APPENDIX

SUPPORTING GREEN URBAN INITIATIVES IN LOCAL BIODIVERSITY IMPROVEMENT.

CONTENTS

A - PROJECT BRIEF

Personal Project Brief - IDE Master Graduation

TU Delft

Supporting green urban initiatives in addressing climate challenges — project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date 08 - 11 - 2021 — 08 - 04 - 2022 end date

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

The last few years, climate change has become more visible in people's daily lives. Warm and dry periods cause heat stress and drought and extreme downpours result in flooding's. Especially cities, with their abundance of pavement and buildings that prevent water from draining and keeps heat contained, are facing the challenge of creating resilience to climate change. An interlinked problem with these issues is the biodiversity crisis, for which cities are becoming more responsible as the built environment is expanding.

Urban nature is being recognised as an important factor in tackling these climate-related problems in the city. Green areas have the ability to absorb rainwater and act as a buffer during heavy rainfall and as a reserve for periods of drought, as well to reduce environmental temperatures. They also contribute to climate-mitigation through carbon sequestration and storage in plants and trees. One last important role to mention is the increase of the urban biodiversity-rate. If urban nature forms strong ecosystems, they form an inviting living and foraging environments for plants, pollinators and small animals. The importance of urban green areas as so-called Nature-based Solutions (NbS), have been recognised in policy developments of cities like Rotterdam, the Dutch Green Deal 'Nieuwe Stedelijke Natuur' and by the EU Biodiversity strategy.

Another trend currently taking place is the participatory turn in cities. Citizens take more and more initiative in shaping the city and get more involved in the design of their direct living space. This trend also applies in the field of urban nature, which is referred to by the socialization of nature (Aalbers et al., 2018). Urban residents that have a desire for green areas close to home, take action themselves to realise this ambition. They set up an initiative with like-minded neighbours to remove the tiles in the street and replace them with plants and trees, or to create a small park or communal garden in the neighbourhood.

This trend is not only recognisable from the bottom-up, but also top-down stimulated by regulations. The municipality of Rotterdam has introduced a so called 'zelfbeheer'-policy, in which they provide subsidy and information to citizens who are interested in taking on the management of areas originally maintained by the municipality. From facade gardens (voorgeveltuintjes) and tree grates (boomspiegels) to areas of wasteland and public gardens. Furthermore, there are intermediary organisations that support citizens initiatives by helping them in realising their green idea. Examples are national organisations like IVN and local organisations like Groengoed, Rotterdams Weerwoord and Tussentuin in Rotterdam.

As the initiators have the intention to make the city greener and an affinity with their living environment, these initiatives have the potential to contribute in tackling the beforementioned climate-related problems in the city. But factors might limit this contribution, depending on the background, intentions and social network of the initiators. The process of designing these projects could therefore be optimised. There might be a knowledge gap that could be bridged, like which plants should be chosen to create a stronger ecosystem, rather than choosing plants that are the most appealing or familiar. Or a need for a change of perspective or stimulus, like seeing the perspective of insects have a need for limited distances to be able to move between living environments, instead of setting up the green areas as green 'islands'. Or the process could require more long-term planning and envisioning, as research has shown that green initiatives can be more effective if they set an explicit goal in the beginning of the project (Arjen Buijs et. al., 2019).

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introduction (continued): space for images

image / figure 1: Green street initiative (https://duurzaam010.nl/verhalen/groene-golf-door-het-oude-west)

image / figure 2: Communal garden initiative (https://tussentuin.nl/tuinen/oeverloos)

Personal Project Brief - IDE Master Graduation

TU Delft

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

As explained in the introduction, green urban initiatives have the potential to be valuable contributors in the battle against climate change, but their contribution can be improved. The main question that has yet to be answered is therefore:

How can urban green initiatives have a larger contribution in addressing climate-related problems at a city level?

This carries the following sub questions:
1. What are contributary factors of urban green projects and urban nature in battling climate change?
2. What are limitations that cause initiatives to leave opportunities unexploited?

This requires knowledge about the great variety of green urban initiatives and their potential contribution, as well as an understanding of the target group regarding these limitations.

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, ... In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

Design a toolkit that helps green urban initiatives in their design process to make a larger contribution to the climate challenges in their local context.

Supporting research should be carried out prior to the design. To find contributary factors, an exploration phase should be initiated. This phase could include gathering information on urban ecology and urban initiatives by interviewing experts and literature exploration, and should include a brief but broad analysis of the great variety of examples of urban green projects.

To find limitations, more extensive research should be done to achieve a high understanding of the target group, the context, the design process they go through and their latent needs and motivations. This should include literature exploration, interviewing the beforementioned intermediary organisations and field-research in the target context. This target group will be confined to people that are actively involved in green urban initiatives in the city of Rotterdam.

The result of this research should be translated through the design of a toolkit that helps the target group to increase the contribution of the green area that they create. It should be applicable during the design process that the citizens go through in order to realise their initiative. The toolkit should be presented in a form that suits the target group and context, and could possibly encompass multiple tools that are applicable in different stages of the design process to achieve different goals.

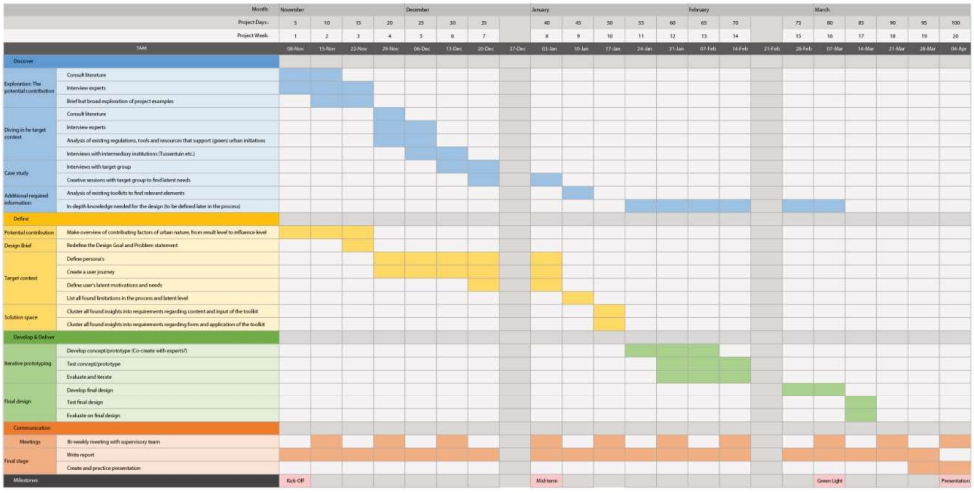
Initials & Name J Luijten Student number 4287223

Title of Project Supporting green urban initiatives in addressing climate challenges

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date 8 - 11 - 2021 8 - 4 - 2022 end date



The Gantt chart above shows how this graduation project will be executed. The activities that will be executed during this project are categorised as Discover, Define, Develop & Deliver activities, as used in the double diamond methodology developed by the British Design Council (designcouncil.org.uk). The activities will, however, take place parallel to each other, in an iterative process. That means that the bigger blocks of colour, represent the continuous cycles of iteration that the activity will be exposed to. For example, a user journey will be tweaked according to insights that were obtained during Discover-activities, and in turn will also influence the direction of the Discover-activities, which will give insights that will help develop the user journey etc.

The exploration of example projects is meant to be broad, and should give an overview of possible contributions on a scale of abstraction; from result to contribution level. This could include projects like food forests (designed as strong ecosystem with an optimized biodiversity-level) and projects mentioned by literature related to Nature-based Solutions (which show successful aspects of climate-adaptation), for example through the Urban Nature Atlas. Around 30 projects should be explored, through literature and possibly expert-contact. This should give a basic understanding of all possibilities regarding urban nature.

The case study will be a more in-depth study of around 3 projects in the target context. On the result level, the projects can be compared to the overview of potential contributions to see success-factors and which contributions are unexploited. This provides a starting point for defining limitations. The main focus of the case study should be on the process- and latent level, through interviews, observations and possibly creative sessions.

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, ... Stick to no more than five ambitions.

In my Reflection on Design-essay, I wrote: "My goal is to design for the earth, by designing for people. To give nature space, [...] I want to make a humble contribution in bringing nature and human back into balance."

Now I realise that this is about designing for the nature-inclusive transition, towards a society in which people are finding ways to live with nature instead of next to nature. Or as David Attenborough phrased it so nicely in A life on our planet: "to move from being apart from nature, to being a part of nature once again". It means to recognise that nature's role is intertwined with that of humans, as a stakeholder of society.

In my Manage your Master essay I wrote the following dream job description: "One of my biggest interests and a common thread through my life is the connection between human and nature. Up till now, I did not find any job opportunities in this direction, but the world has only started in its search for ways to create more balanced and greener conditions. Therefore, I hope that somewhere in the future I will find (or create) a job that combines my skills with this interest. A job where I can use my skills in interaction design to research and design the way humans interact with nature. To create a more positive and greener living experience."

This graduation project gives me the great opportunity to explore my interest in the human-nature interaction. It gives me the change to prove myself and others what design can contribute in the field of the transition to a nature-inclusive society.

As for personal learning ambitions, most of them evolve around my struggle with perfectionism, which is both a curse and a virtue. It can benefit finalizing results, but it often hinders the process leading to those results. Challenges I want to approach during this project are:
- Get into contact with experts before I have read everything I can find about the topic of his or her expertise.
- Present not-nearly-finalized results in the process to my supervisory team so they can help me improve.
- Doing field research and/or facilitate a group session and feel comfortable with the uncontrolled nature of the interactions in these activities.
- Having fun and celebrating milestones instead of focussing too much on things I did wrong

Lastly, I have the ambition to practice interviews, sessions and other forms of social contact with user and experts, as I would like to broaden my experience with this for my future career.

FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

This project will done in collaboration with the Participatory City Making Lab of the Industrial Design Engineering faculty.

