there is some space for things to grow or live, it will find its way. The only thing that needs to be facilitated by humans is some space, some ecological mess and next do nothing (Schilthuizen, 2022). Native and local plant species will spread and grow, the ones that fit the environment will stay.

Figure 18. Front garden with nettles.

Rewilding and nonhuman autonomy

As can be seen in figure 18, the nettles found their refuge in this person's front garden. Even in this ‘wild’ garden the relation to humans still plays a significant role. Maybe the residents like their prickly, uninviting persona, maybe they have no energy, money or care to invest in a more inviting front garden. Or perhaps they are practising rewilding and let the ecology decide what should live in the garden. While I doubt that the last reason is true, a relation in which humans ‘allow’ rewilding offers more autonomy to ecology and an alternative to relations of management and control (Tree, 2018; Arts et al., 2020).

4.8 KEY INSIGHTS

In this chapter I looked at practices of city ecologists, the municipality of Den Haag, and nature inclusive design.

Relations with urban ecology are generally human-centred, the preferences of humans are considered over those of ecology (if they are considered at all).

Most current ecology inclusive practices do not think about the holistic picture. For example, bee Hotels do have great appeal to people but do not align with what Dutch solitary bees actually need to thrive. Nature inclusive building only focuses on endangered species and following the laws around that.

To get a more holistic understanding ecologists check if a habitat offers: food, reproduction, safety, connection and variation to align with what a specific species needs. Similarly to humans nonhumans have specific preferences for what facilities they need around.

Both nature inclusive building and the municipality approach relations with ecology from a perspective of management and allocation. Ecology outside a border doesn't count as valuable.

To revitalise ecology it works to just create some space with ecological messiness. Flora and fauna will move in and the ecological system will manage itself. Nonhuman species are autonomous and adaptive in their use of the city, if we leave them the opportunity to take in space.

4.9 DISCUSSION

Human centred relations of management and caretaking are showing an attitude of human exceptionalism where the human is placed above the nonhuman species (Haraway, 2008). In general, ecology is treated as a second class citizen.

These findings display the attitudes of humans and that it will be difficult to change current attitudes. The goal of this

project is not to intervene on a systematic level and change the way that nonhumans are included in city planning but to experiment with designing alternative ways of including ecology in design.

I found that current practices lack a holistic approach to what ecology needs and connection to these needs. However, there are examples of designers, citizens and architects exploring how to treat ecology as an equal through a more holistic approach (Pijnappels, n.d.).

In a system one type of species can thrive while another suffers under their presence. I do not see one thriving species as a goal but the revitalization of ecology as a whole. Therefore the focus on protected species is also limited in my eyes.

III. REFUNC AND THE LOCAL URBAN ECOLOGY

Chapter 5

MATERIAL-CENTRED REFUNC

5.1 INTRODUCTION

In the previous section of this report the challenges and opportunities of designing with urban ecology and through more-than-human design were explored. In this chapter the local context of the project is brought into the picture. Starting out with looking at Refunc.

The project is done in collaboration with Refunc. It came to be because of my interest in the way they playfully repurpose materials in their designs and their interest in designing symbiotic relations with other species. In this chapter I explore Refunc's current design process, how ecology is currently represented in Refunc's work and what opportunities and challenges lie within the implementation of MTHD for Refunc.

5.2 METHOD

Throughout this project I spoke with Denis from Refunc multiple times. These conversations were supported by presentations and semi-structured interviews. We shared multiple projects of interest and materials of this project and Refunc projects over time, these materials are shown in this and later chapters. I assisted Denis in working on two projects and paid attention to his design process while working with him (appendix 2). Denis also assisted me in designing and making activities that are described in chapter 7. At some moment, Denis shared an introductory presentation to Refunc with me (appendix 3). I looked at projects and materials on their website and analysed how ecology is included in these designs. Later in the project, I also met with Jan and conducted a semi-structured interview/ feedback session.

5.3 REFUNC IS A METHOD

Refunc is run by Denis Oudendijk and Jan Körbes. As stated on their website, their mission is to play with material reuse and the shift of their functions (Refunc, n.d.). Their projects are often temporary, living in the public space, and consist of functional objects for people to interact with (Refunc, n.d.).

RE-CONNECTING PEOPLE AND MATERIAL

We want to change your way of thinking. By shifting functions we are questioning the standard design approach where form follows function. We try to achieve an endless lifespan, a circular way of using resources, where anything can become something else. We build pilot projects in architecture, interior design and public space. We share our knowledge in a variety of workshop programs. (Refunc, n.d.)

material centred design

Denis mentions that all human made objects eventually become trash (2023). And exactly these materials, the ones seen

as trash, the objects that are not being used for their original intended function are used by Refunc and given another life (see figure 19). They look for the right material to fit a function or they find a material and see what affordances it has and what it could be (Norman, 2013). As a result all objects are seen as half-products (Oudendijk, 2023).

Figure 19. Denis and some materials that used to be an office interior.

Projects/materials/functions/people

The design of their website (see figure 21) and the periodic system (see figure 22) shows the framework in which they operate (Refunc, n.d.). You have materials (objects seen as semi-products) and functions (what an object can do or be) (Refunc, n.d). Combining these leads to solutions and projects (Refunc, n.d).

As Denis explains, Refunc is a method and not a brand, It is the way of working that they experiment with and share with the world (Oudendijk, 2023). Later in this report, I will experiment with Refunc's method and philosophy in combination with MTHD.

Practice | objects are semi-products

Use existing 'waste' objects as materials.

Practice | material whispering

Find what an object wants to be and what affordances it has.

Figure 20. Hortus hermitage (Refunc, n.d.)

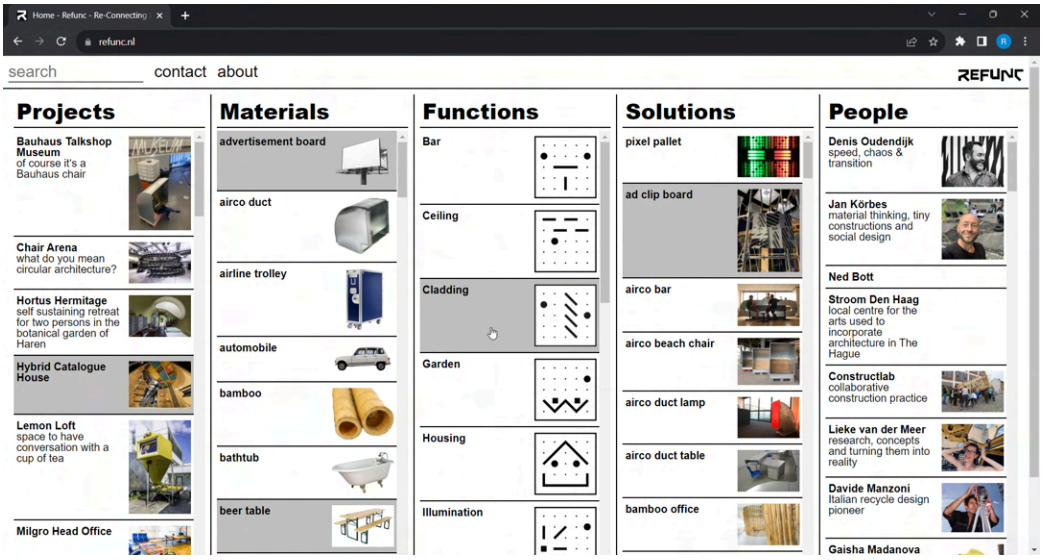


Figure 21: Refunc website (Refunc, n.d.)

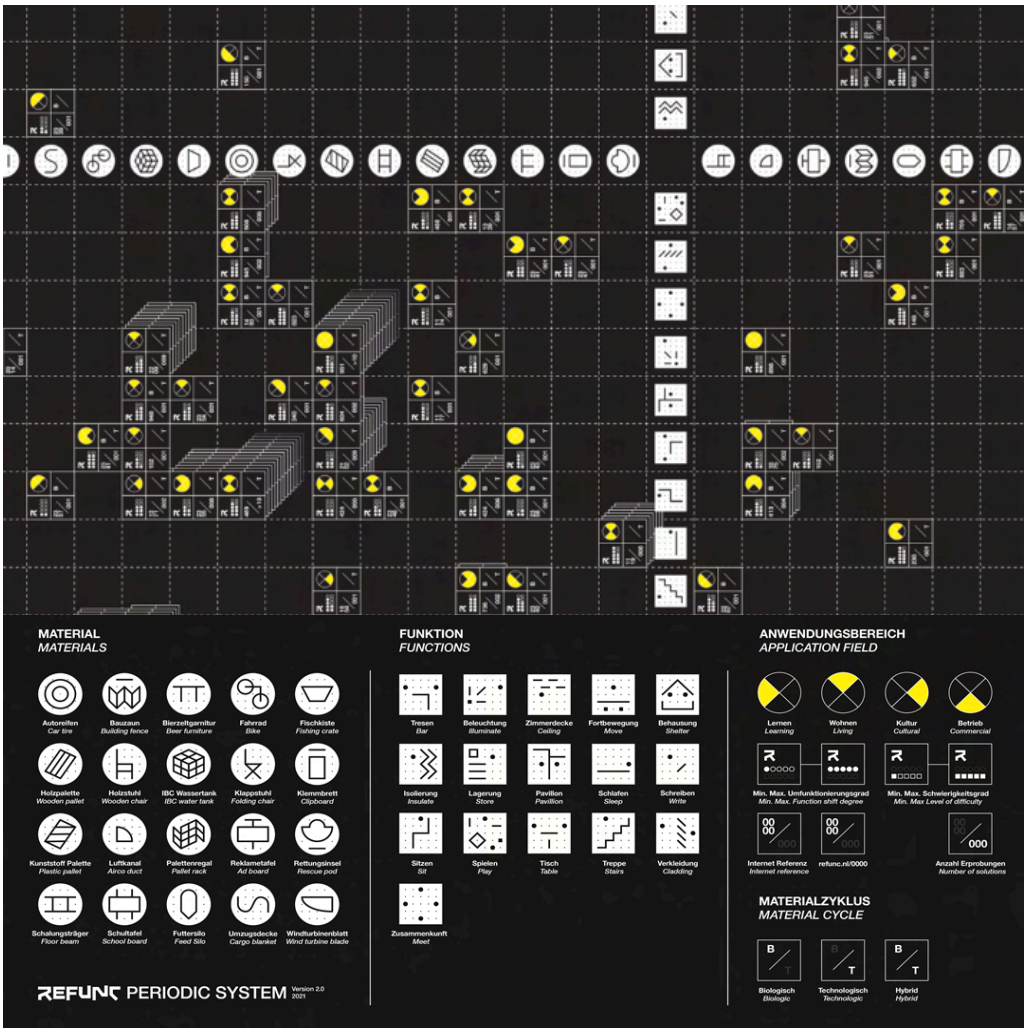


Figure 22. Part of Refunc's periodic system (Refunc, 2021)

5.4 GETTING TO KNOW MATERIALS

After designing with Refunc (see appendix 2), I learned that Refunc's approach is intuitive. Jan Körbes describes his process as a dialogue with material in which you intuitively find out what the material can become (Körbes, 2023). When doing something, you find out what you don't want (Oudendijk, 2023). The intuitive process is reflective practice with in-action and on-action moments of reflection (see figure 23) (Tan, 2021; Cross, 2004).

Play

A big part of their design process is finding the right objects for the function or finding what an object wants to be (Oudendijk, 2023). To figure out what materials can be and do Refunc plays with them (Oudendijk, 2023; Körbes, 2023). Approaching materials and design through play leads to novel ideas and new process insights (Huizinga, 1938).

Practice | play
Learn to understand materials through play.

A growing practice

The practice of Refunc is a growing practice, they have gained a detailed understanding of the materials they work with (Cross, 2004). Jan explains that through his experience he got to know infinite ways of what you can do with tires and how the material reacts to applications (Körbes, 2023). It is a process of finding what works and building intuition and knowledge.

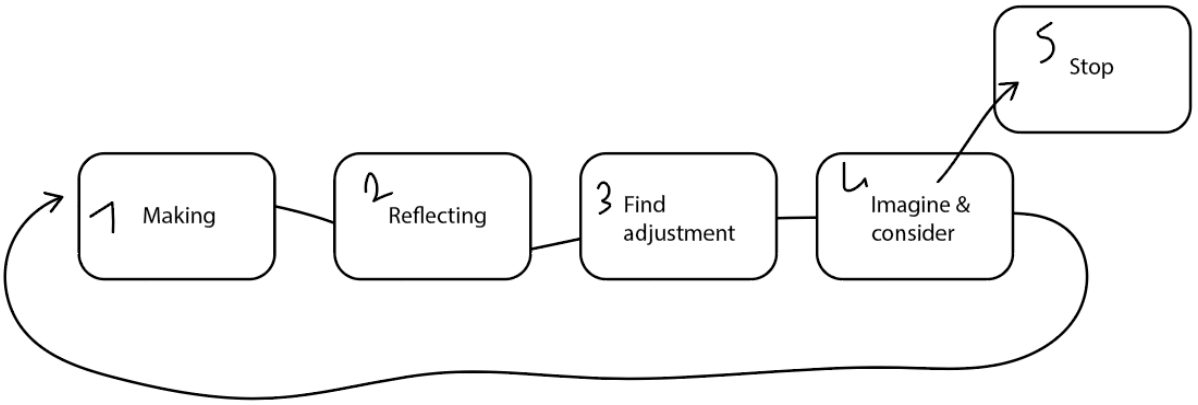


Figure 23. Denis's making process; as observed in appendix 2.

5.5 CIRCULAR PRODUCT USE

Circular design is a restorative and regenerative approach in which things are designed to create less waste and hold value longer (Ellen MacArthur Foundation & IDEO, n.d.). Materials are reduced, reused, refurbished, remanufactured or recycled (Ellen MacArthur Foundation & IDEO, n.d.). The field of circular design mainly focuses on creating new circular business models and production methods (Bakker et al., 2019). Refunc intervenes in the current linear use and production of things (Refunc, n.d.).

Figure 24. Pixel Palace, build with tie wraps and pallets (Refunc, 2015)

Kwantum jump of function

Refunc makes things from existing products, they find new uses for products that are not being used in their original functionality anymore (Oudendijk, 2023). While a product is being used it inevitably loses value over time. This way a product will live through multiple different life cycles than it was initially designed for (Körbes, 2023). Preferably the materials are used in ways that they can be reused infinitely, other times they are transformed (see figure 24) (Refunc, n.d.).

While repurposing is mentioned as low impact circular design, Refunc rethinks the whole use of materials which is one of the most impactful approaches to circularity (RVO, 2020; What Design Can Do, 2023).

Practice | design the afterlife
Use materials without impacting the material integrity to give them infinite life. Or think of what function the material can have after your adaptation and use of it.

Practice | meant to last
Circular materials are meant to last forever or be biodegradable and experience a 'natural death'.

5.6 MTH PARTICIPATION

While at the faculty of Industrial Design Engineering at TU Delft all designers are taught to deliver human-centred design, Refunc doesn't lead by this practice (Zijlstra, 2020). Some designs are not supposed to align with the preferences of the user but instead play with the functionality of the objects (Oudendijk, 2023).

Refunc challenges users' behaviour through improbable combinations of materials and functions as seen in the tables in figure 25 & 26. Denis explains that Refunc used to call themselves thing-whisperers (Oudendijk, 2023). They explore what it is to 'design with' materials (nonhumans) in relational and expansive ways (Wakkary, 2021).

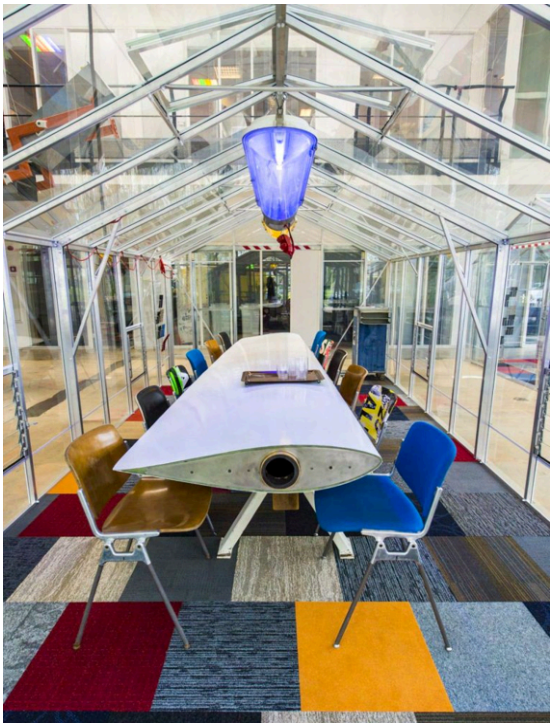


Figure 25. Milgro head office (Refunc, 2023)

Figure 26. Bedspring table (Refunc, 2023)

Thing-whispering to MTHD

In this project we are broadening the MTH approach to ecology. Designing with ecology does not come naturally to Refunc. They state they do not know what is needed to facilitate ecology and Denis usually asks a friend for help when he adds plants in projects (Oudendijk, 2023).

Projects that do involve ecology are used in a human-centred way. There is no focus on functionality for ecology but the ecology is used as another material. It is a part of the visual story of the design (see figures 27 & 28). Denis plays with the definition of things, in one project he designed structural trees to be overgrown by ivy, redefining what a tree could be (see figure 29). Donna Haraway (2016) calls this making the edges of things blurry.

Figure 27. Portable dunes (Refunc, n.d.)

Currently ecology is not seens as a client of their designs but as another thing to design with, in that way the process is human-centred. Denis is open to introducing ecology as their clients and curious to explore what mutually beneficial relations could be designed in which ecology is also a material (Oudendijk, 2023). Throughout the project Denis kept playing with the question: ‘can you isolate a house with bees?’ (Oudendijk, 2023).

Figure 28. Refunc micro farm (Refunc, 2021).

Figure 29. Refunc project for a schools rooftop garden with ecology.

5.7 KEY INSIGHTS

Refunc is a design agency working through intuition and play. They create playful solutions for people with waste materials.

Rethinking the use of waste materials results in an effective circular practice. In Refunc circular philosophy all objects are seen as semi-products and should be used in a way that gives them infinite life (or a ‘natural death’).
Refunc’s understanding of materials is based on years of experience and the practice developed over time. The combinations of functions and materials are explored through an intuitive and playful process of finding affordances.

Refunc involves materials in a more-than-human manner but does not treat ecology as an equal client with agency yet. This is an opportunity for this project.

In the next phase of the project I will be combining Refunc and MTHD practices but first we will look at the location in which Refunc and the project are situated.

5.8 DISCUSSION

In this project I mainly worked with Denis which skewed my perspective to that of his.

Experienced designers work in intuitive ways, this creates friction with the exploration of a new practice that does not align with this intuition. This might be a challenge in this project later on (Cross, 2004) .

Chapter 6

ENTANGLED IN THE MAAKHAVEN

6.1 INTRODUCTION

In this chapter you will read about the relations with ecology around the facade garden of the Maakhaven (the building in which Refunc resides). Parallel to the design activities of chapter 7&9, I researched the context of the Maakhaven. A design with ecology will be entangled with processes and actors around and the design process is about unravelling these entanglements (Tsing et al., 2020; Nicenboim, 2022). The unravelling in this chapter is done through the exploration of relations between local humans and ecology and lastly I reflect on the opportunities and challenges of designing within this context.