Initials & Name J Luijten Student number 4287223

Title of Project Supporting green urban initiatives in addressing climate challenges

B – CASE STUDIES TARGET GROUP

Introduction

Three case studies were done to get to know more about the target group.

Approach

Set-up
Three citizens that are active in three different initiatives in Rotterdam were interviewed. Due to contextual factors, different approaches had to be taken.

Case study 1
An interview was done through creative methods. The participant was asked to create a timeline of the process so far and sociogram of all the people involved in the initiative. These methods were used as a base for further questioning. Audio was recorded. A site visit was conducted later on.

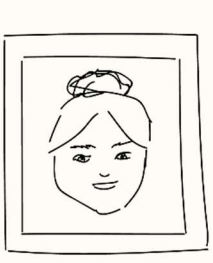
Case study 2
The interview was done on site and combined with a guided tour by the initiator.

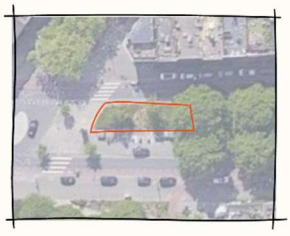
Case study 3
The interview was done on site and combined with a guided tour by the initiator. Audio was recorded. This interview was followed up by a second visit later on.

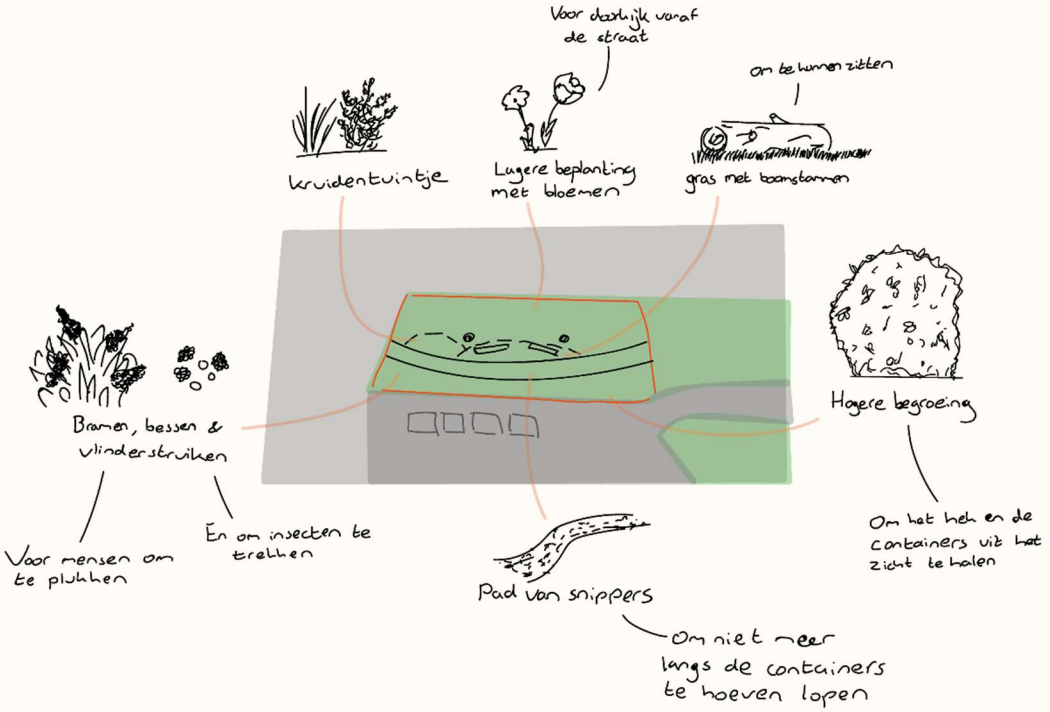
Analysis
The information gathered in the interviews were visualised through a timeline and sociogram, as well as the elements that formed the initiatives. The transcripts and visualisations where later used to formulate insights.

Results

Case study 1






Voor dagelijk verval de straat
Om te kunnen zitten
Kruidentuintje
Lagere beplanting met bloemen
gras met boomstammen
Hogere begroeing
Bramen, bessen & vlinderstruiken
Voor mensen om te plukken
En om insecten te trekken
Om het heh en de containers uit het zicht te halen
Pad van snippers
Om niet meer langs de containers te hoeven lopen







DOOR JAC
GESPOT!
JAM POT
SOEP POT
DAN WIN JIJ DE
JACKPOT


This project evolves around the transformation of a public green area of about 125m^2. I will write a short summary of the project, where they are in the process, how it started etc.

People involved and group dynamics

There are around eight people involved in the initiative. The level of engagement and the way in which they are involved differs. The initiative is mostly lead by two enthusiasts, one of them delivering a lot of creative input and the other brings in structure and documentation. This specification of a role applies to the other people involved as well. Everyone makes a specific addition to the cumulative, in terms of: knowledge on plants, experience in gardening, actual gardening tools to work with, know-how on creating a feasible budget, skills in organisation, connections with people and organisations, and awareness of the available funds or subsidies and through which channels to tap into them.

- ➔ Insight: These people collectively own a considerable set of skills, knowledge, resources and confidence. They are aware of each others competences and make use of them to benefit the project.

Approach

The way in which this group approaches this initiative is very much project-based. Besides the actual gardening activities, which they mostly plan together, but sometimes do individually, they hold regular meetings in which they discuss their plans and visions. The way they designed the garden is step-by-step. Starting with a brainstorm with lots of different ideas. After this, a map was drawn to visualize the different hights and plant categories, accompanied by a project-plan that contained an explanation of their vision and framework conditions (like; it should be safe for children, or no poisonous plants). This project-plan was required to apply for a subsidy and they used a tool from Opzoomer Mee for this. And lastly, they made a scheme of the borders they are going to create, containing the amount of which exact types of plants they will buy and for what cost, and also providing information on when they should be planted and their required maintenance. The specific types of plants are chosen based on factors like the amount of sun they will get, their full-grown size and height and the amount of water they need. A tool provided by the Intratuin is used for this, and also the knowledge from the group members who have a lot of experience and plant-knowledge.

This structured way of working might partly be adopted because the format of the project requires this, but is possibly mostly caused by the mind-set, experience and abilities of the initiators.

Relationship with urban nature and biodiversity

As mentioned before, the initial drive to start the transformation of this green area was to cover an unpleasant sight, and had not so much to do with a motivation to contribute to urban nature. But the brainstorm they held in the beginning made them aware of the possibilities of having a positive impact on their neighbourhood, regarding people and nature. They realised that they could transform the monotonous look of the shrubs that the municipality planted, to a more inspiring place. Examples of ideas were to plant edible herbs and fruits, to add plants that are interesting for pollinators, adding a pond which would benefit water-containment and would have added an additional biotope to benefit different species, creating compost and adding educational signs near the plants to educate children in the neighbourhood. Not all of these ideas made the cut to the final concept. The final design decisions were mainly based on aesthetics and the experience it evokes for people. The vision of creating a positive effect for nature, came back in the decision to create a specified area for plants that attract pollinators. The elements were chosen because they felt doable and not too far out of the comfort zone of the initiators. The ideas from the initial brainstorm have not been disregarded

completely however, but might be revised in a later stage of the process, when the first obstacles are overcome and a stable result is realised.

- ➔ Insight: The motivation to increase biodiversity can take place as a vision of creating a place with a positive effect on animals. This motivation is not necessarily reflected by the actual decisions and actions taken, as it can get overshadowed by different needs and desires.

C – EXPERT INTERVIEWS

Approach

Semi-structured interviews were conducted with three people who are involved with the target group

Result

Below follow the summaries of the three interview-outcomes

Stefan Herwig

Volgens Stefan zijn de meeste mensen zich wel bewust van de problematiek rondom biodiversiteit en klimaat en willen de meeste mensen daar ook wel graag iets tegen doen als ze dat kunnen. Niet iedereen is alleen volledig op de hoogte hoe.

Hij omschrijft een aanpak op ecologische wijze. Dit vergt volgens hem een andere manier van kijken naar groen, waarbij loslaten van controle en meer aandacht voor observatie een belangrijke factor zijn. Als verschillende actieve betrokkenen niet hetzelfde perspectief hierin delen, kan er frictie ontstaan. Voorbeeld: Twee mensen beslissen samen over de inrichting van een voorgeveltuin. De één heeft een associatie met groen vanuit de controle van de mens, netjes en georganiseerd. De ander is zich bewust van de natuurwaarde van de dingen op hun beloop laten gaan en ruimte bieden voor natuurlijke ontwikkelingen. Hoe komen ze dan samen tot beslissingen en welke beslissing maken ze?

- ➔ Insight: Een stedeling kan meer biodiversiteit creëren door op een ecologische wijze te tuinieren. Hiervoor moet de stedeling een omslag maken van de neiging om in te grijpen en controle te houden naar het loslaten van controle.
- ➔ Insight: De houding tegenover biodiversiteit zal bij de meeste mensen nagenoeg overeenkomen met het volgende; men is zich bewust van de situatie en is bereid een positieve bijdrage te leveren. Handelingen en keuzes kunnen echter verschillen, afhankelijk van het perspectief dat ze hebben over groen.
- ➔ Vraag: Wat houdt ecologisch tuinieren precies in? Welke verandering moeten mensen maken? In begrip/perspectief en in handelen?
- ➔ Ontwerprichting: Groepsgenoten met de neuzen dezelfde kant op laten wijzen.
- ➔ Ontwerprichting: Een nieuw perspectief bieden door te laten observeren.

Ian Mostert

Ian heeft me laten nadenken over de termen biodiversiteit en klimaatadaptatie, welke over het algemeen niet erg met mensen resoneren. Het zijn wetenschappelijke en abstracte termen. Waar de raakvlakken liggen, is in de effecten die ontstaan in de directe leefomgeving wanneer biodiversiteit of klimaatadaptatie wordt gestimuleerd. Bij de effecten van een hogere biodiversiteit heb je het bijvoorbeeld over; meer leven, meer beweging, meer kleur, en dus meer te zien en te beleven, het hele jaar door. Bijvoorbeeld, de wens voor veel bloemen, vlinders en vogels komt vaak terug, omdat de meeste mensen dat ervaren als een positieve toevoeging aan hun beleving van het groen.

- ➔ Insight: Motivaties om een hogere biodiversiteit te creëren, kunnen voortkomen uit een achterliggend bewustzijn over de problematiek, maar keuzes hierin hebben vooral te maken met de directe beleving en associaties.

➔ Ontwerprichting: Interesse *sparken* in biodiversiteit, door de focus te leggen op de beleving van het groen.

Eline van Weelden

Eline vertelde me over een participatieproject dat de gemeente is begonnen in Reyeroord, met als doel een vorm te vinden om samen ecologisch te beheren. Hieruit bleek het bewustzijn over wat je zelf kan doen, hoe je dat kan doen en de betekenis van ecologie onder de stedelingen nog vrij laag was. Er waren wel mensen met een groen hart, die bijvoorbeeld lid waren van een natuurvereniging, maar ze realiseerden zich niet dat ze dichtbij huis ook iets konden doen.

➔ Insight: Mensen die wel gemotiveerd zijn om iets voor de biodiversiteit te doen vanuit een achterliggend bewustzijn over de problematiek, hebben niet altijd de juiste kennis, ervaring of inspiratiebronnen om er ook naar te handelen.

D - ACTION ANALYSIS

Below follows an explanation of each action found in the action analysis.

Hemelwater afkoppelen

Disconnecting rainwater from the sewage system allows water to flow over the surface into the soil and helps to diminish flooding risks.

Regenton

A rain barrel keeps the rainwater that is disconnected form the sewage system for later use.

Natuurlijk onderhoud

Natural maintenance is a way of maintenance that allows more room for natural processes in which everything is interrelated. This results in a higher biodiversity.

Insectenhotel

Insect hotels contribute to a more healthy wild bee- and butterfly population in the city. These animals are responsible for 60% of the cross-pollination of our food-supply.

Kasten voor vleermuizen

Bat boxes provide a safe place to stay for bats, an animal species which can often be found in the urban environment as it provides a suited habitat for them.

Grindstroken

A strip of gravel or other types of permeable pavement like woodchips or an open paving pattern are ways to create a ‘paved’ surface that allow water to sink into the soil beneath it. This also provides room for a more natural soil life.

Neststenen en -kasten voor vogels

Nesting boxes and birdhouses provide a proper nesting-environment for birds. Bird species that breed in urban areas are often dependant on fixed nesting places in buildings. Nesting boxes and birdhouses and their placing should be specified to a specific bird-type.

Insectenbloemen

Flowers that are suitable for bees and butterflies provide the nectar that pollinators need. These flowers are often native species. They provide shelter and food for small mammals as well.

Takkenril

A wall of branches provides an environment for specific plant types and fungi to grow. It also provides shelter, nesting and hibernation possibilities for animals like insects, small mammals and birds.

Wildernismuurtje

A wilderness wall is created by placing stones or construction waste on top of each other. The space in between, as well as the sunny and the shadow side will provide a specific habitat for certain plant types, toads, salamanders and beetles.

Haag

A hedge provides shelter and a corridor to get from one place to another for birds and small mammals.

(regenwater) vijver

A pond or ditch acts as a buffer for rainwater and it supports the life of animals like birds, amphibia, and water-dependant insects like damselflies (waterjuffers) and dragonflies (libellen).

Rugstreeppaddenpoel

A natterjack toad pond is a pond specifically created to support the natterjack toad, a toad-species that survives well in urban areas. But it also supports other toad species and amphibians. The design contains a broad positive environment for the amphibians to reproduce.

Groene daken

A green roof can be created in different ways. They provide habitats for pollinators, birds and bats, but they also can be used to absorb rainwater and collect it for later use.

Bruine daken

Brown roofs mostly consist of sand and rock. They provide a habitat for specific bird types and insects. It also absorbs rainwater.

Waterdak

A blue roof is acts as a buffer for rainwater. This will have a cooling effect and can provide drinking water for birds, and a habitat for aquatic insects.

Groene gevel

A green façade has a cooling effect on the building and provides shelter, food and nesting possibilities for birds and insects.

Groene kademuur

Green quay walls provide habitats for wild bees and butterflies.

Ecologische oever

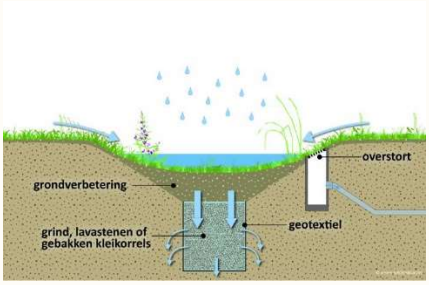
An ecological (river)bank is a way in which a (river)bank can be designed and maintained, so that it provides a high contribution to the local biodiversity. They provide an environment for birds to breed and for small mammals to find cover. They provide an easy access for animals to the water. And lastly, they have a positive influence on the quality of the water through its purifying properties.

Infiltratiekratten

A infiltration system can be placed underneath pavement, to stimulate infiltration of rainwater in the soil. Rainwater is guided from the roof or pavement via pipe or gutter towards an infiltration crate below-ground.

Wadi

A *wadi* is a sort of trench in which rainwater can be collected and absorbed by the soil. It therefore contributes to climate-adaptation, but it also provides shelter, food and water for small mammals, amphibia and insects. It is build with distinct set of layers containing soil, gravel and geotextile.



E - CONCEPTUAL TEST 1

Introduction

This conceptual test was done to see how the perspective of an animal can help to change the human perspective on green. Making the concept was also expected to expose differences between an ecological and traditional garden design.

Approach

Materials used

A. An inspiration board with pictures of different types of gardens.
B. A building-kit to design a model-garden, containing elements with high ecological value and of low ecological value.
C. A story booklet about the life of a hedgehog.

Process steps

1. The inspiration board is shown to the participant and used as a conversational tool to discuss his or her opinions and underlying motivations for certain decisions.
2. The participant is asked to build his or her desired garden with the building-kit. This is again used as a conversational tool to discuss opinions and motivations.
3. The participant is asked to read the story booklet about the life of a hedgehog.
4. The participant is asked about his opinion of his own created garden now and if he or she would like to make additional changes or not.

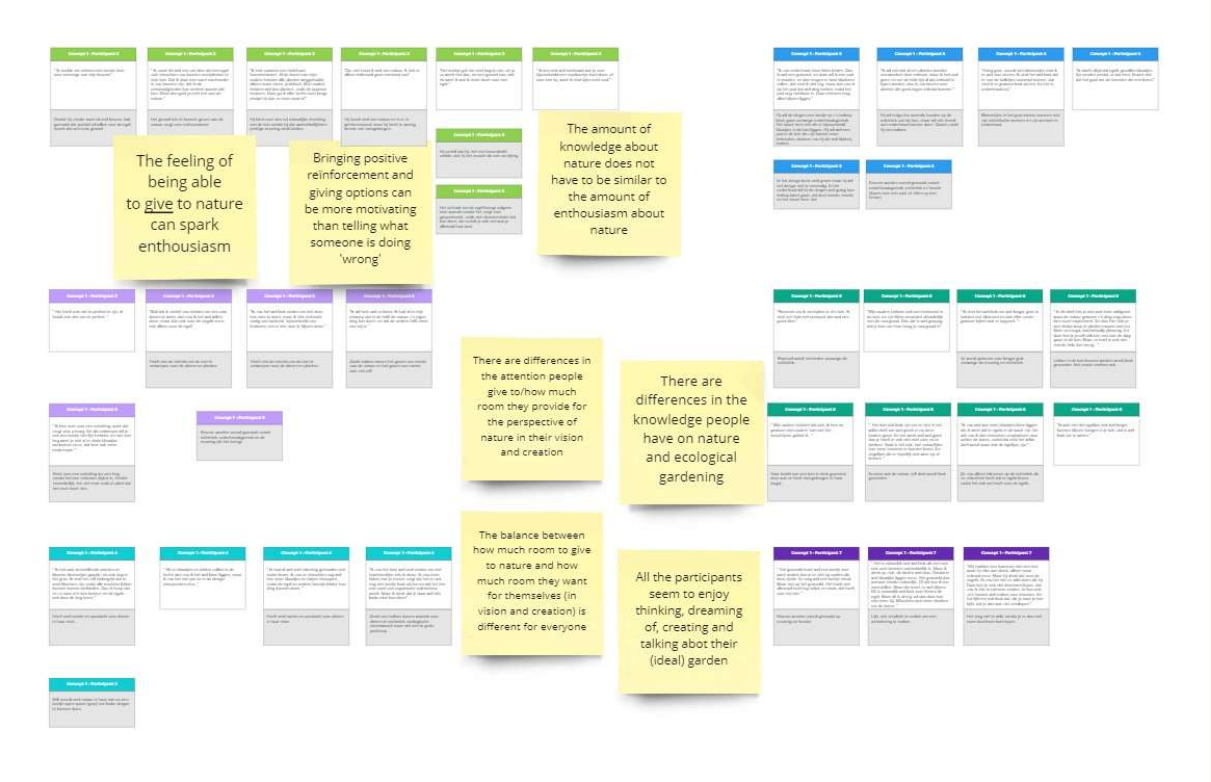
Participants

Number of participants: 6

There were no criteria set for the participants, as a variety in background knowledge and different perspectives on green was desired.

Analysis

Audio was recorded during the tests. The recordings were replayed at a later moment and remarks or quotes were written down. These notes and recordings were later analysed to write statement cards. These were then reread and insights were written on post-its.