6.2 METHOD

During the project, I visited the Maakhaven multiple times. On my visits I heard stories about the ecology and plans with the facade garden from Maakhaven residents who shared their stories in passing. I took photos of the ecology around and asked an expert on flora and fauna to determine what species live there and what the local species needed (see appendix 7). During my explorations of the neighbourhood I spoke with a landscaper from the municipality and asked him about their role as caretakers and management in the Laakhaven (see 6). To better understand relations between ecology and makerspaces like the Maakhaven I applied the art of noticing at other makerspaces with another MTHD student (see appendix 8) (Tsing, 2021). For my last research activity I invited an ecologist and representative from the AVN (General Association for Nature Conservation for The Hague and surrounding areas) and Toon (the initiator of the facade garden) to go notice the entanglements around the Maakhaven (Tsing, 2021).

6.3 LOCAL RELATIONS

The Maakhaven is an atelier building filled with creatives located in the Laakhaven distric Den Haag. A creative hub or as it is called in the Netherlands; a *broedplaats*, which means breeding ground or hatchery. There are 40 residents; artists, woodworkers, graphic designers, etc (Maakhaven, n.d.).

Figure 30. A sketch of possible signage (Maakhaven, n.d.)

The human-centred facade garden

Two years ago, Toon (a Maakhaven resident) started out with a facade garden and, as he called it, “threw some seed into the ground” (personal communication, 2023). It used to be full of dog poop and nettles and with Toon’s addition of out-of-date bee friendly seeds it became a flower garden (personal communication, 2023). Now there are two committees, one for the design of the facade and one for a water buffer initiative (Maakhaven, 2023).

It seemed that the interest in the facade garden is mainly aesthetic, to represent the Maakhaven with signage and grow multiple species of ivy that bloom beautifully (see figure 31 and 32).
The concerns of the residents around this patch of ecology were mainly human-centred.

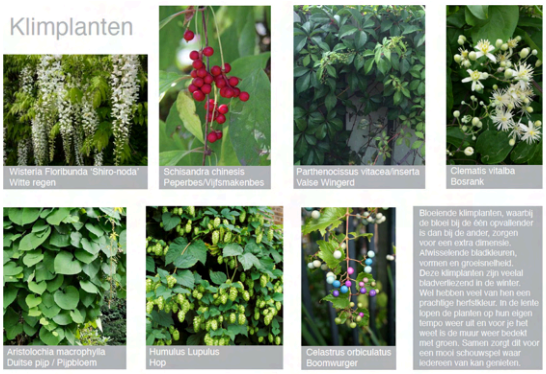


Figure 31. The types of ivy chosen (Maakhaven, n.d.)

6.4 NOTICING ENTANGLEMENTS AT THE MAAKHAVEN

During the noticing exercise with Toon and the ecologist and representative of the AVN, I learned that the area around the Maakhaven is quite diverse and offers enough affordances to be seen as a good urban ecology habitat (appendix 9).

First time noticing entanglements

I ask the three participants to think about entanglements. This did not go naturally, it was very difficult for all participants to think in entanglements and noticing outside of their personal perspective and expertise. I still gained many insights from the activity.

Figure 32. Frederike and Reinder of the AVN in front of the Maakhaven.

Biodiversity value

Because most patches of ecology are constructed by humans with little diversity in species, the number of companion species are relevant to the biodiversity of the area (Aghina et al., 2022). The AVN categorises flora by these measurements making one species more valuable than another. The bushes and trees around the Maakhaven don’t have a high biodiversity value.

Practice| biodiverse key species
Plant species that have high value to biodiversity.

Rats are no threat

The residents of the Maakhaven told me that there are many rats living in the area. The rats dumpster dive together and take the found *trashures* to their burrows (see figure 33). I imagined them to be an issue for the ecosystem because of their common perception and the amount of rat poison boxes in the Laakhaven district. Instead I learned that there is no issue

with their presence in this area, besides being a disturbance to humans (G. Vann, n.d.).

Figure 33. Stills of a video of the rats roaming around in the bins.

Entangled in the metropolis

Most of the flora in the area is non-native. The ecologist finds it fitting with the history of the Laakhaven district, non-native species have always entered through the harbours of cities. Another expert expressed great disdain for Dutch municipalities planting the same flowers in the flowerbeds making all cities look alike instead of using local species (see figure 34). The bee friendly flower mix in the facade garden can be found in all big cities in Europe, it disappointed Toon to learn he planted exotic species. The ecologist explains that it fits with the personality of the big city and how all metropolises look alike.

Figure 34. Ecological flower beds.

The effects of globalisation are noticeable for humans and nonhumans alike. Attitudes around homogenous city flora and exotic vs. native species differ. It can be seen as fitting within the context or threatening to the native character of cities.

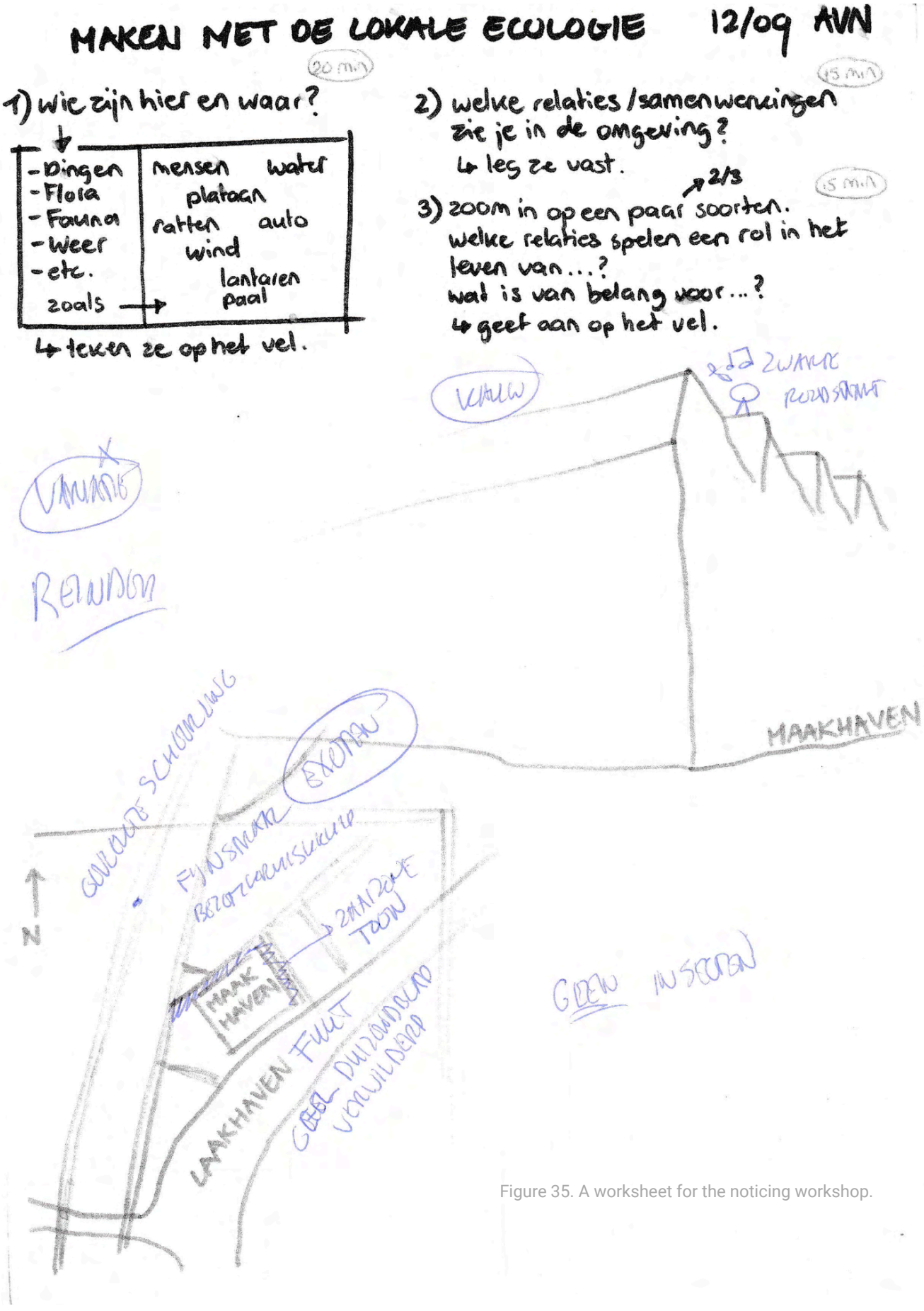


Figure 35. A worksheet for the noticing workshop.

6.5 INTERVENTIONS AND AFFORDANCES

The ecologist naturally looks at the affordances of the Maakhaven area for nonhumans (appendix 9). He is not looking for places to hang up birdhouses but what species can use and what they lack. The noticing activity results in a list of recommendations for an intervention for the local ecology.

More variation

The facade garden is a long streaks of a homogeneous habitat. You can imagine when you walk in a forest the way one square metre looks totally differs from the next. This variation is important for ecology and harder to find in built environments (Denters, 2020).

Practice| variation
Facilitate variation to home more species.

Utilise all space with junk spots

The ecologists asked for more ecological mess, for example by making a brown roof. With some (local) dirt and organic material the area will overgrow and get inhabited by ecology (Schilthuizen, 2022).

A building full of holes and gaps

The ecologist noticed that an insect is living in almost every hole in the wall. He recommended jokingly to drill lots of holes in the wall. He also looked at the edge of the roof and pointed us toward a gap; 'that is great for a bat to sleep in'.

6.6 MORE-THAN-HUMAN *BROEDPLAATSEN*

From the noticing activity at two other creative hubs: the NDSM and de Ceuvel in Amsterdam a few elements of human-ecology relations around *broedplaatsen* are noticed (see appendix 9).

Figure 36. Eurasian sparrowhawk nesting in the bamboo at a NDSM front garden.

Patchy bits of humans and ecology

The patchiness of humans and ecology is very visible in the NDSM (see figure 36) (Tsing et al., 2020). When there is less interference of the municipality's maintenance, there is more room for ecology to find its way. Human and nonhuman traces become more intertwined on all scales (see figure 37).

Figure 37. Entangled mess.

Management, control & ownership

Residents of the NDSM that own a driveway tend to make it a garden (see figure 38). At the same time, most of the NDSM area is overgrown, ecology has free range and grows without interference wherever the circumstances allow for it to do so. The relations of management and ownership influence the amount of space that can be taken up by ecology (and what species are allowed to do so).

Ecology is good for us

In the Ceuvel, ecology is given a place in a demonstrative way to show how we could create urban landscapes where ecology doesn't have to move for human structures and infrastructure. The flora is used to clean water and the polluted ground in the area (de Ceuvel, n.d.). It shows again that humans need to be convinced of the value of ecology for human benefit to be interested in creating other relations of cohabitation.

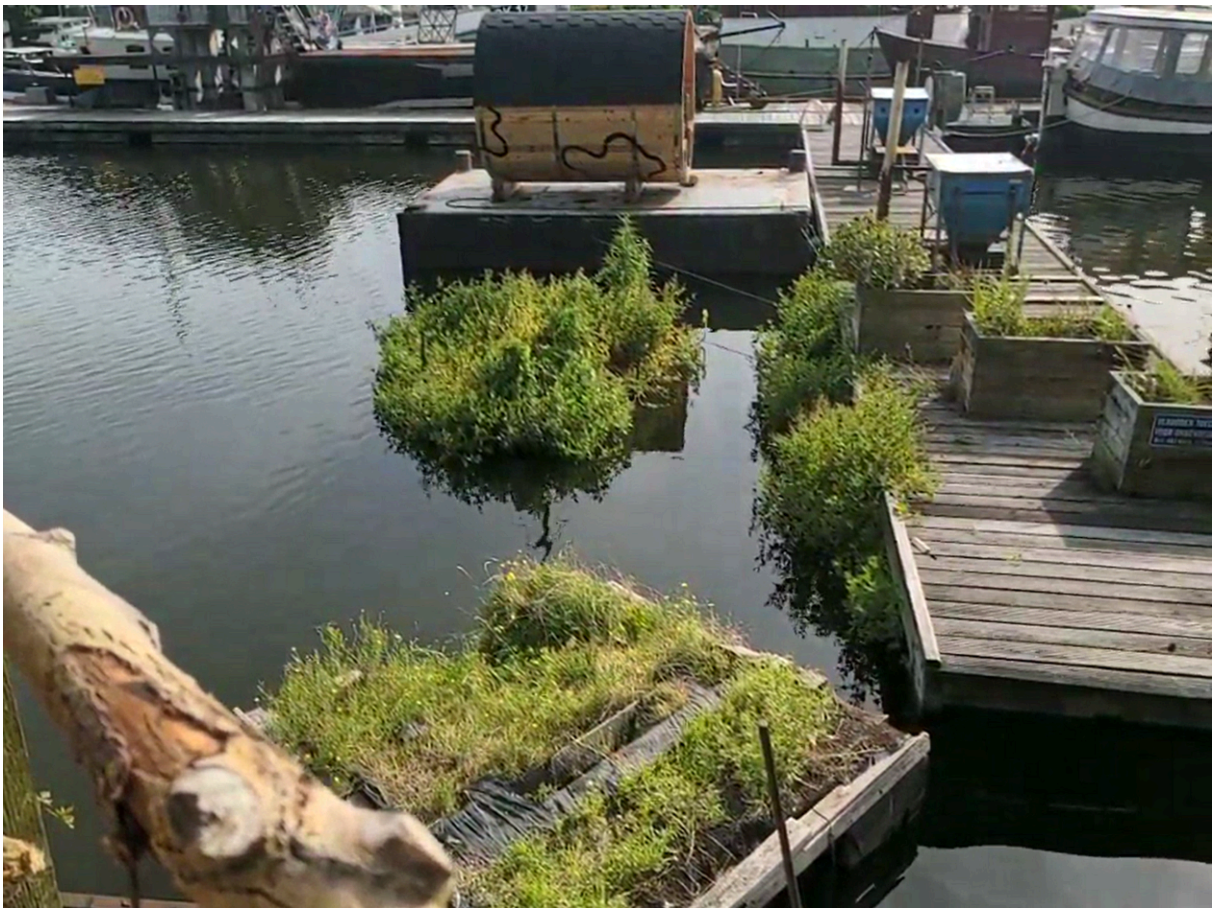


Figure 38. Islands with flora and fauna

City versus Maakhaven

While the feeling of ownership makes Toon take responsibility for creating more opportunities and space for ecology (see figure 39). It has an opposite effect to the municipality, who wants to keep the pathways organised and clean (Gemeente Den Haag, 2020b). Contrary to the rugged character of the NDSM the municipality of Den Haag changed the Laakhaven character (De Haan & Van der Laan, 2023). Maintenance burns away plants on the sidewalk and before the people of the Maakhaven can intercept (personal communication, 2023).

The only protection from the municipality is to claim the space (see figure 40). A planter is not part of the municipality's jurisdiction and gives flora the freedom to self govern.

Figure 39. Plants growing along the side of the building. June 2nd & August 28th.

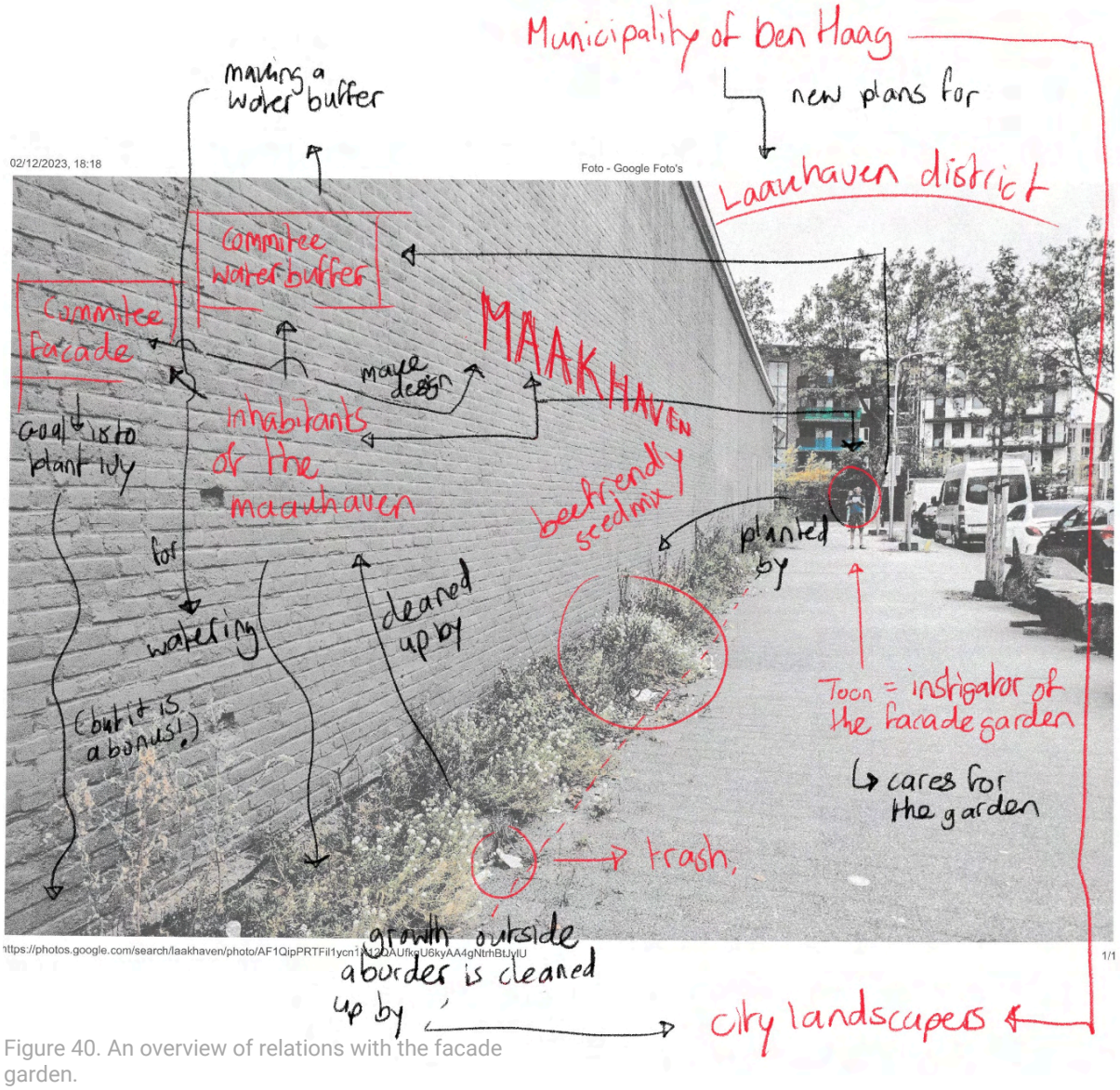


Figure 40. An overview of relations with the facade garden.

6.7 KEY INSIGHTS

People in the Maakhaven are trying to make a green facade, the goals for the facade are mainly coming from a human-centred perspective.

The ecology around the Maakhaven is quite diverse, especially for the city. The plant species in the Maakhaven are entangled with humans and can be found in many urban environments in the Netherlands and Europe.

There could be more variation and the biodiversity value of the area is not that high, creating more ecological mess and holes and gaps in building is recommended to create more room for ecology.

Factors like management and ownership influence how humans relate with ecology and what is done to facilitate ecology, humans influence what agency and the amount of room the flora and fauna is given in these urban environments.

6.8 DISCUSSION

In this project I started exploring designing with ecology through the case study of designing a facade for the Maakhaven (the building in which Refunc resides). Later I add other locations and case studies to the project but the research done around the Maakhaven is still relevant

It is hard for people to start noticing in different ways and think about relations instead of species, they are experienced in looking at the ecosystem in a certain way. More practice and tools like *urban recipes* can help people to move out of their perspective (Liu, 2023).