Results

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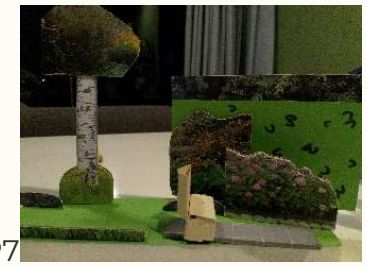
P3 
P4 
P5 
P6 
P7 

The main value of this test was that it showed what people value when they design a piece of green space.

One of the values that crossed was **aesthetics**. What is found aesthetically pleasing is not the same for everyone. Sometimes, the aesthetics are planned and controlled by the designer. Sometimes, the aesthetics come from unplanned elements.

> *" On second thought, I'll chose a fence instead of a hedge. As the designer you want to create consistency, and with a hedge you can't control if there will be dead leaves etcetera. "*

> *" High grass, especially with little flowers looks nice to me. I like that there are these dots that pop up here and there. "*

Another value is the **amount of maintenance**. This could range from doing the minimum, to intentionally incorporating a part in which you can get to work.

> *" I don't want all my plants to be overgrown by weeds, but I also don't feel like being busy weeding all the time, so I would choose plants that can't get overgrown by weeds easily. "*

> *" In this part, nature can do its thing. But this other part is where plants are planted intentionally, so you can do your own thing and get busy."*

Another value that is closely related to aesthetics but not exactly the same, is the **experience** a garden can bring. (smell)

> *" It can also be fun to see what comes up in this wild area and what works in this soil-type. "*

> *" My parents have quite some plants, like the Japanese maple. I make sure I visit them at least once in autumn because it turns so beautifully red! "*

> *“ I used to have a neighbour who had a garden which he didn’t control at all, it was just weeds. He did that for the birds. But I wouldn’t like to have a garden that wild, because you couldn’t walk through it. ”*

The last value people can have, is the **value it brings for animals**.

> *“I put in a lot of different types and colours of flowers. I find it important to have a lot of flowers so that the insects can come enjoy and munch on the nectar. So I hope this way they will come to my garden.”*

> *“ The more natural it is, the more insects can live there often. And hopefully the more birds get attracted to them in turn.”*

Other insights:

- Because every participants awareness was different at the beginning of the test, the story gave a new perspective in varying degrees.

- The story was mostly experienced in a positive way because of the approachability and imagery. The content gave them positive reinforcement of the choices they made that had a positive effect on the hedgehog and inspiration to change some of their choices to have an even more positive effect.

- The participants were not inspired to research things for themselves, because it already provided clear solutions. How to inspire to take this extra step.

Insights

- There are differences in the knowledge people have on nature and ecological gardening
- There are differences in the attention people give to/how much room they provide for the perspective of nature in their vision and creation
- The balance between how much room to give to nature and how much room they want for themselves (in vision and creation) is different for everyone
- All the participants seem to enjoy thinking of, dreaming of and talking about their (ideal) garden.

- The feeling of being able to give to nature can spark enthusiasm
- Bringing positive reinforcement and giving options can be more motivating than telling what someone is doing wrong
- The amount of knowledge about nature does not have to be similar the amount of enthusiasm someone has about nature

F - CONCEPTUAL TEST 2

Introduction

This conceptual test was done to see how snippets about the unexpected value of specific natural elements can inspire people to find more information on ecological gardening and change their behaviour.

Approach

Materials used



A. 6 Character Standees of different types of organisms that can be found in a garden.
B. Info Sheets for each organism type on the Standees with bits of information about the needs of these types.
C. 8 Event-cards with happenings that can occur in a garden which can lead to maintenance decisions and actions.

Process steps

1. The participants were asked to choose the organism types they want to represent and put the accompanying Standees in front of them so the others can see who they represent.
2. The participants are asked to read the Info Sheets that accompany their chosen organism types.
3. The first event-card is shown to all participants. They are asked to discuss if they would take action, what this action would entail and why. They were asked to approach the situation, taking the species they represented into account, but also from their own perspective.
4. All remaining event-cards are shown and discussed one by one until all 8 event-cards have been dealt with.

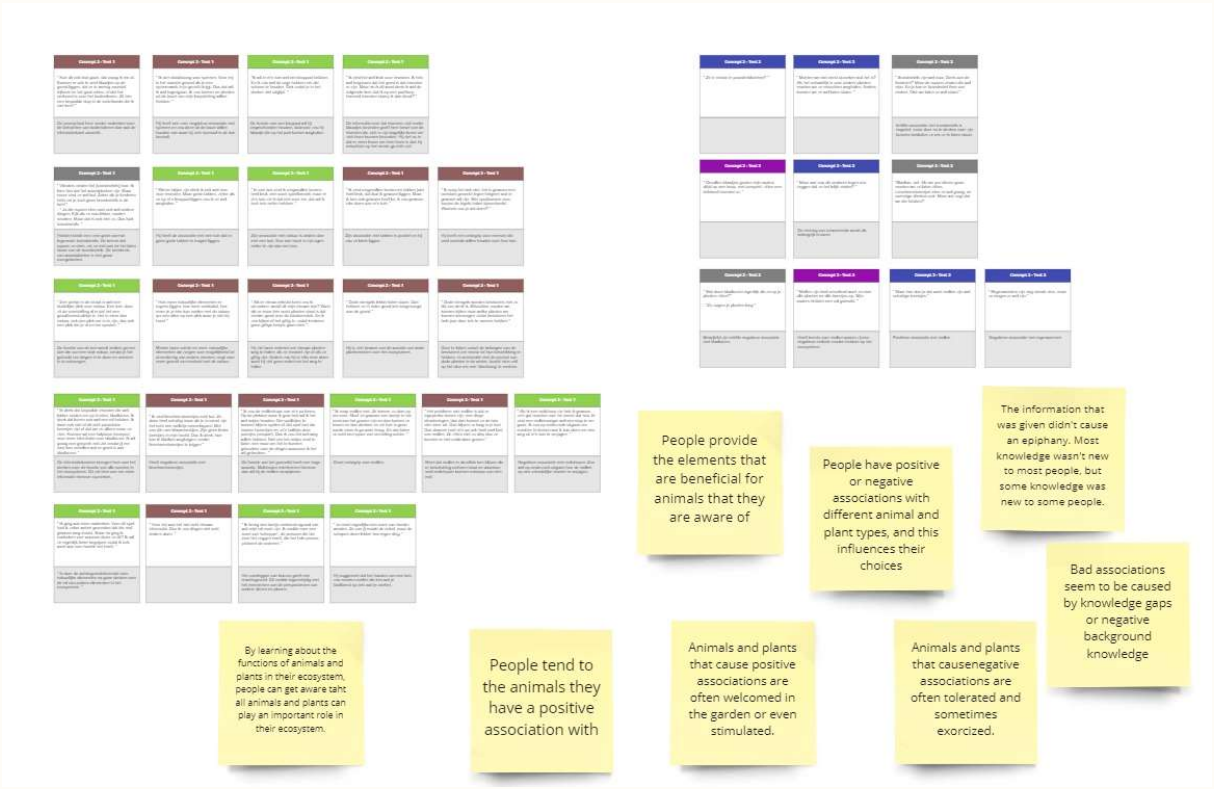
Participants

Number of participants: 4 (two tests were done with two participants each)

There were no criteria set for these participants, as a variety of different backgrounds and different perspectives on green was desired.

Analysis

Audio was recorded during the tests. The recordings were replayed at a later moment and remarks or quotes were written down. These notes and recordings were later analysed to write statement cards. These were then reread and insights were written on post-its.



Results

It was expected that these information snippets would evoke a sort of **aha-moment**, as it would provide a peak into a world that would be unknown by the participants. It turned out that this was not the case, **as most of the knowledge wasn't new to most people**, but some knowledge was new to some people. Did happen was that, by **learning about the functions** of animals and plants in their ecosystem, they got **aware** that all animals and plants **may play a role** in their ecosystem.

> *" What do aphids actually do when they are on your plants"*

> *" It made me start to think. Before this game, I would have definitely found that a mol should just be gotten rid of. But now I started to think: Why do they actually do this? I actually want to get to understand them better so I know what kind of function it has."*

Another interesting outcome of this test was that people can have **positive or negative associations** with different animals and plant types, and this can influence their choices. The animals and plants that they have **positive associations** with, are often welcomed in the garden.

> *" I really like tree trunks and branches, I will just leave them be."*

> *" But how would you get rid of mols, because they are very cute animals."*

Bad associations seem to be caused by **knowledge gaps** or **negative background knowledge**. Negative associated animals and plants are sometimes **tolerated** and sometimes **exorcized**.

> *" I really hate ladybugs. They pretend to be cute but when you zoom in om them, they are real scumbags, with their weird fang-mouths. So I'm just thinking, how do I get rid of these aphids without getting those ladybugs"*

> *" Mols are very tedious, because they eat all your plants and all of the animals. My parents used a trap to get rid of them. "*

The action that would follow up on an **initially negative association** could sometimes be influenced by providing information about the value that the element can have in the ecosystem.

> *" Nettles are rather tedious. Think of the kids! But the caterpillars like them. And you can use them for nettle tea. Ok let's keep them."*

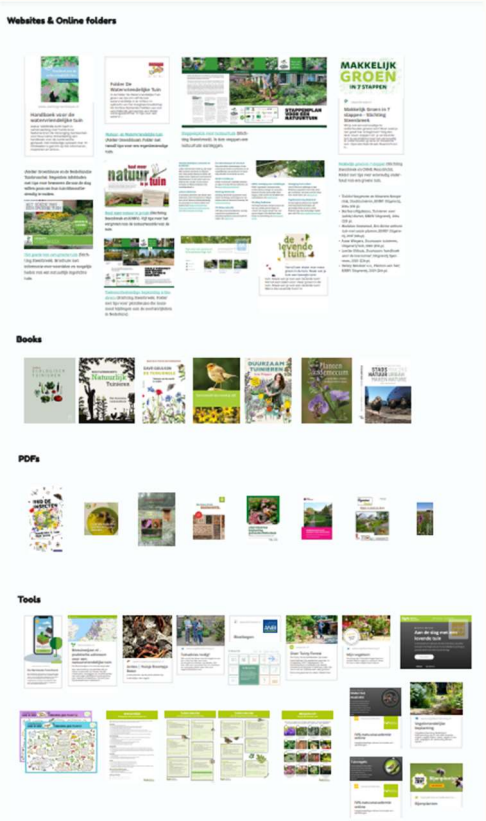
G - SECONDARY RESEARCH ECOLOGICAL GARDENING

Introduction

The main goal of this secondary research was to reach an understanding of what ecological gardening entails. There are many resources developed for gardeners to teach them how to maintain and design a garden in an ecologically responsible way. A selection of these resources were analysed to find out what ecological gardening means, how it is done and where it comes from.

Approach

<u>Gathering and selection of resources</u>
Through the first phase of research, many resources about ecological gardening passed by. An additional search was done on the following subjects: Ecological-, green-, biological-, organic-, natural-, nature-friendly-, animal friendly-, -gardening and -garden. A substantial collection of websites, informational booklets, books



and online tools was the result.

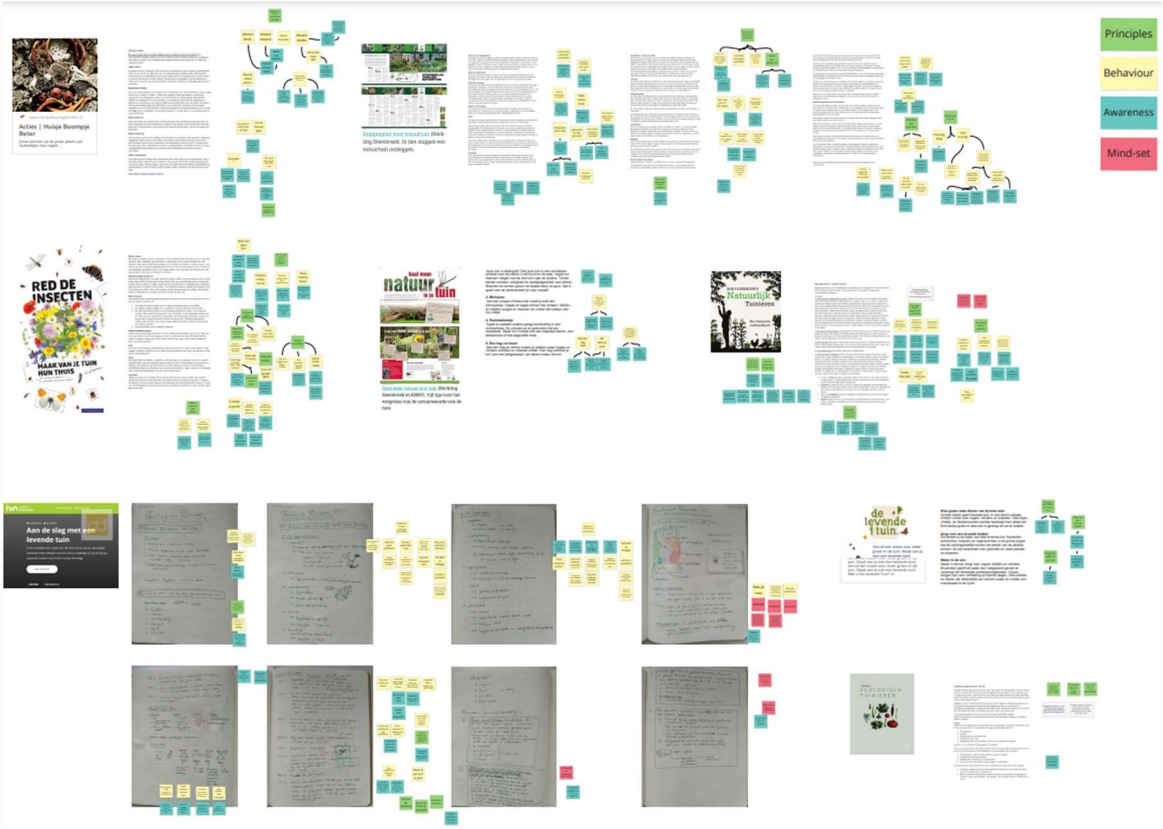
A selection of these materials was made on accessibility and relevance. These were then used for further analysis.

Analysis

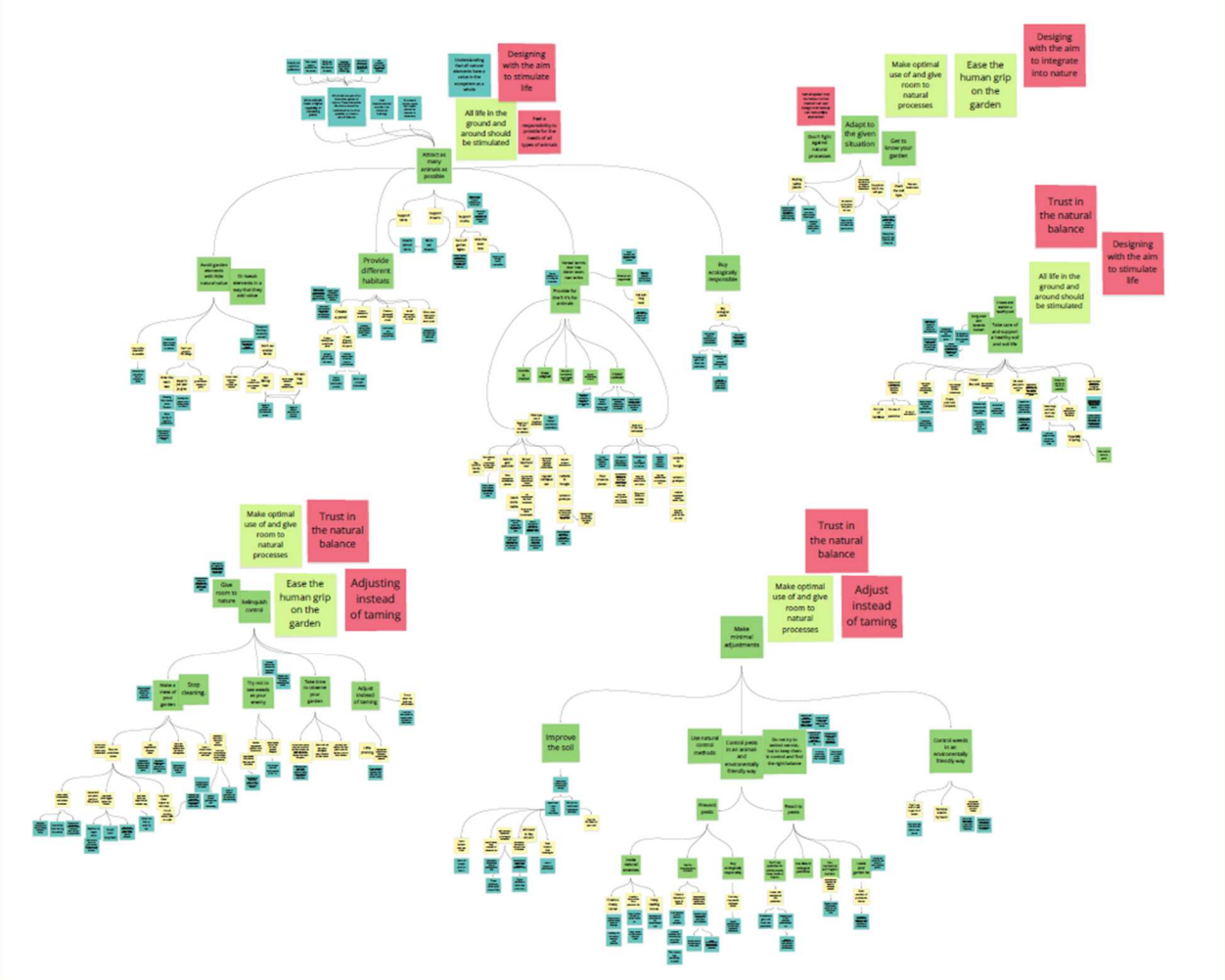
The materials were read and summarized. Notes were taken during the online course. While making these summaries and notes, it became apparent that most information that can be found in these resources, can be categorized under one of the following categories:

1. **Examples of ecological gardening behaviour.**
   These are the concrete actions that people can take to design or maintain their garden in an ecologically responsible way. So for example: “Don’t use common pesticides.”
2. **Examples of principles that are complied with when gardening in an ecological way.**
   This means the rules or generic behaviours that are at the base of the stated concrete actions. For instance: The behaviours, “don’t use common pesticides”, “use little biological pesticides”, and “use mechanical pesticides”, all come from the principle: “Control pests in an animal- and environmentally friendly way”.
3. **The awareness behind these principles and behaviours.**
   These are the pieces of knowledge someone should be aware of to know why they should apply certain behaviour. They are the reasons or the arguments that explain why these behaviours or principles are ecologically responsible. For example: “Common pesticides should not be used to get rid of unwanted pests, as they also cause harm to pollinators, like bees and butterflies, as well as to their natural predators, like birds or hedgehogs, who eat the contaminated pollinators”.
4. **Examples of mind-sets that are needed to be able to show ecological behaviours**
   This is about the attitude that someone needs to adopt to be able to show ecologically responsible behaviour. For example: “Take the time to get to know your garden”.

These four categories were used to analyse the information. Post-its of different colours were used to present the found information in the four different categories: Green for principles, yellow for behaviour, blue for awareness and pink for mind-set. Connections were made visible by linking and structuring the post-its in relation to each other.



The information bits were then put together in an overview, to have all the gathered information in one place. They were organized by putting information bits with a similar meaning together and by linking stand-alone behaviours to existing principles. New principles were formulated to capture the remaining behaviours. Some principles were found to be overarching some of the other principles. Therefore the principles were clustered into groups that were then defined with one overarching principle, which we will these guidelines. Additional guidelines were formulated that represented the connections between the remaining principles. This structurization and clustering resulted in 5 main guidelines, consisting of different amounts of behaviours and awarenesses.