IV. DESIGNING AND MAKING WITH ECOLOGY

Chapter 7

DESIGN EXPERIMENTS

7.1 INTRODUCTION

Alongside the previously mentioned research activities (chapter 1-7) I carried out multiple design experiments. These activities are set-up to experience how to actually do MTHD. New knowledge is gained through every experiment and results in more MTH practices, as well as unexpected and expected insights on the challenges and opportunities of applying these practices. In this chapter I explore the designing experiments and later analyse what challenges and opportunities were experienced while doing so.

Related work

The projects *Watching Myself Watching Birds: Abjection, Ecological thinking and Posthuman design* (Biggs et al., 2021) and *Turner Boxes and bees: from ambivalence to diffraction* (Wakkary et al., 2023) both explore a design journey with MTHD and were used as inspiration for this analysis.

7.2 METHOD

In the experiments making and designing were used as autoethnograpic research tools (Biggs et al., 2021). Every design experiment led to new insights about applying practices of MTHD and revealed more questions and blindspots (Biggs et al., 2021).

In this chapter I showed parts of my design journey which analytically showed the process of me (the designer) during the project and what choices I made to gain more insights (Wakkary et al., 2023). The design journeys are explained through the context, practices, designs and challenges of every experiment.

The design experiments include multiple activities such as prototyping, material exploration and co-creation with MTH others. These activities are also informed by the background research and collaborations with experts mentioned in previous chapters and took place over the duration of the graduation project. Each experiment starts off with guiding questions which can be seen as design goals. The designing itself happens through a reflective practice (Schön, 1991). The experiments are recorded through photos and drawings of the designs and process and an anecdotal description of the process.

I reflect on the challenges and insights relating to my experience with the cross pollination of MTHD and Refunc practices. Which is done by researcher introspection and interactive introspection with the graduation team and others (Xue & Desmet, 2019). The main challenges being; *1) de-centring of the human, 2) materialisation and 3)overwhelming complexity*.

7.3 EXPERIMENT #1: THE REFUNC ORIGINAL CONCEPT

Context: the facade of the Maakhaven.
Design goal: What is the initial concept for the facade?
Designers: Denis and I

I started off the project by asking Denis for his initial concept in mind as I wanted to know what he was imagining.

Concept | ivy structure
I found that he was not strongly attached to any idea. While he easily shares optional ideas,he did not strongly attach to any specific concept for the facade. He didn't draw a sketch on the picture I brought either (see figure 41). His idea was to simply place a structure that ivy can grow on, made from material like Heras fencing or scaffolding.

Figure 41. Denis and the picture of the wall.

I made a simple sketch of the concept (see figure 42).

Materialisation | attaching without leaving a trace
Denis didn't start talking about the ways we could attach something to the facade without drilling holes and thought about how to attach something temporarily. There are three options; place it in the ground, attach to the gutter or to a lamppost. For a material-centred designer it makes sense that this is a starting point for the conceptualisation.

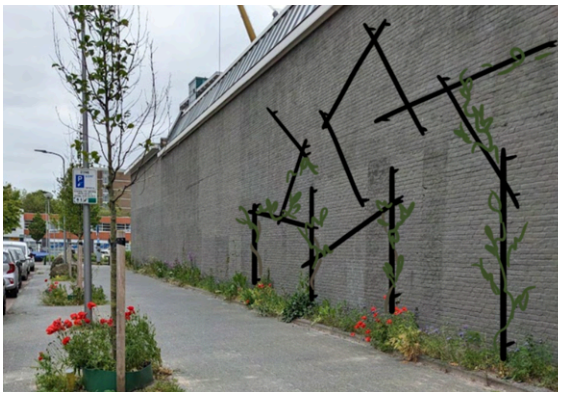


Figure 42. A simple sketch of the use of material.

Decentre the human | A Human-centred starting point
The concept for the facade is mostly human-centred; to let ivy grow on the wall because it looks nice. Denis's concept is also material centred, starting out with a material that makes sense with the function of growing ivy and easily affording structure. The idea shows little thought about the use the design has for the local ecosystem.

Overwhelming complexity | Challenge: when to start making
Starting out the project I planned to start making and prototyping as quickly as possible to gain insights from the prototypes and how they interact with their environment. During the project I learned this does not feel right to me. While I experienced a bit of apprehension with making activities I learned that Denis also only starts making something when he knows what it is going to be and for who he is making it.

7.4 EXPERIMENT #2: PRODUCTS FROM THE ENVIRONMENT

Context: de Maakhaven.
Design goal: What more-than-human additions can I make to the facade with local materials?
Designers: Denis and I

Denis advised to start the making process by figuring out what the waste streams are in the area (see appendix 4 for an overview of the materials). I went on a walk and gleaned three materials (a cardboard structure, a tube and a paint can). Next I created three designs based upon the insight mentioned in previous chapters about urban ecology.

Practice (Refunc)| Gleaning
I started out this experiment with gleaning local materials. As seen in the movie Glaneur et Glaneuse by Agnes Varda (2000), Refunc sees the value and beauty in the things left behind.

Practice (MTHD)| Autonomy for other-than-humans
When coming up with the design I tried to think of designs that allow for the ecology around the Maakhaven to have more autonomy in the city landscape.

Afterwards I reflected on the concepts and the process of making it, I identified that some elements were not accounted for enough.

Practice (city ecology) | Connectedness
Green structures should be connected with the others so that all needs of ecology can be met in the area. (Aghina et al., 2022)

Challenge: human needs
The residents of the Maakhaven have their own plans for the facade. Will they only be satisfied with the addition to the wall when it adds beauty, Maakhaven signage or also if it is just a lively wall? In this experiment I designed for the ecology and excluded the design goal for the Maakhaven residents. I reflected that to convince people of the value of the design we also need to involve them.

Figure 43. A possible location for the can to attach to, riding on the bike.

Materialisation | connections that make sense
Denis and I started making prototypes of the concepts. Next he exhibited a focus on attachment methods, how can you place something in its environment, what materials and methods will work well and work with the affordances of the environment? We looked for natural connections between materials with magnets and Denis hung up a log as a conversation between the natural and synthetic material (see figure 43 & 44).

Figure 44. Denis hanging up a log.

Denis advises to see how something can communicate with its environment. You should make sure something is not just an object in the space but visually and conceptually aligns with the context.

Challenge: looking like trash

An apprehension of Denis was the fact that things look like trash and are therefore cleaned up instead of left to be (see figure 45). After several weeks the cardboard structure was indeed taken away while the things we hung on the street sign are still hanging there currently.

-> Practice (Refunc) | aesthetically interesting

It helps if the concept is aesthetically interesting to convince designers and humans of the value of a MTHD.

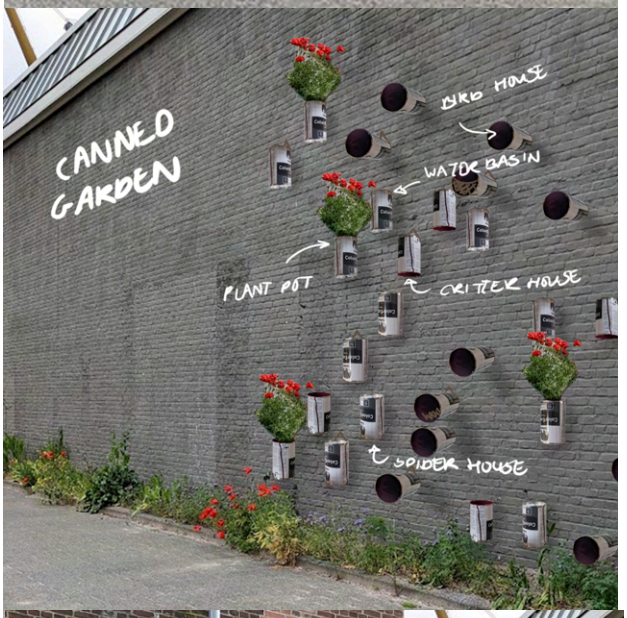
Challenge: Conflict rat & human

From Denis, I learned that there are rats in the neighbourhood, when checking on the sand castle it looks like little rodents chewed into the structure. I was not intending for it to be used by rats, the co-existence of rats and humans is a sore point. In our human structures and cities there is much place for rats to thrive but they are commonly not liked and seen as a pest (Tsing et al., 2020). The sandcastle brings attention to this conflict. Maybe this is why it has been taken away? Or just because it looks like trash?

Figure 45. The changes in the and around the prototype and facade over time (3 months).

Intervention | Sand castle
Bees need piles of sand not beehotels (appendix 7). The cardboard structure will keep the sand in place and dry after rain. This little tool station allows some animals to build their own structures.

Intervention | Water hacking
According to city landscaping (appendix 6), ensuring the plants have access to enough water proves difficult in the paved environment of the city. Most rainwater runs away because there are no borders around plant beds or the ground cannot absorb it. In this concept, we started by leading back some of the water that would normally go to the sewer system into the plant beds.



Intervention | Canned garden
One of the elements the ecology needs is room and structure to create a habitat. The paint cans can be positioned in different ways to be of use for multiple species of flora and fauna.

Overwhelming complexity | Challenge: think outside of your perspective

After making these first interventions I experienced a type of making paralysis. I felt like I didn't have enough knowledge or experience and got afraid of coming up with a 'bad design'. I became consciously incompetent(Curtiss & Warren, 1973). I continued researching more about ecology and thinking of designs but stopped making these. Since it didn't align with my need to create a design that makes sense.

Decentre the human | material centred starting point

I started thinking of material-centred designs based on the knowledge I gathered around city ecology. This starting point was not based on what the local ecology could use to be revitalised, leaving me to question whether there was actual value in the concepts. I did also feel like I didn't have enough knowledge and/or the expertise to know what would add this value.

Denis is playing with material and is thinking about what it could be for other-than-humans. While making these things, Denis says: *"I keep thinking of bee hotels, that is not good."* (personal communication,2023). He mentions that he finds it difficult to think of functions valuable to nonhumans besides drilling holes in something and it being a bee hotel.

-> Practice (MTHD) | Find affordances

By looking at the affordances of the gleaned materials and acquiring knowledge about the multispecies perspective I would be able to align the design choices and materials better (Wakkary, 2021).

Challenge : long term vision

Ecology does not stay still and its interaction with an intervention will change it overtime as well as influence the ecological system. For example, the cardboard structure will decay and what will its role be?

7.5 EXPERIMENT #3; REDESIGNING A REFUNC PROJECT

Context: The Maakhaven & camping in Friesland.
Design goal: What does Refunc need to add to make their design MTH?
Designers: Denis & I

In the third experiment, I came up with redesigns of Refunc projects. The goal of these designs is to figure out where you should intervene to have a MTH outcome to the project. I imagined the last two projects to be placed in the context of the Maakhaven.

Because I was constantly thinking about the place ecology has in my environment I noticed that things grow in cracks and crevasses (see figures 46 & 47). Lichen, moss and plants can grow on stone and porous (wet) materials.

Figure 47. The wall of my apartment building.

Apparently there are not as many good cracks in the urban environment for plants to grow because I don't see much life on buildings. Design agency RHeia used this principle and created cracks in facades (see figure 48).

Figure 46. Life growing between rock formations.

Figure 48. Levende gevel (RHeia, n.d.)

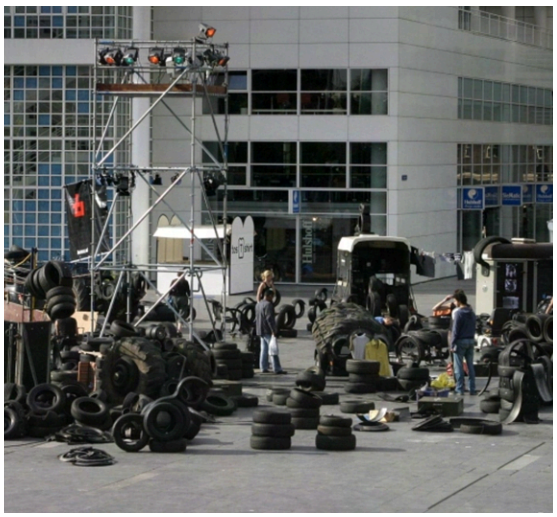


Figure 49. TodaysArt (Refunc, 2005)

This project was a temporary project, to let it interact with the ecology it needs to be placed for a longer amount of time to see what life forms attach to it.

Intervention | Reintroducing texture

Starting out with the project of TodaysArt (see figure 49), I think of adding a layer of texture and dirt within the crack of the tires. Adding connections so that water can naturally flow and be transported between tires. Like in a natural stone structure, the water and life can find a way in the structure.

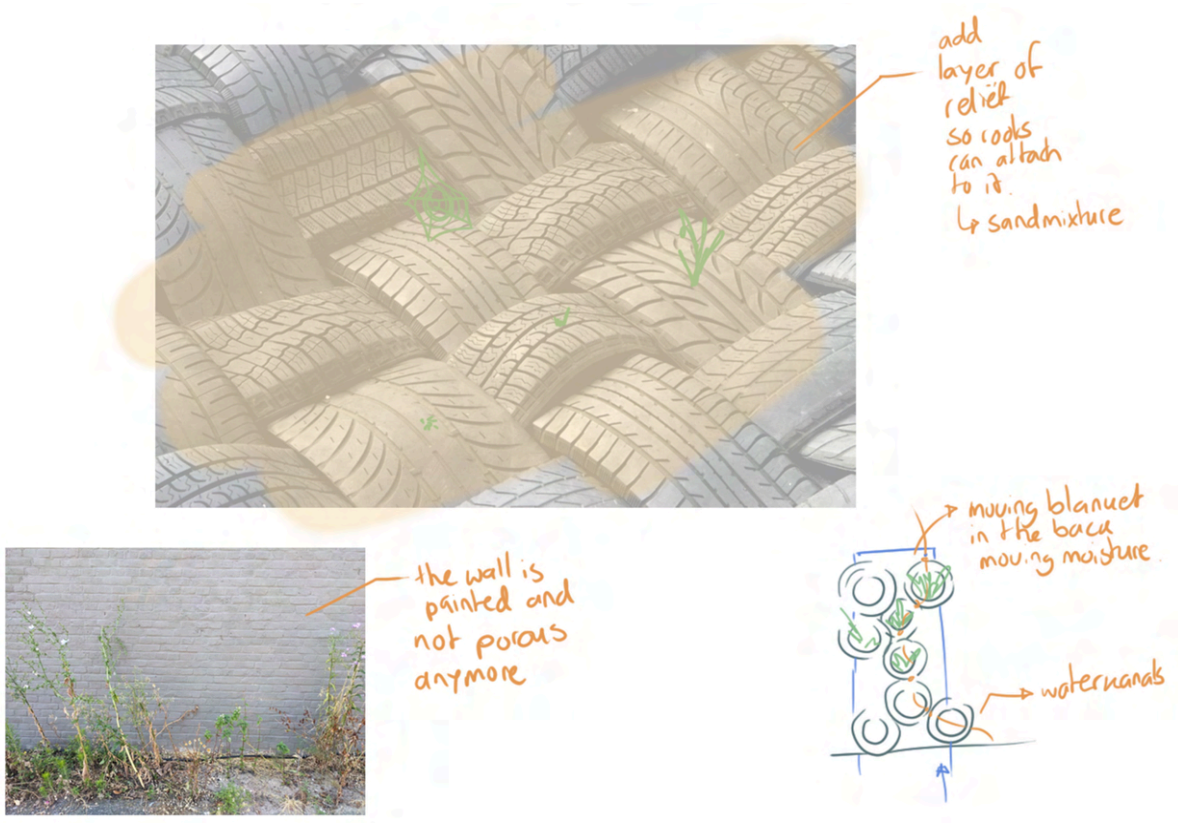


Figure 50. The redesign and photos of plants growing in cracks and on texture.

Intervention | Dwelling in Friesland

Denis asked me to add a layer to the outside of a silo dwelling that will be placed on a camping site in Friesland. It is important to connect the greenery to its environment (Schilthuizen, 2022). To create a green roof I let myself get inspired by the products of the farmers in the environment and traditional building techniques with biological materials. With dirt, hay and cow poop from the environment, plants can continue to grow on the dwelling.

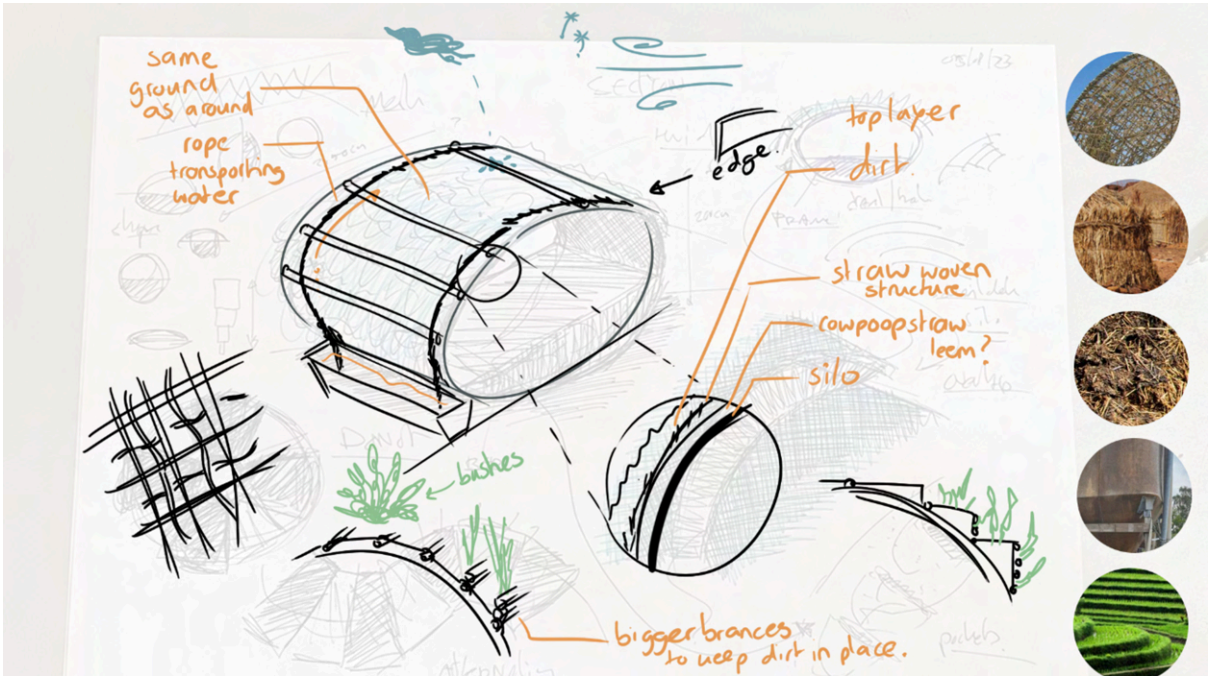


Figure 51. Dwelling in Friesland drawn on a sketch of Denis.

I noticed little islands in the city for plants and animals. To me they seemed like a forced and human-centred design. We don't want to share the space with other-than-human species so we put them on an island in the water? Why don't we create little islands to create bits of river bank? The municipality wants to improve the waterways for ecology and add natural river banks *(Nota Stadsnatuur Gemeente Den Haag,* n.d.*)*.

Figure 52. Sleeping pod (Refunc, n.d.)

Intervention | Sunken river bank
Instead of housing humans in the boat structures I think of sinking a boat to create a bit of 'natural' river bank.

Figure 53. A sunken river boat.