Results

The meaning of ecological gardening

The resources that were used to understand the meaning of ecological gardening came from different backgrounds. Some would use the term ‘ecological gardening’, some would call it ‘biological gardening’ and some would speak about ‘natural gardening’. Although some differences can be found, their common denominator is that they are all trying to help people to construct and maintain their garden in a way that resembles more the *natural way*. To clarify, with the *natural way* is meant here: the way things would occur when humans would not interfere.

I first want to explain this *natural way* a bit through explaining the main processes that occur in nature, which are mentioned in some of the resources:

1. Natural area’s go through successional stages, creating a layering of vegetation. This means a dense and rich vegetated area, which attracts a great variety of animals and other organisms, and therefore contains a rich biodiversity. (Velt, 2014)

2. Nature keeps itself in balance due to its rich biodiversity. When a species expands, the presence of its natural enemy, or the absence of an excessive amount of its natural food source reduces its numbers. (Flowerdew, 2021)

3. Local vegetation fits its context and therefor supports the local animals and other organisms. This may seem obvious, but it's an important factor that distinguishes natural environments from areas that are influenced by humans, who introduce exotic or cultivated plants with sometimes little natural value. (Atelier GroenBlauw, Natuurmonumenten)

4. Nature is self-supportive due to its rich biodiversity. All natural elements play a role in their local ecosystem and their existence is interdependent. For example: a bird needs insects as a food source, while the insect eats plants. Plants need nutrition provided by soil life, while soil life needs vegetal and animal waste to produce this nutrition. This waste is in turn provided by, for example, the droppings of birds, the dead bodies of insects and the dead branches and leaves of plants. Thus, diversity in all life is vital. The greater the biodiversity in plants, the greater the biodiversity in animals, as different animals need different offers in food, shelter, and nesting opportunities. As plants are dependant on a healthy soil, the biodiversity in soil life plays a key-role in the support of a natural area. (Flowerdew, 2021)

The main aim of ecological gardening is therefore to aspire a balanced and natural ecosystem.

<u>The principles</u>
Clustering of the principles that were found resulted in the following 5 guidelines for ecological gardening:

1. **Attract as many animals as possible**
   As mentioned in the explanation of the natural processes, the main reason behind this principle is that all animals are part of an interactive system of nature. So in order to stimulate a balanced ecosystem, these interactive life-chains should be maintained as much as possible. Another more general reason is the fact that the living areas of many insects, birds and other animals are decreasing, which is causing the general decrease of biodiversity. Improving your garden to attracts animals is a way to provide more living space to these animals. This is done by avoiding garden elements with little natural value, by providing different habitats, by translating the knowledge of the different needs of different animals into actions, and by buying ecologically responsibly.

   Examples of behaviours:
   [Afbeelding maken]

   > Fundamental 1: All life in the ground and around should be stimulated / Mind-set 1: Designing with the aim to stimulate life

2. **Relinquish control / Give room to nature**
   Behind this principle lies the understanding that the management of a garden comes down to the interference of the successional stages an area goes through. The loss of biodiversity loss of an area essentially is caused by the interference of people, as a balanced ecosystem would occur when humans would not interfere. This can be done by cleaning less and leaving the garden/green area more messy, by stopping to see weeds as the enemy and by taking time and observing your garden/green area.

   Examples of behaviours:
   [Afbeelding maken]

   > Fundamental 2: Make optimal use of and give room to natural processes
   > Fundamental 3: Ease the human grip on the garden/green area
   / Mind-set 3: Adjust instead of taming
   / Mind-set 4: Trust in the natural balance

3. **Make minimal adjustments**
   This principle goes hand in hand with the latter. It says to only make adjustments when needed, in a way that does not diverge too much from the natural way, but to use these natural processes where possible. This has to do with soil-improvement and pest- & weeds-control and pruning little.

   Examples of behaviours:
   [Afbeelding maken]

   > Fundamental 2: Make optimal use of and give room to natural processes
   / Mind-set 3: Adjust instead of taming
   / Mind-set 4: Trust in the natural balance

4. **Adapt to the given situation**
   Adapting to the given situation means not to fight against natural processes. So for instance to get to know your garden or green area and to buy plants that fit that context in terms of soil, sunlight, humidity and their origin. But it also means to take time to observe your garden and let things happen when they happen.

   Examples of behaviours:
   [Afbeelding maken]

   > Fundamental 2: Make optimal use of and give room to natural processes
   > Fundamental 3: Ease the human grip on the garden/green area
   / Mind-set 2: Observe and enjoy the effects and dynamics of the garden
   / Mind-set 5: Designing with the aim to integrate into nature.

5. **Take care of and support a healthy soil and soil life**
   This principle is in line with the first one, but with the focus on soil life. This is based on the awareness that a healthy soil is at the core of a healthy

ecosystem. What is important here is to know how the natural nutrition system works, and to make optimal use of these natural processes. Another principle that recurs here is to minimally interfere in these natural processes and to leave the soil be as much as possible.

Examples of behaviours:
[Afbeelding maken]

> Fundamental 1: All life in the ground and around should be stimulated
> Fundamental 2: Make optimal use of and give room to natural processes
/ Mind-set 1: Designing with the aim to stimulate life
/ Mind-set 4: Trust in the natural balance

Mind-set

To add to the local biodiversity through ecologically responsible behaviour, a different mind-set is needed. The following ecologically responsible mind-sets were distilled from the principles, behaviours and awarenesses that were found:

1. **Designing with the aim to stimulate life**
   One needs to redirect its aim with creating a garden or green space, to the effect that that green space has on the life of animals. One needs to feel a responsibility to provide for the needs of as many types of animals as possible. A garden can be more than act as a pleasant scenery, it sustains life. This is about seeing the effect of the plants you plant on the animals and the ecosystem, rather than the plants as is. This means you take into account the perspective of the animals who need gardens or green spaces to survive.

2. **Observe and enjoy the effects and dynamics of the garden / green space**
   To be able to step aside a little and give more room to nature, it helps to see, acknowledge and enjoy the natural processes as they happen. Many resources advise to take a step back, look around and admire what nature has to offer, without the gardeners' interference. This is about seeing the garden as a living, dynamic thing; it is never a finished product.

3. **Adjust instead of taming**
   Nature is alive and wild, trying to tame it costs a lot of energy and counteracts the natural balance. The attitude that helps with interfering in a more lucrative way, is aiming to only make little adjustments when needed, to lightly guide, instead of reign over the green space.

4. **Trust in the natural balance**
   Another mind-set that helps to relinquish control, is to trust in the natural balance. If you believe that nature will transform and regulate itself in a sustainable way, it is easier to let go and observe before taking action.

5. **Designing with the aim to integrate into nature.**
   One needs to feel responsible to stimulate or protect natural processes?

This brings us to the following main mind-set that supports ecologically responsible gardening behaviour:

> To experience the interaction with the garden or green area as interplay between human input and natural processes, instead of a one-way creation.

What is meant here is...

Insights

- There is a large amount of possible ecologically responsible behaviours, even more than the examples that were found.

  -> Question: How do people become aware of these behaviours? How do they know what to do in which occasions? How do you search for information you don't know exists? How do you break patterns?

  -> Possible design direction: Spike their curiosity to learn more about ecological behaviours

- Ecological gardening is based on knowledge and understanding of the natural processes. Knowledge and understanding is therefor required to show ecological responsible behaviours.

  -> Possible design direction: Spike their curiosity to learn more about ecological behaviours and the underlying ecological knowledge.

- Behind every behaviour that was found, lies an awareness of why this behaviour is ecologically responsible. This awareness always comes down to natural processes, or in other words, the perspective of natural elements.

  -> Possible design direction: Show the perspective of natural elements

- The main mindset shift that is needed, is from experiencing gardening as a one-way creation, to interplay between human input and natural processes.

  -> Possible design direction: Somehow encourage this mindset to be adapted.

- Sounds like people just need to let go. Where is the line? What can they let go? Should they let go everything? (Sharida told me not to)

H - OBSERVATIONS NATURAL GARDENING CLASSES

Introduction

The intention of attending a course about natural gardening was to experience and learn from the practice of ecological gardening. But it also turned out to be a good opportunity to observe the concerns of the participants and what challenged them to change their mindset and behaviour.

Approach

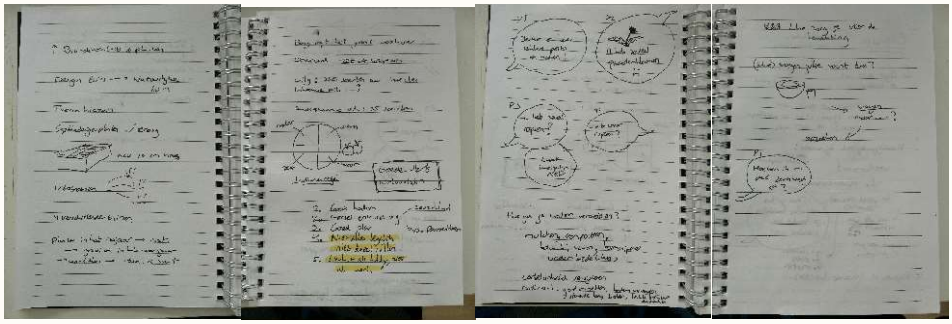
Set-up and participants
All three classes were attended for observation. Classes were on Thursday evenings and each lasted about 2 to 3 hours. There was one instructor and 10 course participants in total. All observed participants were interested in learning more about natural ways of gardening and intended to implement this knowledge in their own garden.

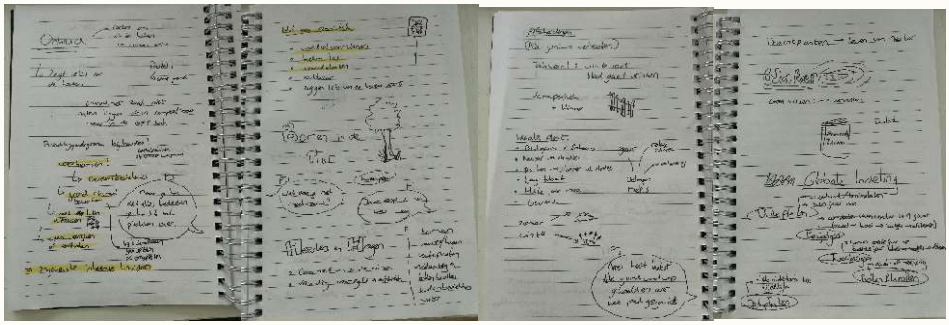
Content of the course
The first class was located in a class room of the local cultural centre and focussed on theory. A presentation covered the principles of natural gardening, examples of natural garden elements and examples on how to maintain a natural garden.

The second class was located in a nursery garden. A lot of plants were shown that can be used in a natural garden. Furthermore, there was a plenary discussion on ways to invite animals to your garden.

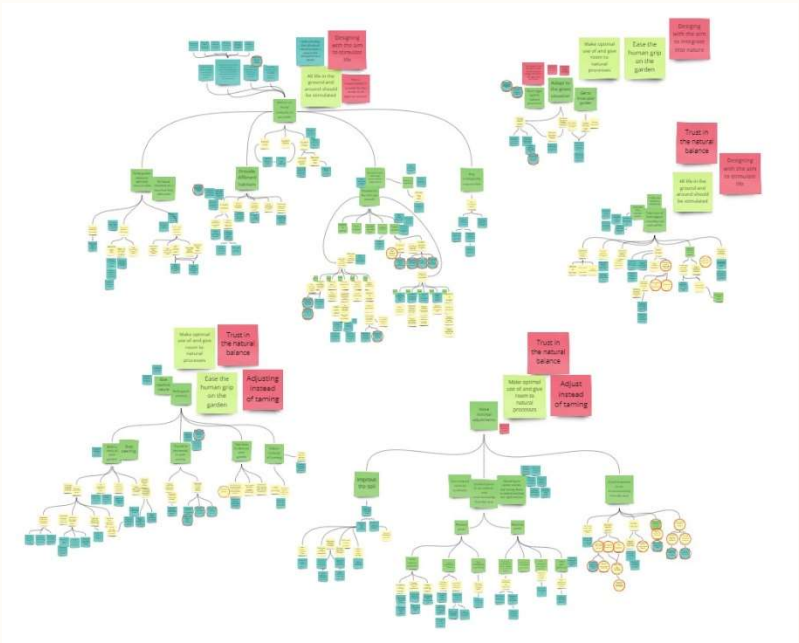
The third class was a tour around actual gardens in the village, which contained good and bad examples of natural gardening. Some of the owners were present to answer questions.

Methodology and analysis
During the classes, new insights on ecological gardening were listed. Furthermore, concerns, questions and struggles mentioned by the participants where observed and noted.





The insights on ecological gardening were later added to the map of behaviours and principles that resulted from the secondary research.



These observations and notes of the responses from the participants were later analysed to distillate insights from.

Results

The course that was attended was about ‘natural gardening’. This was defined as: “gardening in a way that increases biodiversity of plants and animals, in which no use is made of synthetic or chemical pesticides or fertilizers”. One of the main focusses of the course was on soil and soil-improvement. Another topic was weeds and how to prevent them from growing or how to remove them. A little information was given on why weeds can be useful. Furthermore, a lot of different types of plants were shown. Lastly, ways on how to attract animals was discussed. What was not covered in the course but did appear in the secondary research, was background knowledge on natural processes, what the role is that animals play in their ecosystem, and the principle of giving nature more space. All in all, the course had a main focus on the actions you can take in your garden, but not so much on natural processes and the room nature should be given by relinquishing control.

This is reflected in the **mind-sets** of the participants. Their questions mainly evolved around what could be done **to control things**, mainly weeds and pests. It could be even said there was a certain level of **hostility** against certain weeds that some participants couldn’t get rid of, like dandelion and ground elder. These weeds were apparently persistent, and removing them by hand was not sufficient. Some had been trying to fight the weeds for years. Over the course, this hostility seemed to prevail.

There seemed to be **no intrinsic interest in inviting animals** or providing in their perspective/needs. When one of the participants mentioned having troubles because of a plague of caterpillars, the participant was unable to tell the type of caterpillar. One of the participants was not pleased about a blackbird which

recently made a mess of his garden by messing up his soil and throwing things on their pathway.

There seemed to be a **lot of interest in plant types and in how to improve the soil** (in a natural way). Many questions were asked about these subjects over the course.

The tour around **example-gardens seem to spark enthusiasm**, but there is no way of telling if the course helped them to garden in a more natural way and how, and what they're still struggling with.

One of the owners of an example garden sought her own balance in giving control to nature and taking control herself. She seemed to have a very **relaxed attitude** towards maintaining the garden. She had a lot of ground elder in the garden as well, but she seemed not to care too much and just removed some when she found it necessary. She said she sometimes interfered in the garden but didn't carry out too much work. She had a certain **trust in the natural balance** of the garden. There were for instance some snails in the garden but she did not take action to remove them as "they were no burden to her", she said. She also said that birds and hedgehogs visit or live in the garden and eat them. She said the balance in the garden emerged spontaneously. "I initially just planted what I liked, the strong ones then survive and that is how the balance is formed." However, although dead plants in the winter have a high natural value, she **did not like the image of a garden that is completely withered away**, so she does clean up the garden when summer is over.

Insights

Many questions about if and how the course helped them to turn the knowledge into practice arose. What it takes to make the switch. Therefore, it was decided to send a follow-up questionnaire to get some answers on these questions.

People need to find their own balance between how much they want to control and how much they want to let go to nature. But if the needs of animals or natural processes are not considered or made aware of, people can not make a valid choice in this.

Letting go control might not always be beneficial for biodiversity, as pioneering plants can take over a whole area. So to increase biodiversity, sometimes you have to give some space back to some plant types.

Ecological gardening is also 'lazy gardening', as a lot of control is given back to nature.

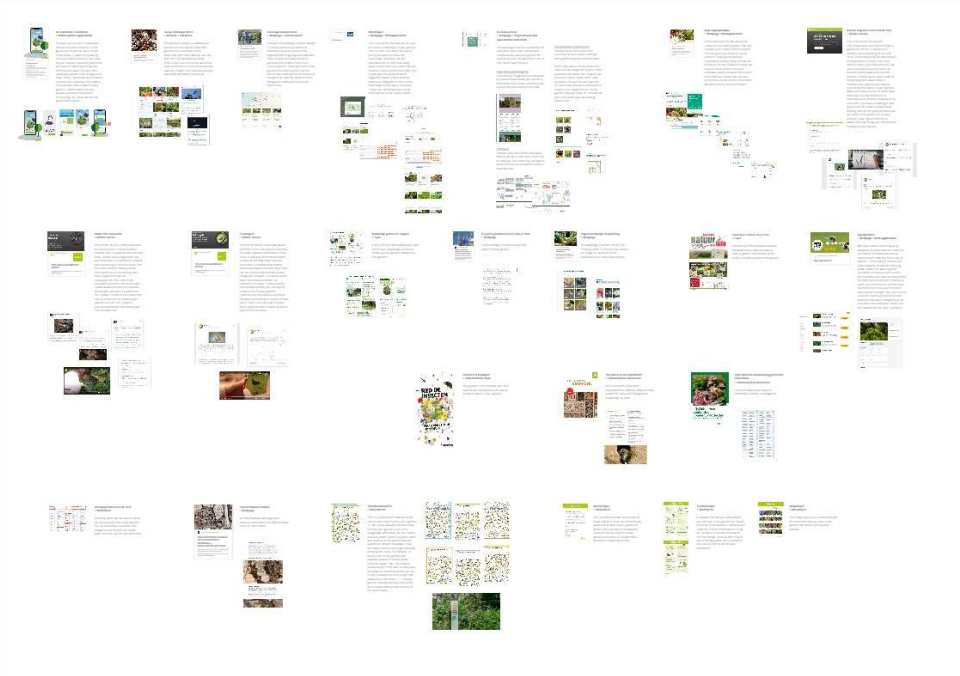
I – TOOL ANALYSIS

Introduction

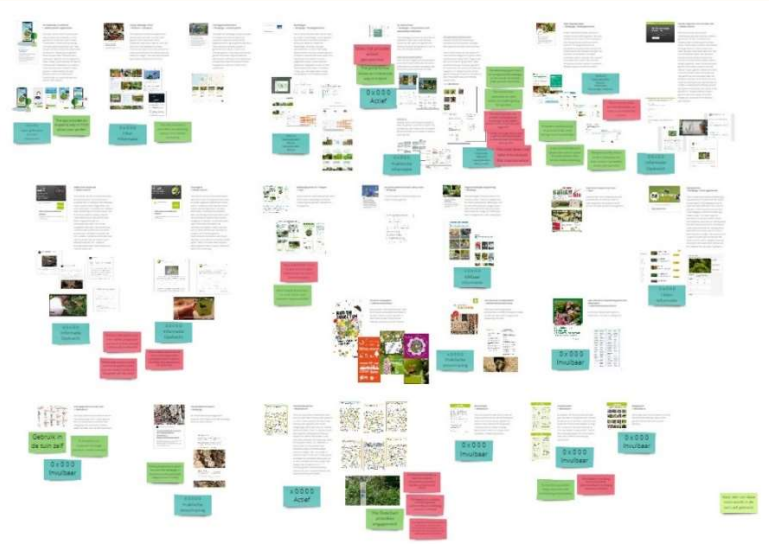
Existing tools were analysed to find examples on how the shift in mind-set and behaviour towards a more ecological one can be triggered. The main question that was sought to be answered was: what tools exist and what do they offer?