Decentring the human | involving ecology in the design process
I created some designs based upon the knowledge I gained from this project. I do feel like the process of the creations of these designs is mainly human-centred. I thought of the ecology as my end user but did not involve ecology in other parts of the process. Making the design could help deliver insights on the effectiveness of the design and to see if ecology will take its place.

Practice | make space
The designs are based on the principle of letting nature do its thing, none of the concepts are about planting things but it is about creating the right circumstances for plants to land and settle in these places.

Challenge : Learning curve
I was adopting new practices to my current design practice, the material-centred approach of Refunc was new to me. I started thinking of ways of adapting Refunc materials to work with ecology instead of thinking of the materials that would have the right affordances themselves.

Challenge : Sharing ideas
I am apprehensive in sharing these concepts and getting feedback on them. Not sharing prevents me from gaining more insights outside of my personal perspective.

Practice | multidisciplinary collaboration
Because Refunc and I don't have a deep understanding of what is needed for the revitalisation of urban ecology, multidisciplinary collaboration helps to acquire this knowledge (see chapter 4). In the design process moments of knowledge transfer and feedback on designs need to be added.

Materialisation | surfaces to attach to.
To create more space for ecology a base layer is needed that life can attach to. I tried to imagine different ways of doing so and making sure there is access to water. In most Refunc projects materials are not porous and/or lively. To design with ecology materials with these affordances should be used (see figure 54).

Figure 54. Lichen growing on Refunc's silos.

Practice (personal)| Porous materials
Porous materials afford ecology a place to attach to and for water to be stored and transported in. These materials are at the beginning of creating liveliness

7.6 KEY INSIGHTS

Overwhelming complexity

I experienced a fear of not having enough of an understanding about the intricacies of urban ecology and/or the concepts not being seen as good quality. As a result, I experienced making paralysis and apprehension of sharing my work. My own apprehension made it hard to implement Refunc's practice of play and experimentation.

Decentring the human

In the experiments I am looking for the right balance between perspectives. Switching between looking for what a material can be and then what is needed to revitalise ecology. Both these activities centre around affordances. Finding ways to make space for ecology and its agency is one of the most important activities to change from current practices to a MTHD approach.

Lessons for Refunc

You need some basic knowledge about ecology and the affordances flora and fauna are looking for to think of what you could design for it. This knowledge can be gained through noticing and multidisciplinary collaboration.

The interventions do not revitalise ecology by definition. There is always uncertainty about the actual results of the interventions that can only be observed after placing them. This expands the reflective practice of Refunc from the design process to also the time after a design is placed.

Refunc currently primarily uses materials that are durable. Biological, porous and/or hydrophile which are important for ecology to attach to and harbour life.

To fight the making paralysis, I gathered all practices mentioned in chapters 1-7 to create an overview and establish a methodology for further experiments in the next chapter.

7.7 DISCUSSION

Earlier in this report I referenced images of species using plastic waste. It would be interesting to see what happens with Refunc materials over time and how ecology uses it.

Designing an intervention with ecology leads to a lot of uncertainty about the results.

Chapter 8

MTH PRACTICES ON THE MAP

8.1 INTRODUCTION

Now that I have gained a better understanding of designing with urban ecology, I look into how the practices from the previous chapters could be combined into a general method or approach. The goal is to create a better overview and use this as guidance in the following designing experiments. I also explore when these practices can be applied to the design process and check what Refunc needs to be able to implement these practices.

8.2 METHOD

I started out by clustering the insights you read about in the previous chapters. To cross reference the completeness of the list of practices, I also added practices from Metcalfe's (2014) work on multispecies design, Superflux's (2021) more than human manifesto and Payne's (2017) words on new ways of conceptualising the human in design.

Figure 55. The post-its are placed in clusters.

I used post-its (see figure 55) and went through three cycles of clustering.

I intended to cluster the practices in a chronological manner but later deviated from this goal.

8.3 A TRADITIONALLY STRUCTURED DESIGN PROCESS

I started out with the assumption that I could cluster the practices based on a chronological iterative order. I am schooled with the models of the basic design cycle (Synthesise, simulate, evaluate, decide and iterate) and the double diamond (discover, define, develop, deliver) (Roozenburg & Eekels, 1995; .....) but as Foster and Ervin (2020) explain, in reality design is a messy process and we need to find ways to engage with the messiness in systematic ways. In the three efforts to cluster the practices I switched from a chronological order to six separate categories; general mindset, setting intentions, research, methods, execution and requirements (see figure 56).

Chronological design timeline

Many practices were not related to a specific moment in the design process but could be implemented at any moment. For example, multidisciplinary collaboration can be done at the start of a project to learn more about the context or during to verify concepts.

Levels of abstraction

Practices were on different levels of abstraction for example *creating junk places* and *experimenting by play* are on completely different levels. One is a concrete requirement for a design and the other is a broad description of an approach to the design process.

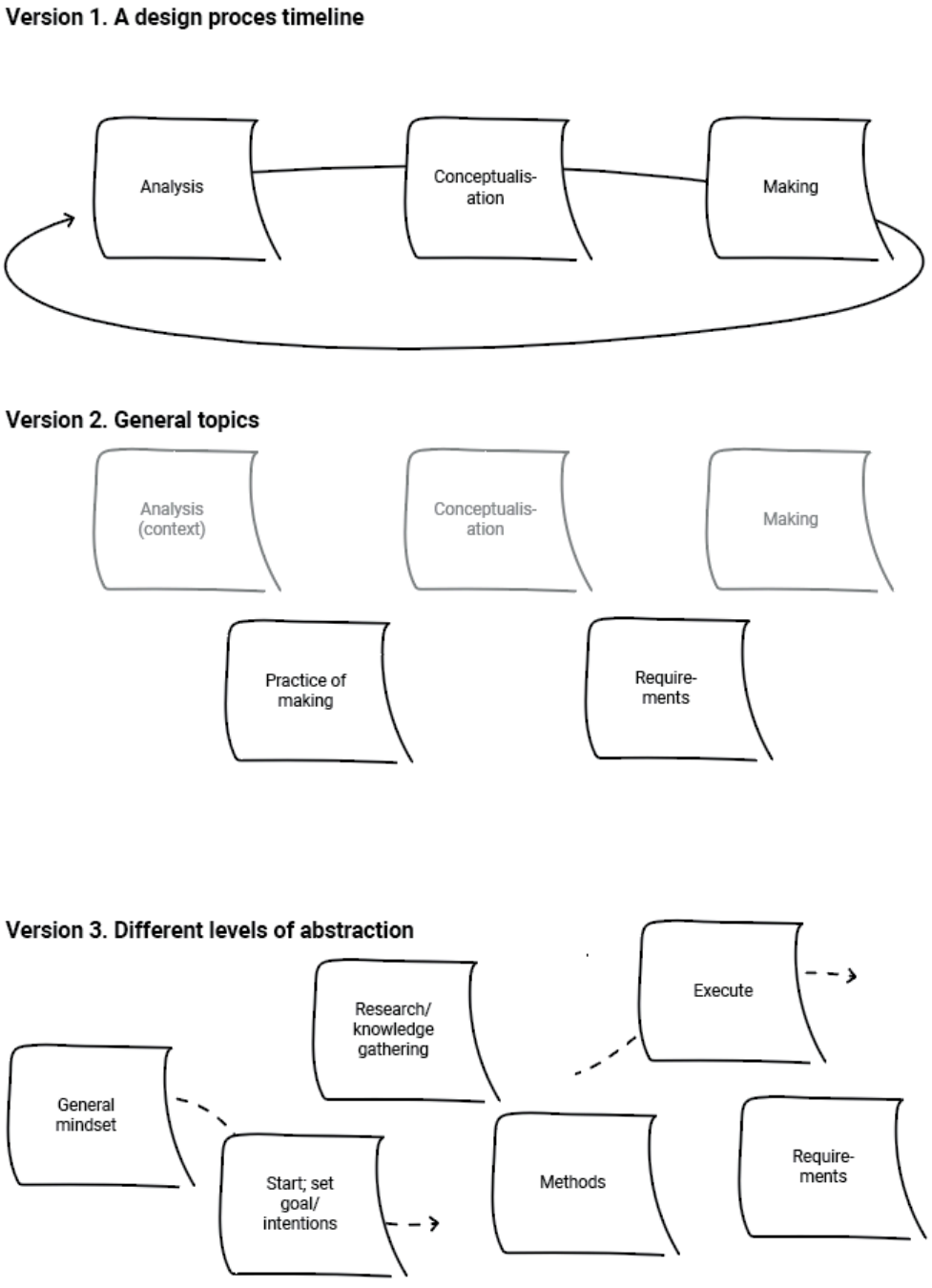


Figure 56: clustering process of the practices.

8.4 THE MAP

As a result I created the map of practices (see figure 57). Practices are clustered within the bigger themes as shown in version 3 in figure 56. This map was the first tool I used as guidance in following experiments. I could have chosen to make it more ordered and make it a list instead of a map but this was not more insightful to me and since I would be the main user of the overview I kept it to this visual overview so I could easily see what practice fits where.

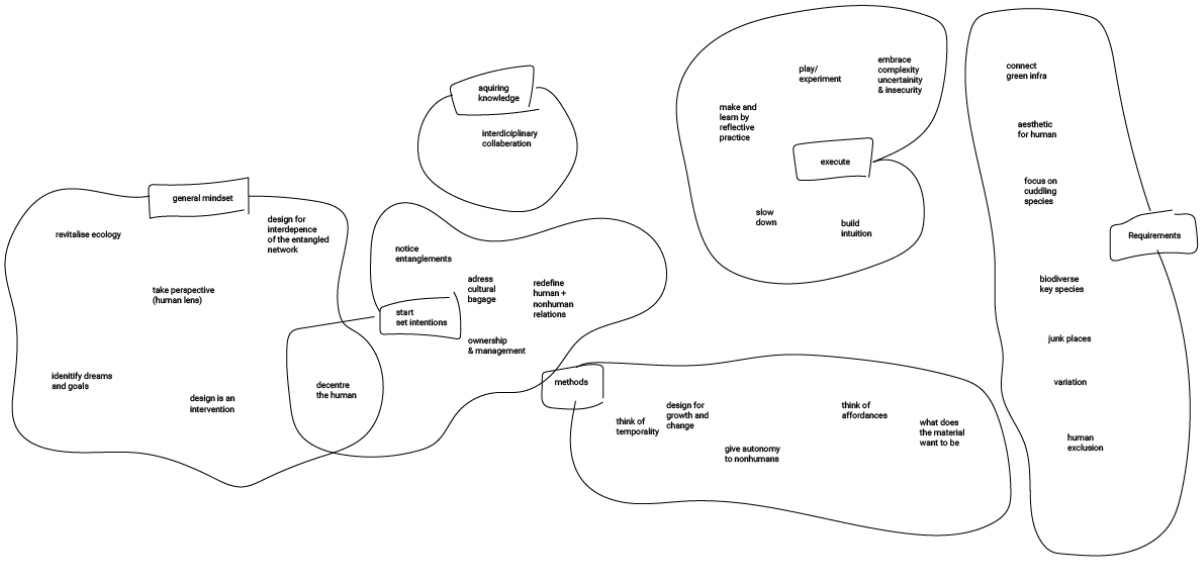


Figure 57: the map of more-than-human practices. See appendix 11 for a large overview of the map.

Refunc and the map

When I brought the map to Denis (personal communication, 2023) from Refunc I learned that he wants to see visual examples to understand what is written on the map. He starts playing with the map and imagines it to be interactive. When you click on a practice it could show you an outcome of the design process. When you add this practice to it, it shows you what will change. The map itself does not stimulate Denis to think about how a design process could be tackled differently but it does stimulate him to think about the ways you can show how a different approach or mindset (MTH) can lead to different results. Denis thinks of his own stories and examples with each word written down instead of asking me what they mean. This taught me that I need to have clear examples to communicate what I mean correctly.

8.5 KEY INSIGHTS

The practices cannot be plotted on a timeline of a design process.

The practices found are best categorised into the following topics; General mindset, Start & set intentions, acquire knowledge, execute, methods, requirements.

The figuration of a map helps me to understand what practice I could implement when.

Denis needs concrete examples to be able to imagine what practices create.

8.6 DISCUSSION

The map is made for me by me, in the case of this project that is not an issue because it is an interim step in the design process. One of my goals for the project is to relay my learnings and insights to Refunc and therefore one of the next steps is to see how these practices can be communicated by use of visual examples. The map was a valuable source for communication but is not a stand alone effective tool for Refunc.

Chapter 9

DESIGN EXPERIMENTS CONTINUED

9.1 INTRODUCTION

Following up after the creation of the map the experiments are continued. With the help of the map a few practices are picked, applied and the key insights about them are distilled.

9.2 METHOD

This chapter is the continuation of chapter 7, the same methods are used to execute and analyse the experiments. One extra element is the use of the map as a guide on what practices to implement. For every design experiment, I start out with a design goal and context and one or two practices to focus on (see figure 58). A collection of practices is involved in every experiment because these became part of my mindset and are automatically involved within every cycle. In co-creation the map is used to explain the practices that we take into account. essentials They convey a way of thinking instead of the execution of the design process. They belong to the categories general mindset: *revitalise ecology, take perspective (human lens) design for interdependence of the entangled network, identify dreams and goals, design is an intervention, revitalise ecology* and start/set intentions: *decentre the human, notice entanglements, address cultural baggage, redefine human-nonhuman relationships, ownership and management*.

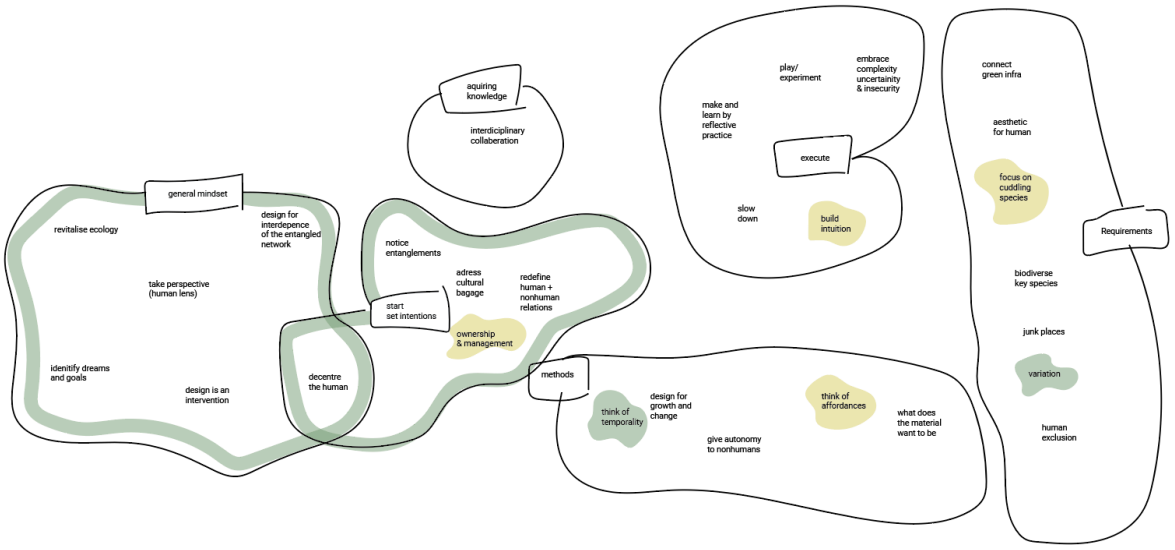


Figure 58. An example of practices: green is intentionally chosen, yellow is organically involved in an experiment.

9.4 EXPERIMENT #5: ECOLOGY OF REFERENCE & VARIATION

Context: The facade of the Maakhaven.
Design goal: How to create ecology of reference with Refunc materials? How to create variation within a small area?
Designers: Me
Practices: Ecology of reference, variation.

Design goal

In this experiment *Ecology of reference* and *variation* are used. I start out with this topic because I learned that more variation was one of the main aspects that the facade garden at the Maakhaven could use.

Ecology of reference (Metcalfe, 2012) is about finding, i.e. a natural ecosystem with similar morphological, chemical or climatic features.
Some animals and plants are pre-adapted to certain conditions in urban environments because of their similarity to natural features (tall buildings and cliffs for example).

Materialisation | Refunc materials

There is an endless list of materials that Refunc works with (see figure 59). A few of them are used often: car tire, building fence, scaffolding, beer furniture, fishing crate, wood pallet, ibc water tank, plastic pallet, feed silo, cargo blanket.

	Lijst der dingen						
Materiaal	Functie 1	Functie 2	Functie 3	Functie 4	Functie 5	Verbinding 1	Verbinding 2
aanhanger	Caravan	Tiny tiny	Zwembad			Montage	
aanrecht	Gevel					Montage	
aardappelkist	Bouw element					Montage	
air deck pallet	Projectie scherm					tiewrap	
airco deel	Bar	Buro	Tafel	Huis		Bout m8	
aluminium pallet	Tafel					Montage	Lassen
Atlas Copco generator	Winkel	Bar	Kassa	Huis		Container koppeling	
Audio cassette	Wand	Lamp				tiewrap	
Auto binnenband	Drijver					Knopen	
Auto buitenband	Stoel	Schommel	Gevel element	Dak bedekking	Verloren bekisting	Bout m8	
auto velg	Voet	Haspel	Bijzet tafel			Bout m8	
autogordel	Sleutelhanger					Bout m8	Schroeven
autoruit	Tafel	Kast				Opleggen	
autospiegel	Reflector					Magneet	
autostoel	Stoel					Bout m8	

Figure 59. A bit of the list of Refunc materials.

Opportunity: Noticing ecology outside its borders

Ecology finds space along the edge of human paths. Where no human interacts with the environment, the ecology finds a place to live (see figure 60). Instead of focussing on creating a place for ecology I start playing with the idea of creating an edge, where humans don't disturb the process of ecological growth.

Practice (Personal)| Bits of ecology

Notice, protect and create microbiomes on the edges. They can be of high value to the habitats of fauna (Kennisnetwerk OBN, n.d.).

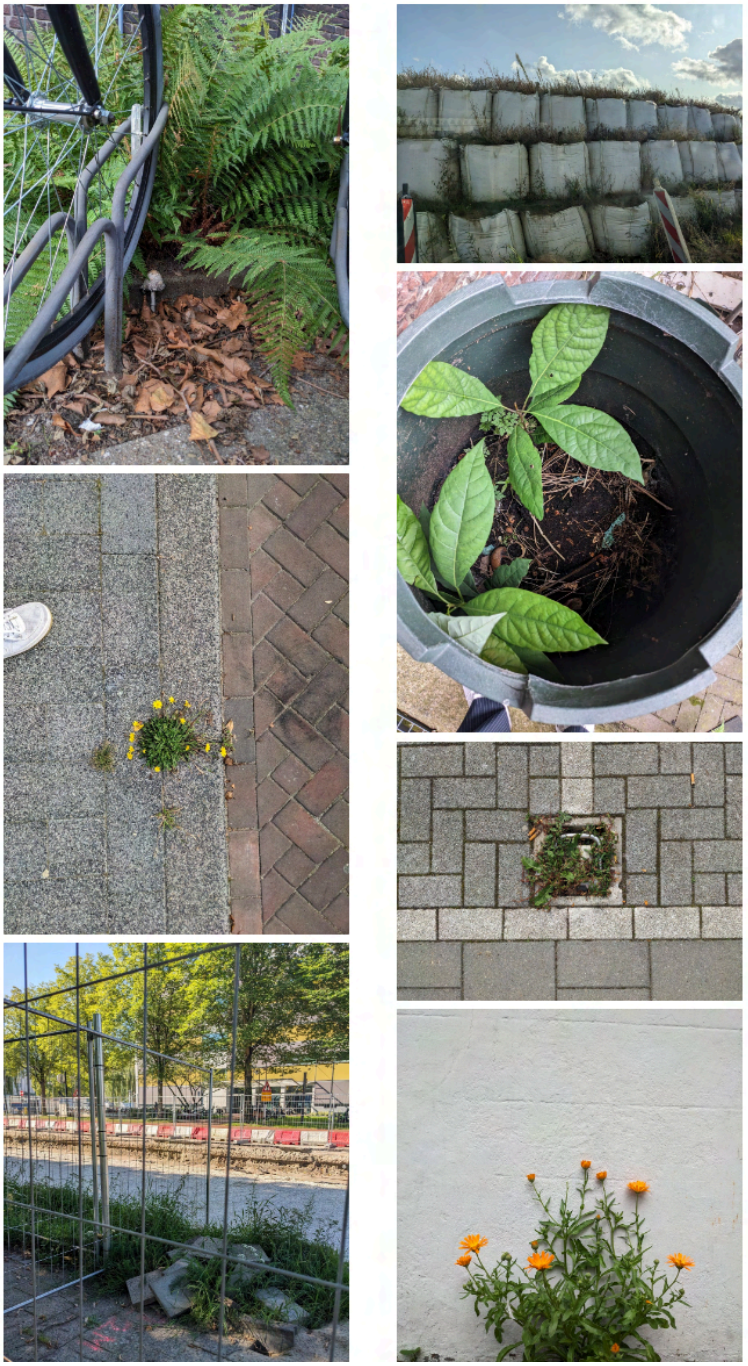


Figure 60. Liveliness along edges and crevasses.

Intervention | Human duct
Ecoducts make place for ecology by rerouting the nonhuman infrastructure around our roads. Turn this around and use Refunc materials to create an edge between human and nonhuman.
The humanduct separates human steps from the ground, this way plants can grow where humans do not walk. By using the grids of plastic pallets, the pavement even has a nice pattern. Within the growth an elephant path of human footsteps will be left behind.

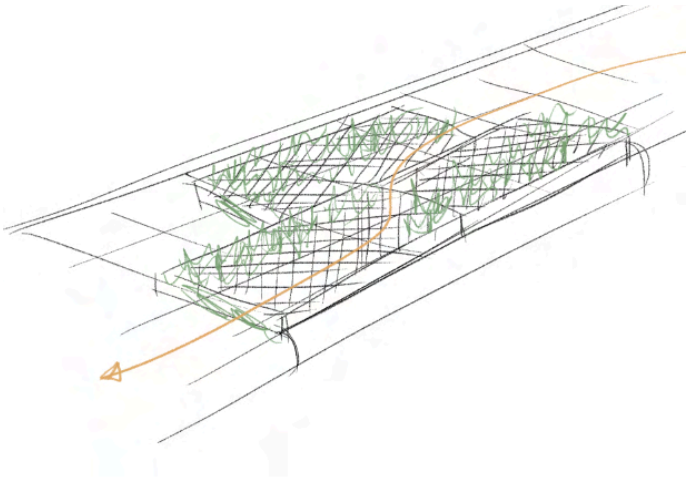


Figure 61. Sketch of a humanduct

Intervention | A wall of variation
Create variation in the soil and habitat, by building a pallet structure up the wall. All pallets are internally connected by the (local) soil. The pallets are filled and packaged in different ways, resulting in variation in moisture and soil composition. In the first pallet Residents can leave behind their composting. The nutrition will spread in the soil as far as it can go.

Figure 62. Sketch of the wall of variation

Decentre the human | part of ecology
The concept wall of variation makes the residents of the Maakhaven part of the variation created in the structure. If they do not use the composting there will be less difference in the nutritious quality of the soil.

Challenge: perception of time
I am uncertain how fast you will notice a difference in growth because of human interruption along the designs. While elephant paths are already connected with human interference in our mind, it might be harder to notice changes in ground quality and liveliness if you are not personally involved in taking care of the patch of ecology.

-> Practice (MTHD) | notice entanglements
To make entanglements noticeable and relevant to others they might need more than to just affect the ecology and hope that they will acknowledge it. Big changes overtime might help this process of noticing.

Practice (MTHD) | variation
Combining multiple materials with different affordances creates variation in ecology too. Qualities such as translucency, water resistance and gaps lead to different affordances.

Practice (MTHD) | ecology of reference
Instead of looking at nature for ecology of reference it is also possible to notice how species use the materials and affordances of the city and how these can be brought into your design.

Overwhelming complexity | Challenge: autumn
The concepts described in this chapter work with plants, while it would be valuable to make them to see how to produce these concepts and how they interact with their environment, I find it hard to make something that won't exhibit growth in the time of the project (autumn). The duration of the project makes it less interesting to test it out too because I will not be able to see results within this timeframe. In the next experiment I will tackle the temporality of the project.

9.5 EXPERIMENT #6: TEMPORALITY AND TEMPORARY

Context: Park at the Binckhorst.
Design goal: How to involve temporality in the design of an MTH skin for IBC tanks?
How to combine human and nonhuman temporality in the design?
Designers: Sterre and I
Practices: Temporality

Design goal

This experiment is centred around *Temporality*. I noticed that I am thinking of designs for things to grow but we are currently in autumn, temporality influences what role a design plays when.

Refunc wants to know how to create a MTH skin for a tiny house made out of IBC tanks. The tiny house would be placed on a patch of overgrown terrain at the Binckhorst (see figures 63 & 64). I invited a friend, Sterre (not her real name), to work with me.

Challenge: Understanding temporality

Temporality plays a role in different aspects of the design process
Autumn means time for decay and storing energy in ecology (see figure 65).

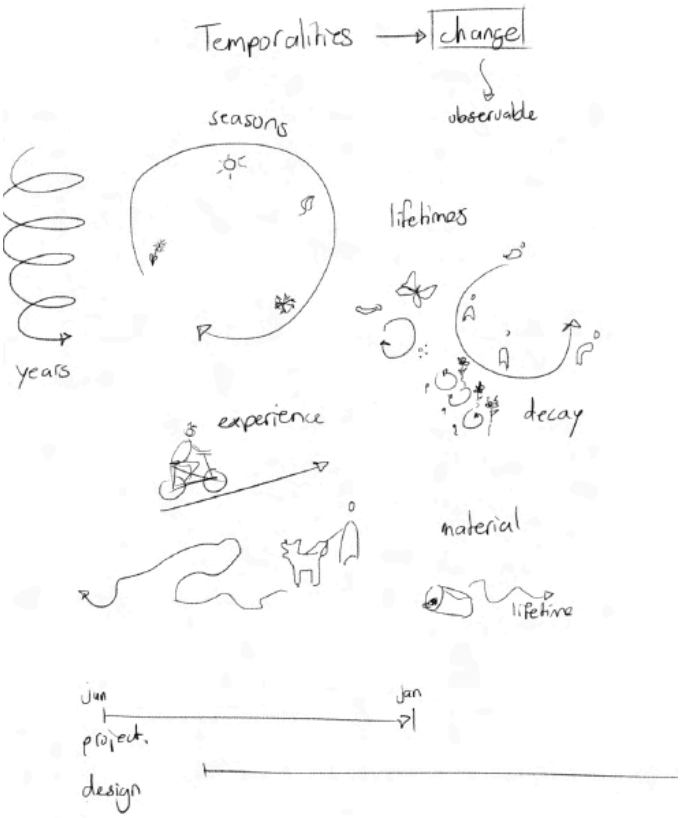


Figure 65. Sketches of temporalities.

Figure 64. The context of the Design.

-> Practice (MTHD) | Think of temporality

The interventions that will have an effect on certain species are dependent on their behaviour in the timeframe that the intervention is placed .

Our perception of time as humans is different from other species.

Compared to the time that the IBC tank needs to deteriorate we are an ephemera (ééndagsvlieg).

Materialisation | add water

The IBC is made out of metal and plastic which is meant to last. For ecology to be able to grow the new skin needs to have something that plants can attach to and the plants need water to grow. Water is a strong agent for change. I even expect the IBC to show some change if it is constantly kept wet on the outside.

Materialisation | add texture

Water can be moved around the IBC tank in an analogue way using natural fibre fabrics and ropes. By creating rough texture (as mentioned in experiment #3) the plants will have something to grow on, with a material like Jutebags or moving blankets, a rough texture as seen in figure 66 can be made.

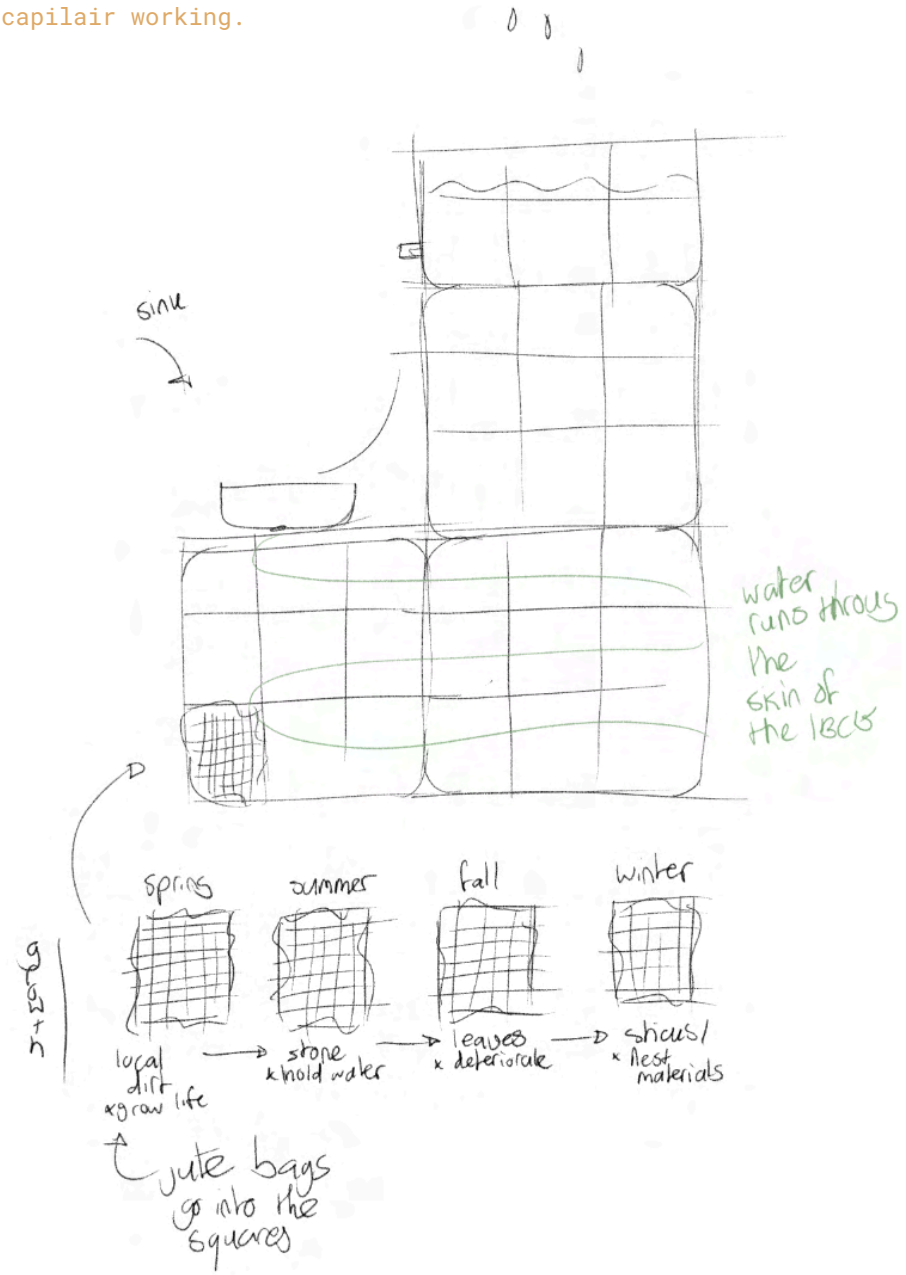
Materialisation | reflect temporality

One of the models plays with the about reflecting the different seasons in different parts of the IBC tank to show that there are different natural processes happening to humans.

Figure 66. Material experiments.

Intervention | tiny outdoor kitchen

The final design is a skin that is connected with the human use of the IBC tank. Because the tank is a tiny house the agent of change water is connected with human rituals. One of the IBC tanks catches rainwater and outside of the tiny house is a little outdoor kitchen with a tap. The skin of the tank is made with moving blankets or jute bags with contents sown in between two layers. The contents of patches fit different ecological processes of seasons. Water from the sink will be pulled around the tank though the capilair working.



Challenge: embrace the unknown
You have to embrace the fact that you are not going to know what the design is going to be when you allow for it to change over time.

Opportunity: connect entanglements
By letting things that humans do directly influence the ecology it makes the entanglements between our lives more tangible.

Materialisation | changing
Materials need to allow for change to happen when temporality is given the chance to create a lively habitat.

Overwhelming complexity | careless play
I personally kept thinking more about how to bring this concept to life and what should come after these small prototypes. I felt frustrated with the project not taking long enough to witness the effects and ecological changes.

When prototyping the little models together Sterre did not seem worried about the design actually being more-than-human. She was playing with ideas of how to present temporality and how water can be held or moved around the IBC tank.

9.6 EXPERIMENT #7: CUDDLING SPECIES & DECENTRING

Context: Parking Lot at mijnbouwplein.

Design goal: How do you support decentring with making? How can an intervention help decentre the human in a human-centred context?

Designers: Mark and I

Practices: Cuddling species decentring humans

Design goal

This experiment is about *cuddling species* and *decentring humans*. Focussing on cuddling species is a practice that is applied by nature advocacy organisations (Natuurpunt, n.d.). Decentring the human is central in MTHD. The goal is to make all actors valued equally in the decision making (D. J. Haraway, 2008). It takes place at the parkinglot behind my building (see figure 67).

Practice (Ecologists) | cuddling species

Use cute animals to convince people to empathise with and care for species living in the urban environment.

Practice (Ecologists) | temporality

I decided to focus on snails and mushrooms because they are both active in autumn.

Co-creator Mark (not his real name) is a big bird and nature enthusiast but has no experience with more-than-human literature. I prepared some materials to read up on the mushrooms and snails: chapters of the MTH thesis *Snail city* (Jiang, 2022) and the wikipedia page of the harefoot mushroom.

Figure 67. The parking lot behind my building.

Practice (Refunc) | Gleaning materials

Starting out this experiment I got materials to work with. From the previous experiment I learned that I need organic material to work with so I went to the office of Delft landscaping and asked for organic waste.They happily referred me to a place in Delft where piles of organic material are gathered after maintenance activities.

Figure 68. Working with organic materials

Figure 69. Pallets at the pallet shop.

Practice (Refunc) | Gleaning
I collect materials for this experiment from the pallet farm. Besides materials I also found life

Opportunity: notice current uses
At the pallet place I looked to see what liveliness I could find residing within the pallets. Some birds flew around, I saw spiderwebs and there used to be a rat nest somewhere according to the shopkeeper but the pallets are thoroughly cleaned and all life is washed off.

At last, I noticed something in the bin with wood chips from the pallet recycling. The harewood mushroom apparently lives there.

Practice (Refunc) | aesthetics
Combine the more-than-human use and aesthtics.

Figure 70. A harewood mushroom.

Materialisation | Organic materials
While working with the plants I gathered, we noticed that some of the materials were very hard to work with. The reeds would not bend but break easily (see figure 71). As I cut one of the reeds and noticed that it had a beautiful core. At that moment I was not sure what it would become.

Practice (Refunc) | play
Through play I learn how to handle and manipulate these materials.

Figure 71. Mark, working with organic material.

Scanning the parking lot

When entering the parking lot Mark immediately started imagining how it could be less human centred (see figure 72). He was interested in the leaves and the flow of the wind.

He also mentioned many improvements that would be good for birds. Most of his ideas were about changing the actual infrastructure of the place and not so much designing something that could be placed within this context.

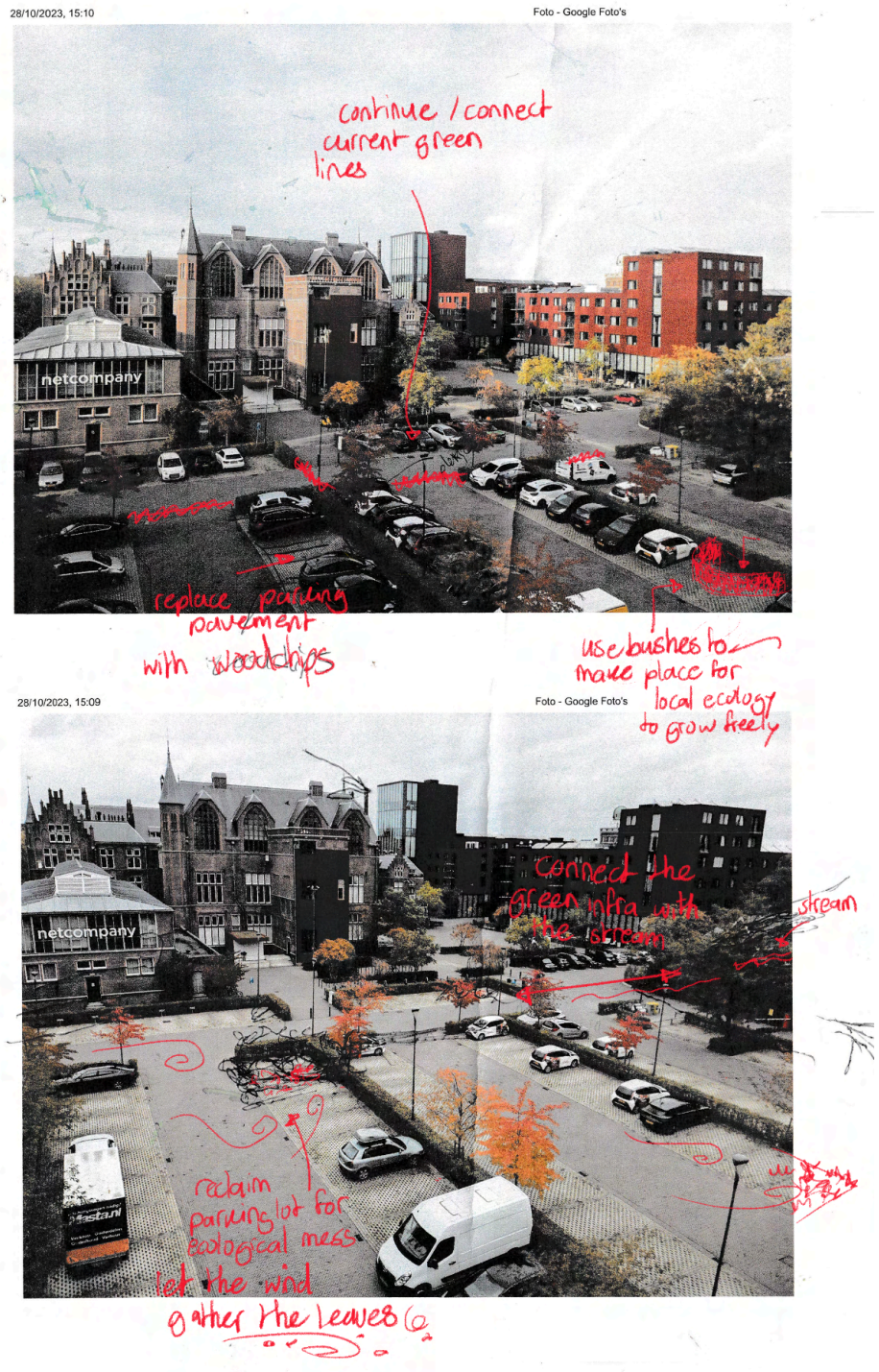


Figure 72. Marks ideas for the area.

Intervention | Mushroom spiral
The mushroom spiral holds wood chips. I found that while playing with the material I was working towards something aesthetically pleasing. I could see many spirals like these around the parking lot in autumn and slowly let them deteriorate overtime.

Intervention | Snail pathway
Instead of making gullies for snails we made an organic speed bump out of withies (a willow branch). With enough structural integrity, animals inside the speed bump will not be disturbed and the connection between infrastructure restored. The withies might even grow new twigs in spring. This might be an issue for cars in the long run.

Intervention | Wind catcher
Leaves are cleaned up in the city. But they are valuable food sources. A windcatcher is placed in a windy corner, reclaiming a bit of the parking lot and gathering organic material. When there is enough to trap leaves they will gather. When I think about Refunc materials I can see a fishnet being used with this function.


Figure 73. Snail trail


Figure 74. Mushroom spiral

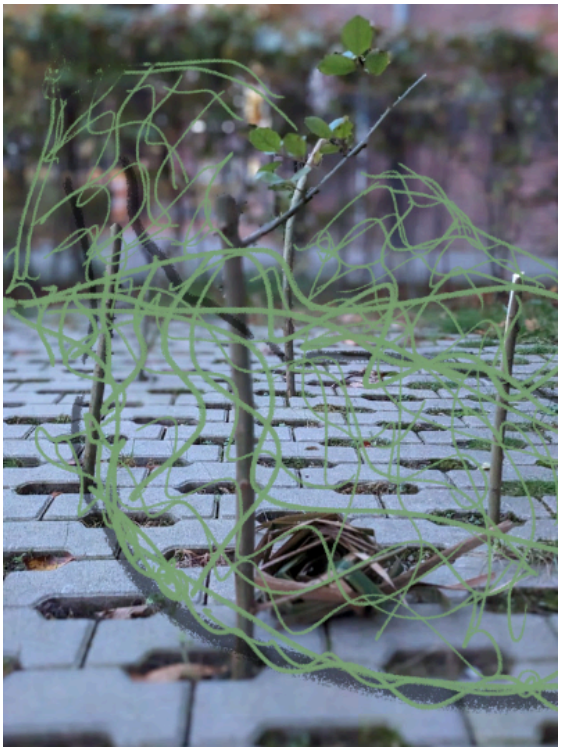


Figure 75. Windcatcher.

Opportunity | human-centred city
Our environments could be improved drastically to better support cohabitation with other species. This context can mainly benefit from having more space and better connection between these spaces. In these spaces you want to let natural processes happen like leaving the autumn waste deteriorate, feed the mushrooms and home the snails.

Decentre the human | First time
Mark shared that he found it very difficult to think of ideas that decentre the human and are for snails or mushrooms. He said that he has little affection for them and finds it hard to empathise with them. He also did not go back to read the materials about snails I had with me. He told me that if the experiment would have been about birds he would have had many ideas.

-> Practice (Refunc) | cuddling species
Not every person shared the same interest in species. It is harder to design with species that one does not care for(De La Bellacasa, 2017).

9.7 KEY INSIGHTS

In this section I reflect on the last insights before moving on to the process of sharing these insights in the next chapter.

Overwhelming complexity
Through co-designing I experience different attitudes towards the lack of knowledge. Mark was struggling with the fact that he did not know what he could do for the snail and mushroom and Sterry immediately started to prototype. The lack of knowledge is only experienced as a barrier for some, namely those who are consciously incompetent and care for it to be different (Curtiss & Warren, 1973). Co-creation and mulit-discplinairy collaboration during the design process can prevent the paralysis because others with more knowledge can function as support.

Decentring the human through play
Haraway (2016) explains that for play one needs to take a risk and that good players know how to invite and sustain their partners interest and engagement in play. The context of this project inherently inhibits my ability to be open, notice, be curious and keep decentring myself. Because of the experienced pressures of a graduation project, I was not as receptive to the MTH player who invited me.. Donna Haraway (2016) talks about the process of play in the practice of decentering. By rearranging elements in a new way, new meanings are created (Haraway, 2016). The fact that I am not able to play freely affects the productivity of the approach of experimentation.

Another way that I accidently prevent decentring is by not sharing concepts with others and not giving others the ability to share their knowledge in the form of feedback (Resilient Designers, 2023). Sharing also leads to more knowledge generation (Resilient Designers, 2023)

The distinction between learning through making and delivering a perfect intervention can be helpful to prevent design paralysis and will be taken into account in the making of the journal

Lessons for Refunc

The experiments led to the insight that multiple elements can be added to the periodic system of refunc (see figure fixme & fixme). The list of materials is extended with a few recommendations for *biological*, *lively*, *porous*, *hydrophilic* and *textured* materials that allow for change, growth and decay.

Another category that is not in the periodic system yet is that of clients (see figure fixme). Adding the category clients helps Refunc to think of the fact that function (or affordances) can be for humans as well as non humans. And that these two factors are dependent on each other.

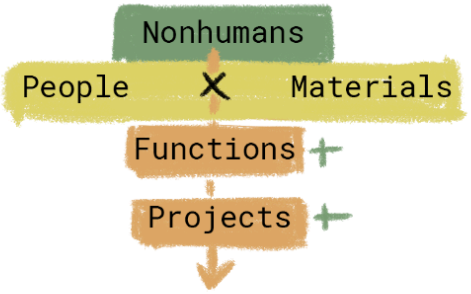


Figure 76. Refunc framework

The addition to the Refunc framework align with the practices: *lively materials*, *find affordances* and *take on a perspective*.

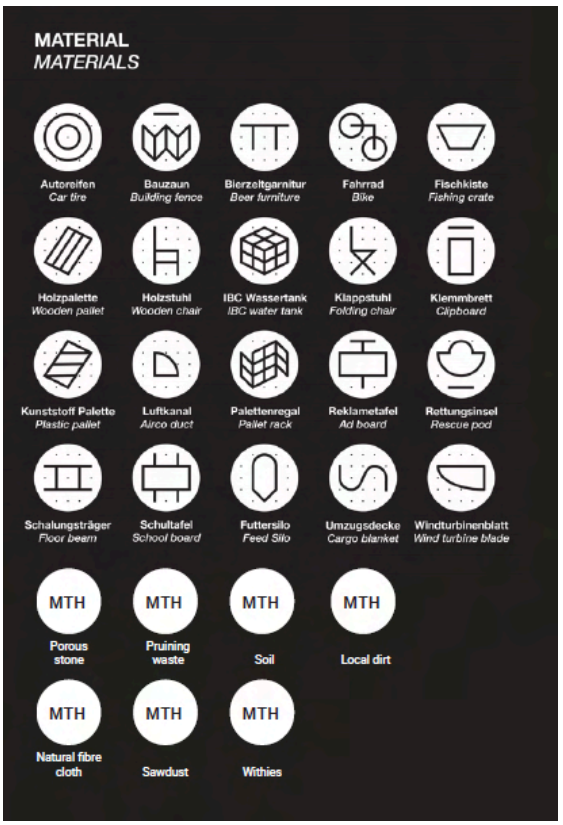


Figure 77. Periodic system (Refunc, n.d.)

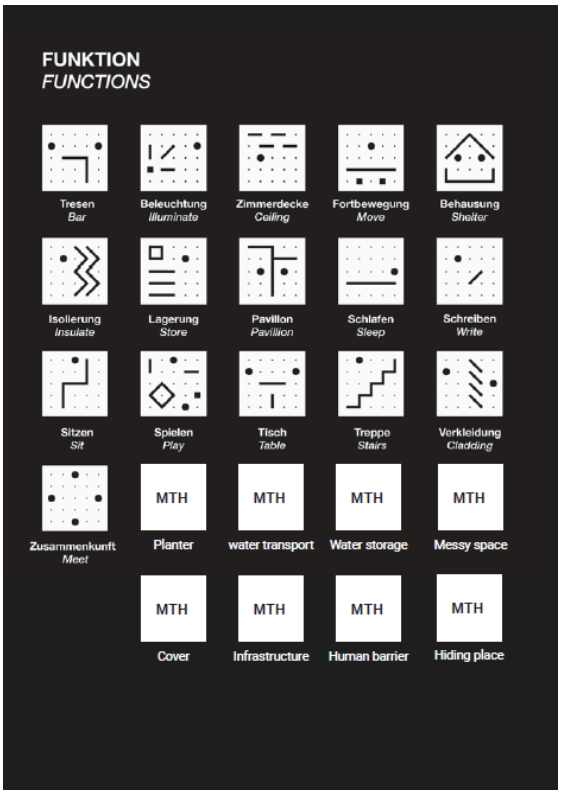


Figure 78. Periodic system (Refunc, n.d.)

9.8 DISCUSSION

In these experiments I did not focus on the validation of the interventions. To validate long effects of ecological processes it would take a longer time than was planned for these experiments. There are people that did look into methods of validation like Aalbers(2022) who created a plant design evaluation wheel for his own project. Another option is to look at the ladder of participation and adjust it to involve MTH others (Arnstein, 1969).

As a novice MTHD I experience a large learning curve, with experience the design practice will become more intuitive and the barriers that I experienced in this chapter might not play a role anymore (Cross, 2004).

V. THE JOURNAL

Chapter 10

THE MAKING OF THE JOURNAL

10.1 INTRODUCTION

Throughout this project multiple practices are gathered. In chapter 8, I made a map of the practices till that moment and the list is continued in chapters 7 & 9.

In this chapter you will read about the design of the journal containing this project insights to pass on the knowledge. The inspiration and insights leading to the final format are represented in this chapter. Finding the right format to share the knowledge and complexity of MTHD in a comprehensible way was the biggest challenge.

In the first iterations of the journal I called it a guide, after the evaluation of chapter 11, this title was changed to a journal. I will call it a journal in this report for consistency.

10.2 METHOD

I shared sketches of the journal with peers and the graduation team for feedback and iterated on the journal accordingly. Alongside these designing activities, I borrowed and consulted multiple guides as inspiration and copied elements of value to this journal. Based on the insights from designing the journal, I created a list of requirements, a design goal and interaction vision for the journal (Roozenburg & Eekels, 1995; Pasman et al., 2011). Which I continued to use to make design decisions.

10.3 USE SCENARIO

The journal is supposed to help prevent people from feeling overwhelmed by the complexity of MTHD. In my case this resulted in making paralysis, I want the journal to prevent this from happening to other designers.

Starting MTH designers are the target group of the journal. It gives visual examples and stimulates people to experiment for themselves. I see it being used as an inspirational tool out of which users can pick practices to explore during their MTH design process.

Personal MTHD journey

Because MTHD asks for an attitude change in designers from human-centred to MTH (Forlano, 2017) and is about becoming with (D. J. Haraway, 2008), the journal is not a prescriptive method. It is meant to make the user explore MTHD practices and trigger them to think about how they should implement them.

10.4 FINDING STRUCTURE IN THE ENTANGLED PRACTICES

The map of chapter 8 was the starting point for the journal. With every effort to structure the contents I reflected on the

fact if it was a force fit or not. Because the practices are on different levels of abstraction I decided to let go of the structure in the map and place the practices on a scale from *thinking to doing* and create another category called *solutions*.

Entangled and structured

There is a need for structure to navigate through the practices. The biggest challenge was to present a clear overview of the practices that were actually entangled with the context of the project. Besides the *practices* other actors relevant to the project were: *examples from the experiments*, *places*, *materials* and *species*.

These elements were entangled with one another but are pulled apart for readability, inspired by Refunc (n.d.) (see figure 81). In the *Feral atlas* (Tsing et al., 2020) drawings of human-nature processes and the navigation screen show the entanglements (see figure 80). This inspired me to show different overviews of the actors (see figure 79).

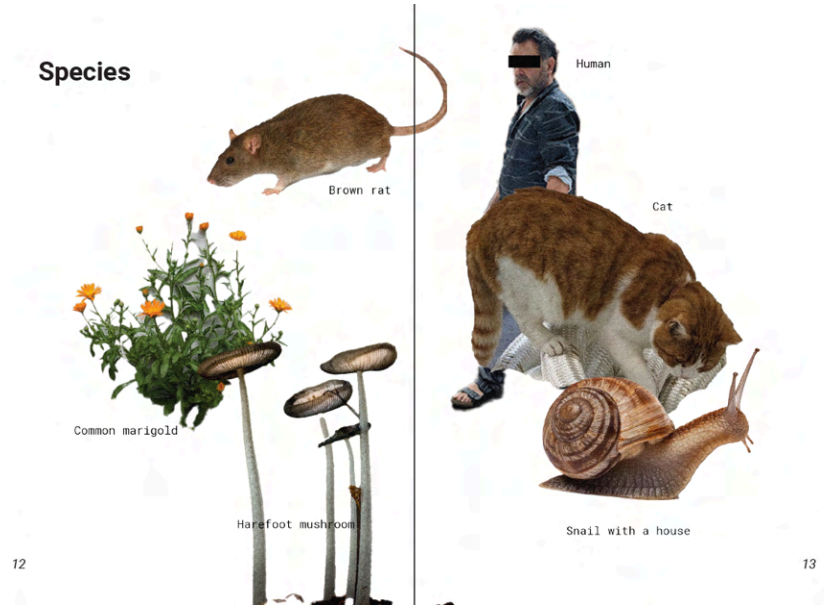


Figure 79. Species page overview

Figure 80. The feral atlas (Tsing et al., 2020)

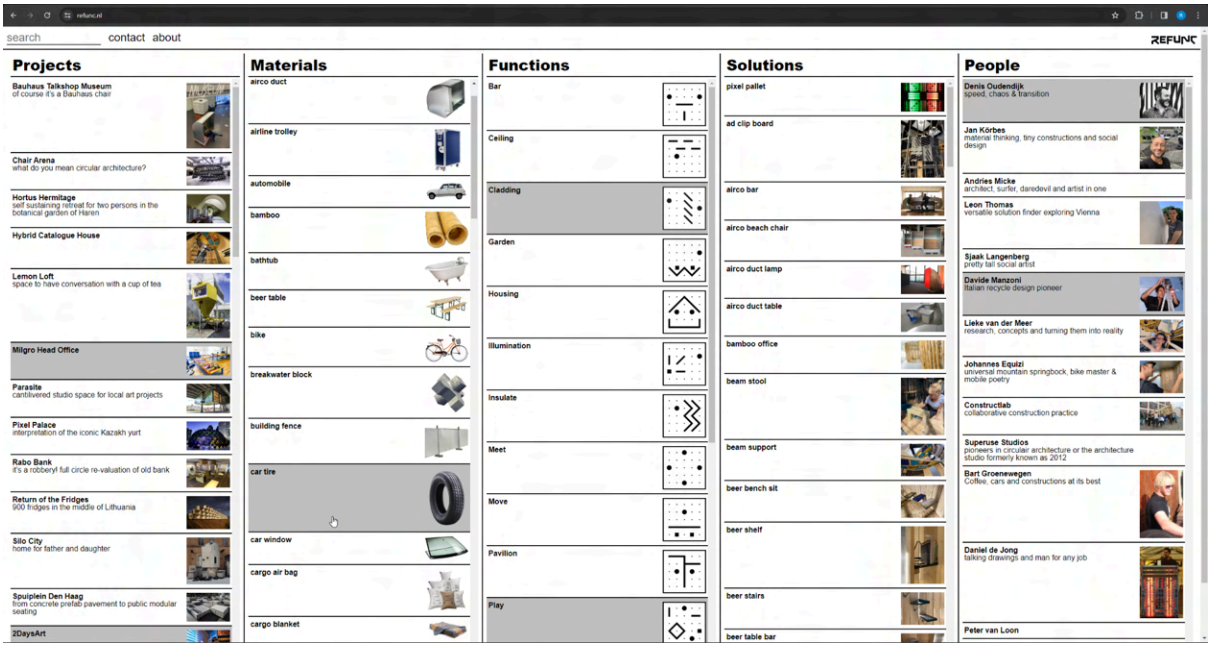


Figure 81. Refunc Feral Atlas.

10.5 INSPIRATION FOR A BOOKLET

A collection of guides and manuals with MTHD and design themes are used as inspirational resources.

Why a booklet
I considered multiple formats for the journal, because it is centred around the practices and text is needed to describe the practices, I decided to make a booklet. It could also take on the shape of an interactive website but I choose for the physical and compact appeal of a booklet.

Well designed books

A pattern Language (Alexander et al., 1977) shows an overview of typologies as does *modern housing prototypes* (Sherwood, 1978). I want the book to be easily browsable like *designerly ways of knowing* by Danah Abdulla (2022) (see figure 80).

The politics of design (Pater, 2016) and *Failed it!* (Kessels, 2016) use examples from multiple artists and designers that speak to the imagination. My journal is a collection of examples and experiences from this project, however references to other works might help people to be curious and explore more.

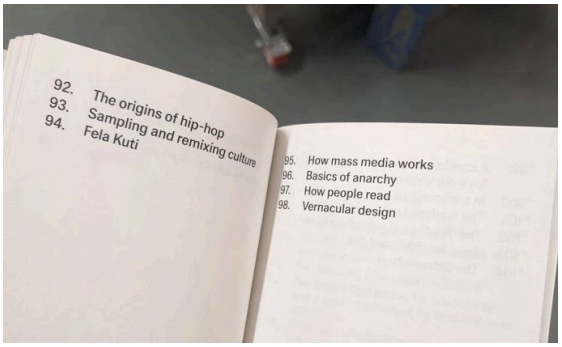


Figure 82: Designerly ways of knowing by Danah Abdulla (2022)

10.6 DESIGN GOAL & CRITERIA

The interaction vision and design goal support me in making the right design choices to align with the goals of the journal.
A list of requirements is used to design the journal and its contents. The list is composed from the previous insights mentioned in this chapter.

Design goal
I want the beginning MTH designers to get introduced to the practices of MTHD and feel inspired to experiment while starting a design project with local ecology.

Interaction vision
Kids building a waterway in the sea with their family.

Kids are not as self conscious as adults. They start playing and are not worried about their lack of knowledge or other insecurities about the end result. In the interaction the parent is thinking about the plan and what they have to do to get the intended result. You could see the journal as the parent with knowledge that allows the kid to play and see what works and what doesn't.


Figure 83. Kids building a canal.

interaction qualities
non-committal, low threshold, driven, inspiring and flexible.

Requirements #1

1. *Introduction (with an activating message)*
2. *Visual source materials (for concrete examples)*
3. *Structure (so you know what to find where)*
4. *Simple interface (to make use accessible)*
5. *Little text (it should be easy to take in, not too much to read)*
6. *Connection through topics (to display the entanglements)*
7. *References to external sources (for those who want to dig further)*
8. *A MTH book (a second layer, the book itself is a MTHD)*

10.7 THE JOURNAL DESIGN

The journal consists of 32 practices. Each practice has a short description of what it entails and some examples of the practice is implemented in the design process (see figure 82). In the beginning there are a few introductory pages to the journal and how to use it.

Find the digital version of the journal here!

See appendix 12 for an overview of some of the design choices made and annotated pages.

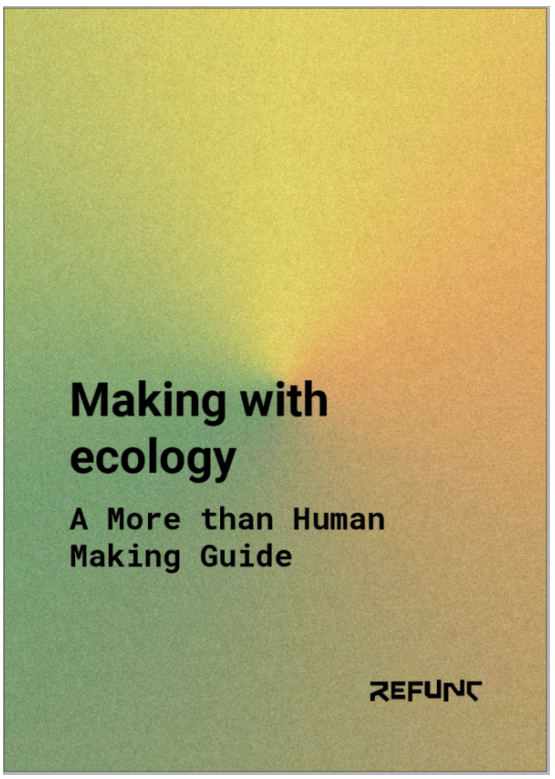


Figure 82. Some pages out of the journal.

Prototype limitations

The prototype itself does not align with requirement 8 yet, the final design should have a second MTH layer added. There are also few sources in the journal yet due to time constraints.

Practices

The topics in this book can be catagorised in multiple ways. In the order that you browse through the book they flow from thinking to doing followed up by some concrete solutions.

FROM THINKING TO DOING.

More-than-Human Basics.

1. Revitalise ecology [M]
2. Take a perspective [M]
3. Decentre the human [M]
4. Redefine relationships [M]
5. Focus on the entangled [M]
6. Design an intervention [M]
7. Exclude and focus [M]
8. Adress cultural baggage [M]

Designing and making.

9. Ownership over ecology [P]
10. Aesthetically interesting [R]
11. Noticing entanglements [M]
12. Find affordances [O]
13. Material wispering [R]
14. Time and temporality [M]
15. Gleaning [R]
16. Play [R]
17. Slow down [P]

A growing practice.

18. Interdisciplinary collaboration. [M]
19. Reflective practitioner [O]
20. Embrace complexity, uncertainty and insecurity. [P]
21. Design the afterlife [R]

SOLUTIONS.

22. Make space [E]
23. From flora to fauna [P]
24. Human exclusion [E]
25. Connect green infrastructures [E]
26. Stimulate variation [E]
27. Focus on cuddling species. [I]
28. Autonomy for non-humans [P]
29. Biodiversity key species [I]
30. Lively materials [P]
31. Junk places [E]
32. Bits of ecology [P]

Every topic describes a practice, these practices are introduces into this project by different sources and backgrounds.

[R] Refunc
[M] More than Human Design
[E] City Ecology
[I] Nature Inclusive Design
[P] Personal
[O] Other

A bees vision shows markers where to find nectar.

3. Decentre the human [M]

To see all species (including humans) as equal.

After becoming aware of your human perspective, start looking at how allmost all design is human centred.

In many relations the human places themselves above other, leading to extractionalistic relations. We want to place ourselves back in the ecological system as an equal to other species.

Instead of creating something for humans first, look at ways to decentre the human in design. Look at ways to coexist with ecology and local species.

10.8 KEY INSIGHTS

The journal aims to make it easier to start experimenting with MTH practices. At the same time it shows the complexity and entanglement of humans and ecology in the city.

Design goal
I want the beginning MTH designer to get introduced to the practices of MTHD and feel inspired to experiment while starting a design project with local ecology.

Practices are accompanied by examples from this project, shown side by side. The examples in the journal support the general description of practices with a concrete execution of it.

It is not a prescriptive method but an open list of possible practices. The user can use the journal freely and pick whatever practice they want to implement. The practices are organised from *thinking to doing* and *solutions*.

The entanglements are shown through the species, things, locations and dates of photos taken.

After designing the journal I validated it with experts and the user in chapter 11.

10.9 DISCUSSION

I structured the contents of the book by feeling what feels intuitive and thinking of the interaction vision and use scenario. I think that the intuitive way of finding structure in the story led to the result that makes the most sense and I am happy I made decisions based on what felt right and didn't continue working with any force fits.

The process of the creation of the journal was quite individual. I found it hard to put my thoughts on paper and uncomfortable with sharing unfinished work. I expect that maybe better examples could have been used in the journal by involving others as co-designers sooner.

The interaction qualities are supposed to be experienced in the interaction with the journal. Since I have spent a lot of time working on the journal I am not sure if these qualities can be felt while using the journal.

To see if the journal really achieves what it is supposed to do I will be testing the journal with the target group (see chapter 11).

Chapter 11

EVALUATION OF THE JOURNAL

11.1 INTRODUCTION

Now that a prototype of the journal is created, it is next evaluated. The evaluation is done through two methods: *1. Feedback interviews with experts* and *2. Simulated use experiment with users*. This chapter gives an overview of the approach and results of these evaluation methods. The chapter ends with an overview of adjustments and recommendations for the final design.

11.2 METHODS

The final design is evaluated in the following ways:

1. *Feedback interviews with experts:* an ~ hour long interview with three experts on various topics related to the journal. Getting an expert view on the contents and reviewing the correctness and completeness of the journal.
2. *Simulated use experiment with users*: a max 2 hour experiment in which the users consults the journal in a design project followed up by a 45-minute long interview. Learning if the journal is achieving its design goal and people experience the intended interaction qualities and codesigning the next iteration of the design.
3. *Feedback graduation team:* the members of the graduation team give their initial thoughts on the contents and format of the journal.

All of these evaluation methods combined give insight into the use and effectiveness of the journal

Feedback graduation team

In a meeting the members of the graduation team got a physical copy of the journal and gave their first impressions. Later these initial thoughts were followed up by more feedback after reading/ scanning the journal more extensively.

Feedback interviews with experts

First the contents of the journal were discussed with three experts; Jaz Choi, a MTH professor, Petra van Leeuwen, a nature educator, and Jan Körbes from Refunc. The experts received a copy of the journal and gave their feedback on the journal and the topics that related to their expertise (see appendix 12). Since I was there to explain more about the journal we also had the opportunity to discuss the reasoning behind certain qualities of the design and consider alternatives.

Pilot test

Before testing the journal with the user, a pilot test was executed (see appendix 13). One participant executed the experiment and gave his feedback. Both the insights on the design and the test setup were used. After the pilot test some slight adjustments were made to the test setup.

1. The participant only thought of ideas he could execute himself in his chosen context because of the

wording I used. Instead of calling it a *'private design project'* I changed the explanation of the experiment to an independent project in the public space with a budget.
2. The feedback on the follow up questions after they finished the experiment was short, to get deeper into the reasoning behind the answers I changed this format to a final interview.
3. One of the interaction qualities was experienced as ambiguous therefore I changed the interaction quality driven to active.

Simulated use experiment with users

Next, 5 users tested the journal within a simulated context of use. They all received a journal and had a few days to get familiar with the journal and use it. The participants received some instructions for the experiment with the journal. They were asked to reserve no more than2 hours of their time to execute the experiment and record some interim feedback. The experiment was concluded with a ~45-minute long interview in which the users were asked for feedback on their experience and thoughts on design improvements. The conversations were recorded and later analysed.

All participants were a part of the target group of beginning MTH designers.

Qualitative data analysis

After gathering all of the feedback and insights through the multiple evaluation methods the recommendations and last design improvements are determined.

11.3 SETUP AND LIMITATIONS

In the feedback conversations with experts I was there to explain more behind a page, this meant that they got more information than the book showed by itself. I was aware of this fact and took note of the elements that I felt the need to to explain more about. These explanations were potential improvements to the design.

The context in which the journal was tested was a simulation of the real context. I asked people to execute this experiment for me instead of them using the journal on their own initiative. This might have led to different outcomes than when someone would get and use the journal by themselves.

I targeted people with some experience with MTHD because I imagined them to be interested in such a journal. In reality it might be used by someone with no experience or background and then it could be the case that it was not comprehensive enough for a novice. I am currently not able to evaluate this.

Due to the fact that the students had a deadline week, some of the participants had little time to execute the experiment and felt rushed. Not all of them sent interim feedback, I asked more questions in the final interview to compensate for the missing data.

11.4 DESIGN REQUIREMENTS

Some adjustments were made to the design requirements based on the feedback in the pilot test and the feedback from the graduation team.

Requirements #2

1. *The design should make beginning MTH designers feel inspired to experiment while starting a design project with local ecology.*
2. *It should introduce beginning MTH designers to potential practices of MTHD.*
3. *The use of the journal should feel: non-committal, low threshold, active, inspiring and flexible.*
4. *The design should be clear and understandable.*
5. *The design should show that MTHD is entangled.*
6. *The design should offer structure to use of MTH practices.*
7. *The design should show concrete examples of the MTH practices that are mentioned.*
8. *The design should be made with integrity and align with the practices and values of MTHD found in the project.*

11.5 EVALUATION RESULTS

The goal of the evaluation methods was to get a holistic overview of the use and context of use of the journal and see how the interaction with the journal aligned with the design criteria.

Use of the journal

All participants did a first scan or read of the journal and then started designing and choosing whatever practice caught their attention. One participant stayed within more-than-human basics while another gravitated towards the solution. The participants chose freely and flexibly what they wanted to use. Two participants brought the journal to the location that they were designing an intervention for.

One participant improved on his design by going over the more-than-human basics multiple times; he used the journal to iteratively validate and improve the MTH qualities of his intervention.

1. Inspired to experiment

All participants mentioned that the journal helped them know what they could do. Four participants chose the practices that fit with their intentions and location (see figure 83). Due to the time constraint they only made little sketches but the concepts were workable and could be placed in the environment. Their attitude toward the concepts showed that they were curious to witness changes in human-ecology relations when placed in the urban context. The examples in the journal were experienced as inspiring.

'I really enjoy the examples, it immediately makes me think.' - Rosa

'My intervention has multiple phases, over time the area changes to a nonhuman-centred use.' - Lesley

2. Introduce practices

All participants said that they thought the journal was complete and a good introduction into designing with ecology. They liked having everything in one place and short and concise descriptions of practices .

'It gave me a compact overview of what I know of MTHD' - Casper

'I think the glossary is great, it is a helpful introduction for everybody' - Sander

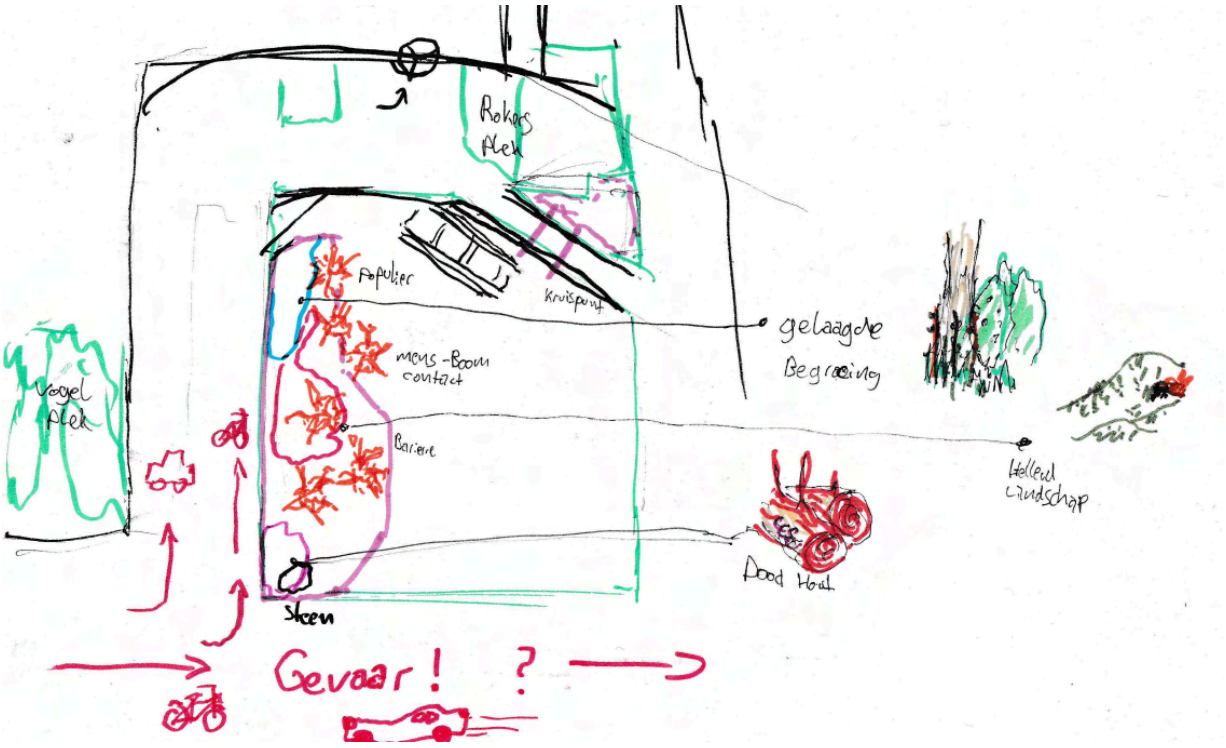


Figure 83. A sketch from a participant.

3. non-committal, low threshold, active, inspiring & flexible

Most of the interaction qualities were experienced as intended. These qualities were chosen to support the design goal. The fact that people experienced the use of the journal as something low threshold, non-committal and inspiring helped them to actually apply the practices instead of just reading about it. People suggested that it could be a more active experience if the journal came with a workshop or assignments.

One person was overwhelmed by the amount of information. She felt a bit stunted and experienced the use of the journal as intimidating as a result. Others had no issue with choosing the practices that fit their project and appreciated the flexible nature of the journal.

'I Let the wind choose the page.' - Hannah

'I just read it once and then I used some practices' - Casper

4. Clear and understandable

Three participants asked for more specification around the use of the journal. They wanted to know how they should use the practices and where in the design process.

People also mentioned that they would want more direction (less flexibility) on how to apply these practices. *Practice 8. Address cultural baggage* is accompanied with a question, this was given as an example of something that would help to know what to do already.

Refunc was introduced quickly, one participant asked for more of an introduction into their methods.

'I am a person who likes reading guides.' - Casper

'You mention Refunc's methods, what are they?' - Sander

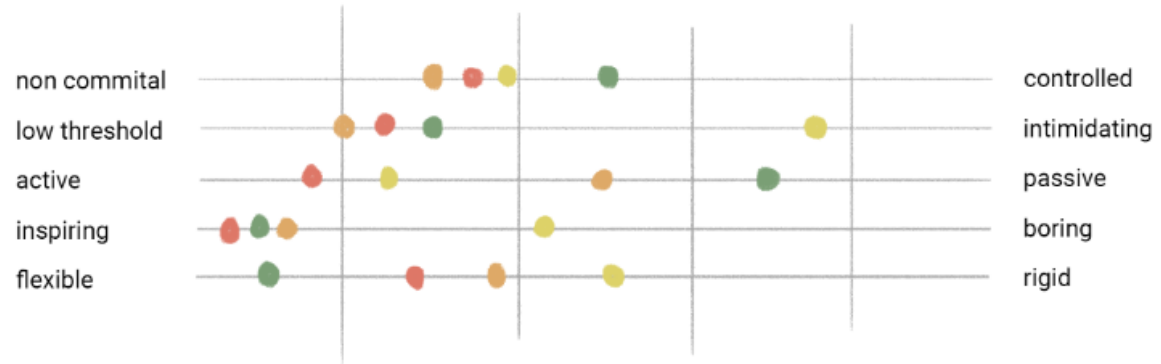


Figure 83. The experience of the interaction qualities

6. Structured

People found that the practices worked for them, two people used the structure by using practices from a specific section. One participant stayed in the *more-than-human basics* and another mainly looked at the *solutions*. Everybody appreciates the side by side of practice and example. The transition from doing to thinking was experienced as vague to two participants, they did not understand what the subsections ment.

'I didn't do anything with the bigger structure.' - Maarten

'It started with principles and became increasingly more practical'- Rosa

7. Examples

The examples are experienced as useful, and work activating. One participant mentioned that many of the examples are in the beginning of the design process, leaving them to wonder what an intervention with some of the practices would actually look like.

'It is hard to make it a real design project instead of a landscaping recommendations' - Casper

'The examples give a little push to start making'- Rosa

Struggles with MTHD

The participants mentioned multiple barriers they felt during their MTHD practice.

1. Not being able to fully decentre and having a holistic overview was experienced as frustrating.
2. There is not an actual prescribed methodology that makes it hard to know how to create MTHD design.
3. It is hard to translate the MTH philosophy to something concrete.
4. A lack of knowledge about other species.

Even though they all expressed that they experienced these barriers they still came up with a design except for one participant that felt overwhelmed.

The fact that they had to come up with a design for the evaluation might have influenced them to start designing faster but it also shows that they found enough support to create an intervention which could be made and tested next.

11.6 FEEDBACK FROM EXPERTS

General feedback of the experts is to add sources within the guide, these were missing in the previous version. Another element that came up in all discussions with experts is the naming of things. Both Jan and Petra were inspired by the title of the journal. Jaz recommended to change nonhuman to other-than-human because it creates less of a division.

2. Introduce practices

All experts were satisfied with the practices in the journal and did not express that anything was missing in the practices. Except in *practice 2. Take perspective*, Petra was missing the list ecologists use to empathise with ecology; food, hiding, procreation, connection.

'I miss the 5 v's' - Petra

Practice 15. Caring is too advanced, Jaz explained that curiosity comes before caring. To form a relationship of care one must be curious.

4. Clear and understandable

Sander explained that he would like a more explicit introduction of the journal.

'It could use more explicit introduction about the who-what-where of the journal.'- Sander

8. Integrity

In my conversation with Jaz the topic of my place in the journal was discussed. Jaz wanted to see more of me in the journal to contextualise where the information comes from. The journal was called a more-than-human making guide. Which made it sound like this is how you have to do it. Instead the word journal would show that my experience is central. I wrote that we do not impact ecology negatively and Jaz recommended me to refer to indigenous knowledge as an alternative.

I thought the notion of cuddling species is problematic, where does it come from? - Jaz

'I can see quite some depth in your journal.' - Jaz

7. Examples

Denis wanted to see more design examples because that speaks to his imagination.

During a feedback meeting with Refunc another student was also present. He is working on a MTHD project with a group and was happy to learn about the existence of this journal.

'This is amazing, this is exactly what I need!' - Refunc graduation intern

11.7 KEY INSIGHTS

The positive reactions of participants show that the journal is desirable, the fact that they have a compact overview of practices helps them out. One participant was overwhelmed with the amount of information and felt stunted because of the fact that they did not have a good enough understanding of ALL practices to start designing yet.

All participants appreciated the examples in the journal and all but one managed to come up with an intervention with the help of the journal.

The journal reaches its design goal of sharing practices and inspiring designers. The actual step to experimentation has not been made because participants had limited time.

In the next chapter the list of recommendations will be used to create the following iteration of the journal.

11.8 DISCUSSION

The journal has only been validated in a simulated experience. These students were not working on an actual MTH design project for themselves. To better evaluate the effectiveness of the journal it should be given to MTHD beginners during a project that they are working on or be tested in a workshop context with materials to create an intervention and set up an experiment.

The journal does not align with Refuncs preferences, it is more text heavy and many examples lack design and materialisation. To be adapted to Refuncs preferences more research should be done about the use scenario and Refunc.

To come up with more designs, more time should be spent designing and experimenting. This is a loop, the journal will grow with more practice and the practice will grow with the journal. It is valuable to share experiences and make it a co-creative practice and introduce other designers to the example and practice generation.

Chapter 12

FINAL DESIGN

12.1 INTRODUCTION

After the evaluation of the journal a final design was created. The final journal is a booklet consisting of practices and examples, the contents, use and materialisation are described in this chapter. You will also read about the prototype of the final design and insights along the way. The chapter is concluded with recommendations for further development of the journal.

Figure 85. The front cover of the journal.

12.2 THE JOURNAL

The prototype of the journal used in chapter 10 for evaluation, had some shortcomings. In the final design the challenges that could be solved in the timeframe of the project were adjusted. The changes consisted of *added contextualisation*, *Refunc materialisation* and *second use*, *better readability and structure* as well as *more instructions for the use of the journa*l.

Sharing the journey

Becoming with ecology involves looking at the interconnected co-evolving relations between humans and ecology and agency of species (Haraway, 2008). The journal shares my journey with urban ecology and supports others to go through the same process as me.

Figure 86. Using the journal.

Using the journal

The journal stimulates experimenting and shares tools to grow beginning more-than-human designer's practices. It is filled with 29 practices, examples of interventions.

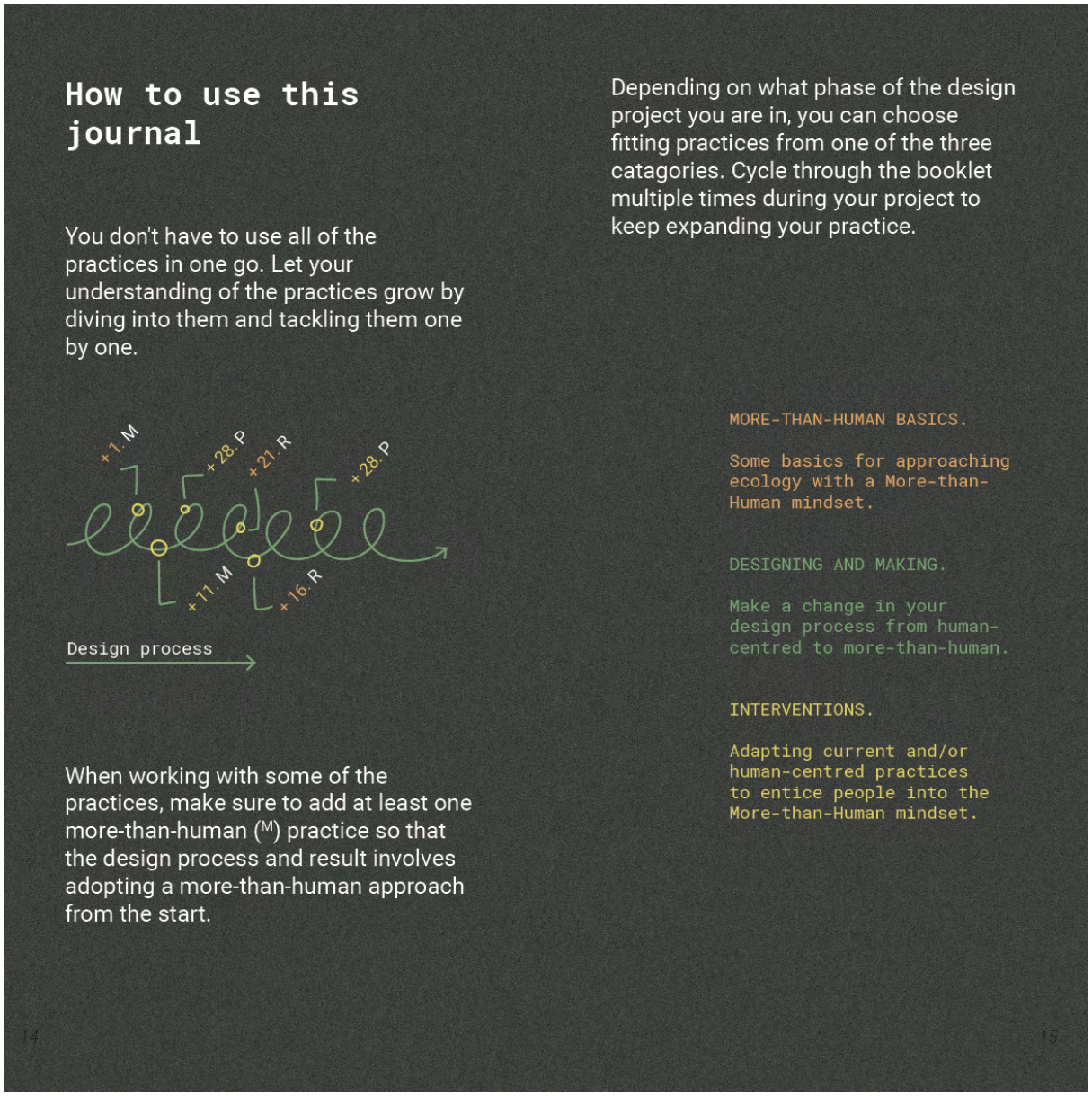


Figure 87. The use guide of the journal.

1. Orientate

Users shared that they wanted more explanation on how to use the journal and therefore this is added to the final design. There is still no prescriptive method of using the journal but a short reader's guide explaining where to start depending on where the user is in their design process. Added to the practices are activating questions to help the user move from reading to experimenting.

2. Navigate

The practices originated from this project and the knowledge shared by Refunc, more-than-human-design, nature-inclusive building and ecologists and are organised in three categories: more-than-human basics, designing and making and interventions. In the previous version the categories were more blurry but this didn't give enough structure to the user therefore these new categories were created.

3. Practice

They can be applied and explored one by one in a reflective and iterative design process. In the journal, the reflective nature of MTHD is supported in multiple places. In the introduction and last pages the user is asked to reflect on their personal practice and the implementation of these practices. In some of the practices, the activating questions ask users to reflect on their position and decentring process.

Figure 88. The species and materials.

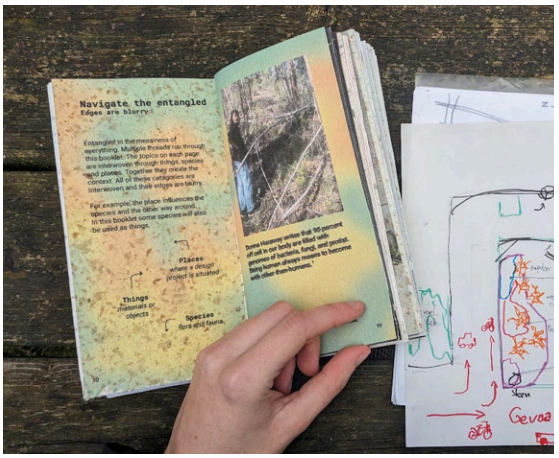


Figure 89. A page in the journal.

Find the digital version of the journal here!

12.3 MTH MATERIALISATION

The final prototype is made by hand with recycled, reused and lively materials. Allowing for the journal to reach a MTH potential and bloom after it is served its use of inspiring designers (see figure 90).

Figure 90. The journal is the size of a clicker brick.

Recycled, reused and function shifted

Practice 20. Design the afterlife is applied to the journal itself. The pages are made out of recycled or reused paper and the cover is made out of the previous iterations of the journal and native plant seeds (see figure 91). After the designer has mastered its contents, the journal can be planted and create space for ecology by itself.

Native and local seeds

The biological clock of the species in the north and southwest of the country are misaligned for two weeks. This would mean that the local bees do not get to feed on the flowers if they are not local. This fact is another valuable insight about the complexity of designing with ecology and gaps in knowledge that can only be solved by multidisciplinary collaboration and experimentation (see appendix fixme).

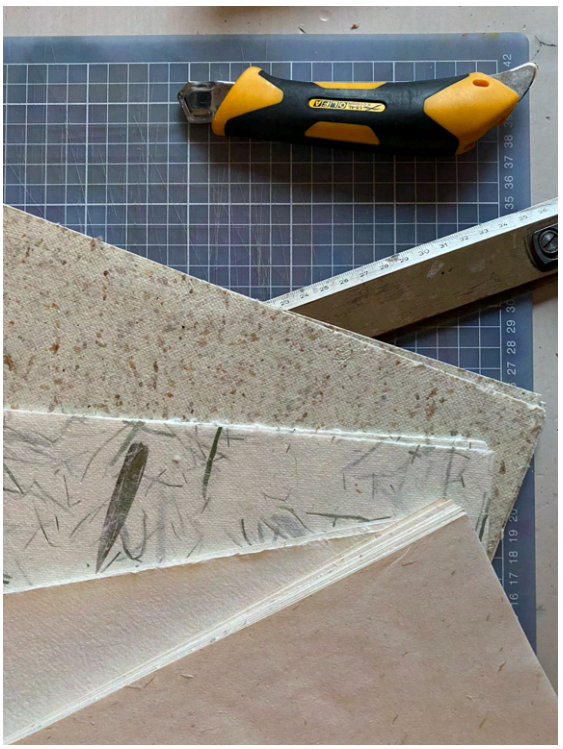


Figure 91. Types of paper used for the journal.

Figure 92. Making the cover.

12.4 JOURNAL QUALITIES

Some of the contents are presented differently after the evaluation. My personal experience is brought more to the front and the context of the project is represented more.

Personal decentring

Some practices like *24. Focus on cuddling species* do not align with the MTH mindset but are in the journal because they can help the MTHD agenda. I mention this friction within the practices (see figure fixme).

There is a little section added in the beginning that references to indigenous knowledge and the fact that this project is approached from a western perspective. It acknowledges that there are humans that have already established equal and just relations with ecology.

I added my details and an open invitation for people to reach out. To keep learning from different perspectives myself and allow others to share what they learned.

Contextualise

The user is given a short introduction to Refunc to get acquainted with their philosophy. In the glossary some of the MTH terms are explained. Species, materials, time and place are mentioned in examples to make the user aware of the entanglements. Sources to MTH literature and projects are referenced throughout the journal (see figure fixme).

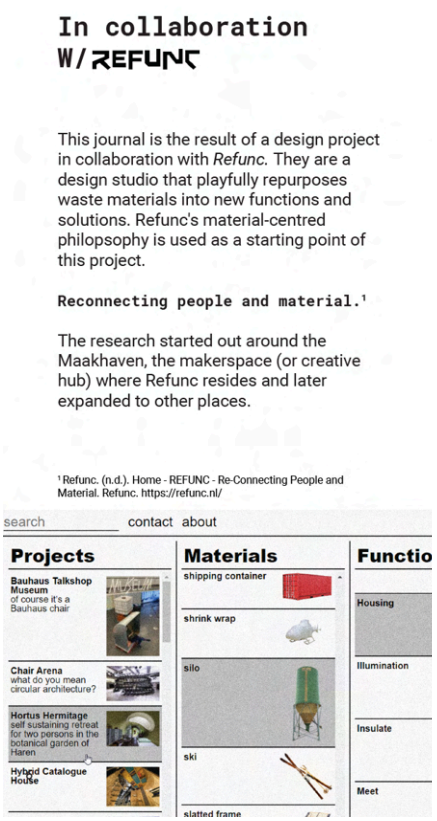


Figure fixme. Iintroduction to Refunc

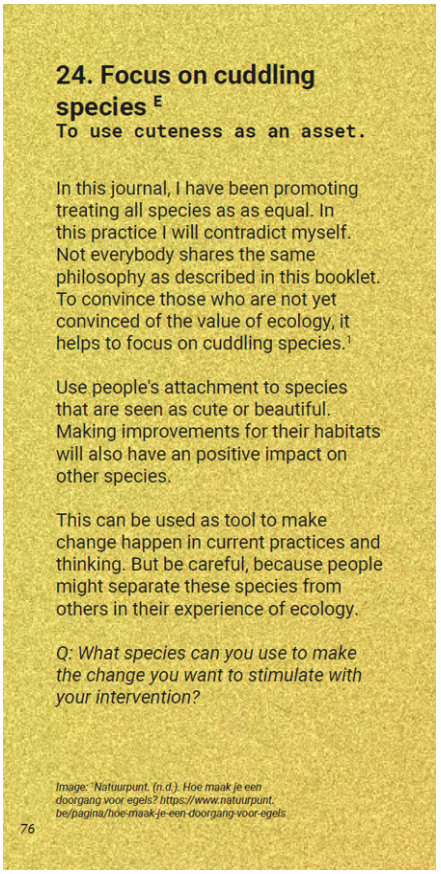


Figure fixme. A page overview

12.5 RECOMMENDATIONS

A design is never finished but this project almost is. Not all valuable insights from the final evaluation have been incorporated in the final design. The list of practices and examples that can be added to the journal will grow as long as I (or others) keep exploring how to design with MTHD urban ecology. Further recommendations for the journal are:

Materialisation
No testing has been done to see if the materials used are safe for ecology. In future material consideration it should be researched what materials have the right impact.

A website could also be made as a digital version of the journal to reach more people and have more flexibility in adding examples and practices.

Modular use

I would recommend exploring a modular format of the journal to improve the playful interactions with the booklet and better usability in group settings.

Specie profiles
A challenge in designing with ecology is the lack of understanding of other species. Adding dungeon and dragons type profiles for species (or even entanglements) could help the user to combat this first gap of knowledge.
I recommend looking at the master thesis *Eco-urban futures* (Nam, 2023).

Assignments
Instead of activating questions some assignments or workshops could make the materials way more experiential. The handbook made by the Resilient Designers (2023) is a good example.

Validating more-than-humanness
There is little focus on the validation of interventions, users do feel a need for this. Long term experimentation and research into the effects of interventions should be done to establish a roadmap of MTH validation.

Materialised examples
Because I stayed in the explorative stage of the design process I had little actual designs as example and a lot of research activities. Refunc prefers to see more actual designs to be added. similarly, using more concrete examples in the description of practices can make it even easier to think of activities and interventions directly.

Shared practising

Everybody that goes on their own journey with MTHD has their own practices and examples to share. Social media and physical meetups could be used to connect practitioners and expand the journal of my experience to a shared journal of many.

VI. KEEP ON PRACTISING

Chapter 13

CONCLUSION

13.1 INTRODUCTION

The project is finalised with conclusions about the general method, the addition of MTHD practices to Refunc and the journal.

13.2 MORE THAN HUMAN DESIGN WITH URBAN ECOLOGY

What methods, tools and knowledge can support designers in designing with MTHD urban ecology?

MTHD is grounded in interdisciplinary works. In this project designing with urban ecology is approached in a similar manner. Practices from the fields of more-than-human-design theory, Refunc, nature-inclusive building and ecologists are combined to create designs with ecology. In this project, I collected 29 practices in total which are combined into a journal:

1. Revitalise ecology 2. Take a perspective 3. Decentre the human 4. Redefine relationships 5. Focus on the entangled 6. Design an intervention 7. Exclude and focus 8. Address cultural baggage 9. Not your ecology 10. Aesthetically interesting 11. Noticing entanglements 12. Gleaning 13. Find affordances 14. Material whispering 15. Time and temporality 16. Play 17. Interdisciplinary collaboration. 18. Embrace complexity, uncertainty and insecurity. 19. Design the afterlife 20. Make space 21. Human exclusion 22. Connect green infrastructures 23. Stimulate variation 24. Focus on cuddling species. 25. Autonomy for non-humans 26. Biodiversity key species 27. Lively materials 28. Junk places, 29. Bits of ecology

This list of practices is the start of an ever growing list of practices. The practices are derived from working with material-centred design agency Refunc, as well as from designing with urban ecology and practices obtained through design experiments.

13.3 APPROACH OF EXPERIMENTATION

What opportunities and challenges did I, as an educated designer, experience during the project?

In this project experiments consisting of designing and prototyping activities are used as knowledge generation tools. This approach effectively obtained multiple practices and insights.

As a novice practitioner it was scary to dive into a new way of designing with little knowledge and expertise. But there were also barriers that led to design paralysis and less actual design results.

There can also be a lack of knowledge and understanding of ecology and its complex entanglements. A practice that can combat this is to apply multidisciplinary

collaboration with all sorts of experts of ecology to learn more about the things you don't know.

If there is enough support to take the risk of playing it can be a great method to explore and come up with new meanings of things (D. J. Haraway, 2008). The felt pressure in this project obstructed my ability to play and prevented a process of playful and open decentring of the human.

The journal is created in order to prevent these challenges from overwhelming designers.

In the materialisation of a design with ecology a lot can be learned from Refunc. The practice of play allows designers to find new MTH functions for materials. In the case of more-than-human experimentation the question is what affordances materials can have for what species and what species need.

Designing with ecology is complex because of the fact that it is an continuously changing system of entanglements. The interventions in this project served the purpose of helping me become acquainted with the practices needed for a valuable design process. For a detailed understanding of the effects of an intervention a project needs to find place on a longer timescale in which effects can be noticeable.

13.4 CHALLENGES IN REFUNC'S ADOPTION OF MTHD

What opportunities and challenges presented themselves in the adoption of MTHD for Refunc?

First of all, Refunc decided to work with me to learn more about MTHD. Along the ride, I have shared bits of information that can help Denis on his own journey. The lack of materialised interventions in this graduation project is a challenge because for Refunc the question *"How to make a MTHD intervention?"* is not answered directly in the format of a detailed design. I had to explore the how-to questions further. Refunc's taking on the MTH human perspective also runs into the issue of a lack of knowledge about the intricacies of ecology. Co-designing already happens at Refunc, this is to be extended to multidisciplinary collaboration in all stages of design to learn what species need and how the design affects them.

To make space for ecology in projects, Refunc's repertoire of materials needs to be extended with lively, porous, hydrofile and textured materials that can allow for change, growth and decay. Previously not present in Refunc's periodic system, MTH clients need to be added to come up with functions for other-than-human species.

Currently whenever Refunc places a project it is finished. Most of the learning and becoming-with-material happens during the making process (Haraway, 2016). This asks for a change in attitude first of all, by seeing a design as an intervention that is ever changing. Following, to design with ecology they need to start listening to the MTH clients and observe the effects of the intervention.

13.5 A (NEVER) COMPLETE JOURNAL OF PRACTICES FOR DESIGNERS OF URBAN ECOLOGY

MTHD is an emergent field and methodology being developed as we speak. This journal adds to the discourse and materials currently out there. The practices and experience collected in this project created the contents of the journal. It supports novice designers' with practices and examples to start designing with MTH urban ecology. It allows the designer to explore their MTH practice iteratively and stimulates experimentation. It not only shares practices to create MTH design but actually has a second life itself in which it makes space for ecology and the agency of ecology. To validate the effects of the journal further it needs to be evaluated by the target user while using it in an actual design project.

Chapter 14

REFLECTION

In this project I wanted to come up with tangible examples of MTHD. During the project this aim changed from examples to the journal. I think that two things influenced this result. On the one hand I felt the need to have more to hold onto during my design process and on the other hand I just do not feel as comfortable in making practices.

This project was quite challenging for me. I often felt overwhelmed with the complexity and insecure about intervening in a system that I didn't know enough about. I am happy to say that I am proud of the journal I produced in the end. I hope I can help other designers on their more-than-human design journey. I am sad to say I have not been able to playfully design and prototype as much as I would have wanted too. The pressure of graduation took away a bit of my ability to enjoy it as much.

One of my goals for this project was to gain more confidence as a designer and I can say it has given me this. Now that I have finished my thesis I feel ready to use my own journal and start coming up with designs!

I feel like I have learned a lot but I also feel like I am still a novice at working with ecology. My fascination for the more-than-human still stands. And I am hoping that I will find ways to explore the practices more in a context with less pressure.

I will keep exploring the more-than-human!

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