Approach

Tools that stimulate to take action towards a more ecological style of gardening were selected. The existing tools that were found were explored and briefly summarized.



They were then analysed on the type of interaction that they offer, elements that were inspiring or that seem beneficial in changing mind-set and behaviour and the things that may be missed opportunities or seem to less be effective.

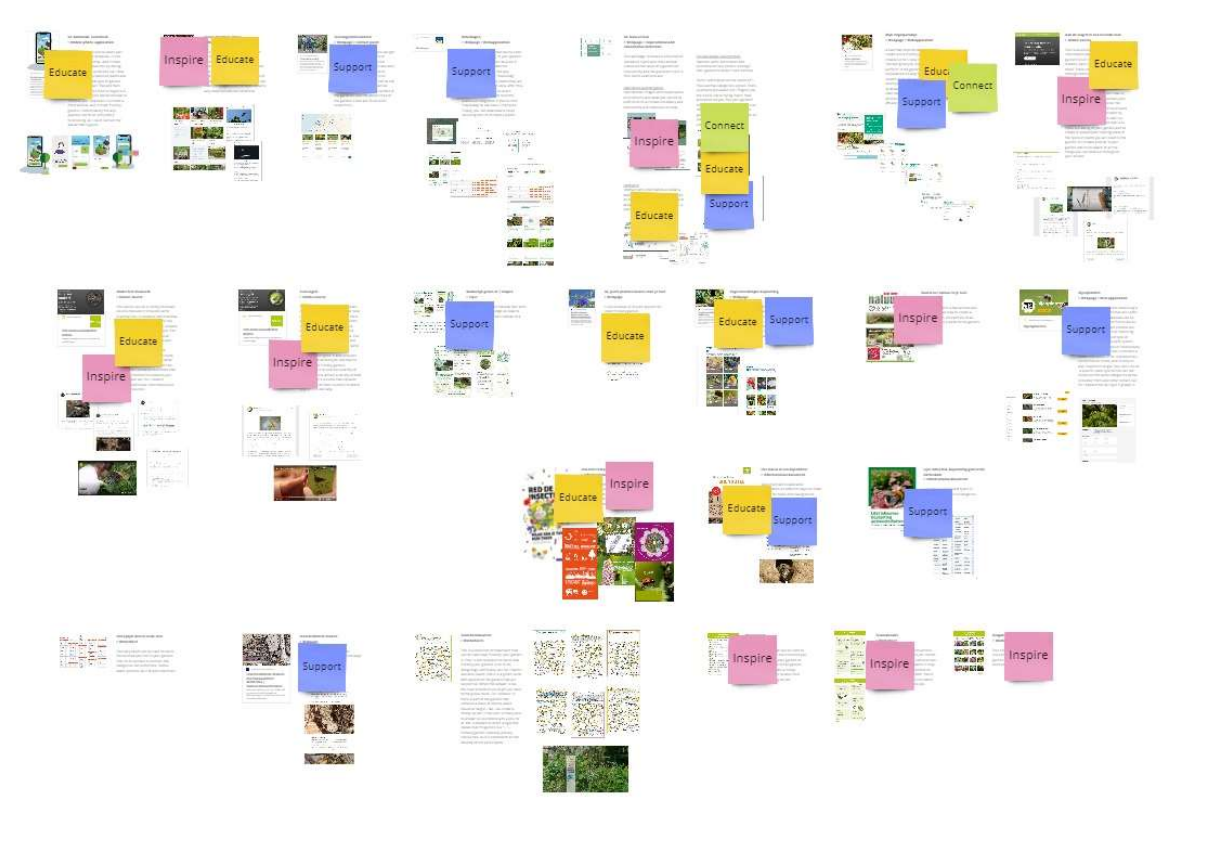


Results

Types of tools

The tools that were found range from static informational flyers and webpages, to interactive databases with categories or applicable filters, to worksheets, online courses, and web- and mobile phone applications.

Elements that are used



As mentioned before, all of the tools aimed to stimulate people to perform actions that benefit the animals or the local ecosystem. I found a few elements that the tools made use of to incite this change of mind-set and behaviour.

One of the found elements is **inspiration**. Inspiration is mostly given by providing examples of ecologically responsible actions, so the user can start getting ideas. Providing these examples could influence the users behaviour in the garden.

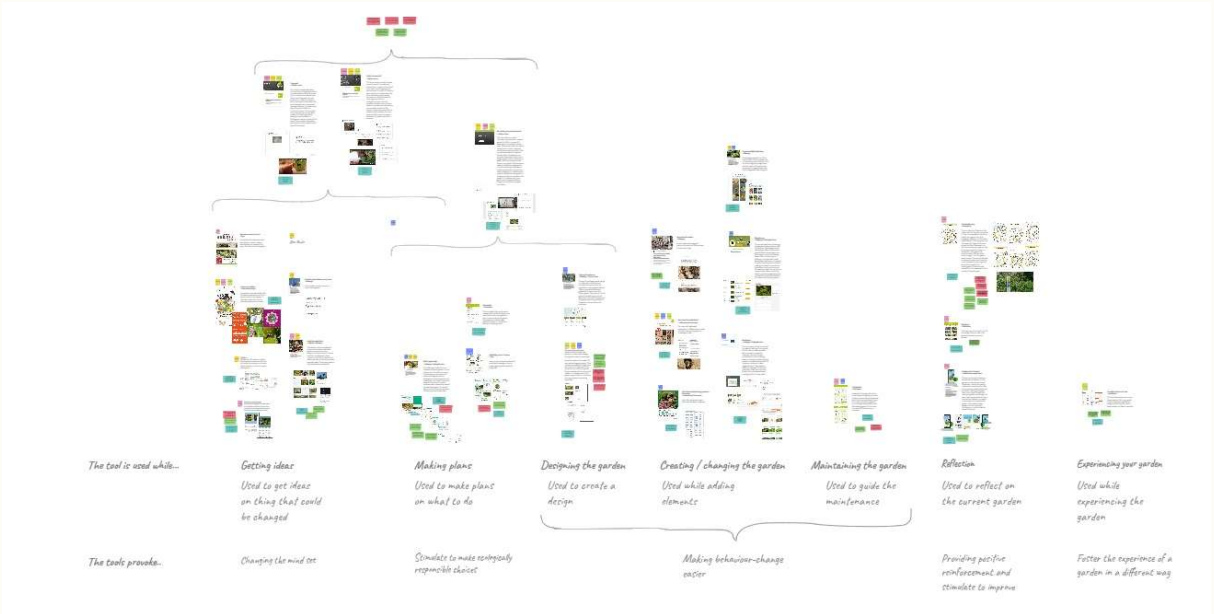
Another element is **education**. The tools provide knowledge and understanding of why these actions are beneficial for the animals or the local ecosystem, or on the needs of animals. This understanding could change the users way of thinking.

A third element that some of the tools provided is the **support** of actions themselves. These tools help guide the making of a (re)design of the garden or the way the garden is maintained. They can make a change of behaviour easier to incite.

Some tools also provide **exercises** that could change a way of thinking. For instance through observation of the garden or animals.

* The lack of a layer of education in some of the tools seems to be a lost opportunity. If the value of a messy corner is not explained in any way, would the user then compromise on aesthetical value of it's garden just because an exercise orders him to do so?

<u>Moment of use</u>



The tools are expected to be at play in different phases of the shift towards ecological gardening.

The tools that educate and inspire, mostly provide ideas, examples and perspective. They will therefore likely be used **in a phase in which the intention is formed** to make changes to the garden or to maintain in a more ecologically

responsible way. The main effect of this group of tools is likely that they **provoke a change of mind-set**.

Then there are tools that mainly stimulate to make actual choices towards a more ecologically responsible behaviour. These will therefore likely be used **after the intention is formed**, when **actual plans are made** to do things differently or to add elements to add to the garden.

Most supportive tools guide the actual behaviour of designing, working in the garden (creating or changing the garden) or maintaining the garden and will therefore likely be used during a **phase of taking action**. As mentioned before, these supportive tools **make actual behaviour-change easier**. An example of a tool that guides the design, is a workshop handout that assigns to sketch the current garden, to add messy corners to the map, a compost hope or to indicate on the map where they see nesting possibilities. Examples of tools that can be used to choose plants to buy in the garden centre are an online tool that makes it easier to choose plants to create a 'bloeiboog', or a database of plants that are useful for pollinators, that can be filtered on categories like plant type, month of blooming or flower colour. The only tool that supports the maintenance, is a calendar that helps the user remind on which maintenance-actions to take in the current month, and allows the user to check off the actions taken.

Some of the tools incite a **moment of reflection** on the current garden. These tools provide **positive reinforcement and stimulate improvement.**

One of the tools can be **used in the garden itself to experience** it in a different way. This is a tally sheet to check off the animals that you can find in your garden.

As mentioned before, some other tools contain exercises to observe the garden as well. It is now apparent that **these tools do not match the context of use** in most cases. Take for instance the online courses, which can be followed on the computer or on the mobile phone. They do provide exercises for in the garden, for example to sit still for 10-15min and to observe the birds that visit your garden. But the tool is not used in that actual moment.

Interaction

The tools show interactions to different degrees. **Many tools primarily send** to the user, while only a **few tools allow for input** from the user, and even **less of them react on this input**.

For instance, tools provide knowledge through text or video's, they provide examples of actions as inspiration, or they offer exercises. The user can choose to act on these given opportunities, but in many cases they are not asked for feedback on these actions by the tool. This seems to me like a missed opportunity to keep the user engaged in the process.

One of the tools that does ask for feedback and then reacts on this is the 'bloeiboog'-tool. The tool first asks for input on the plants that are present in the current garden, and the types of bees they want to support. It reacts on this by

showing the type of bees that are currently supported by the garden. It then gives advise on which plants to add, based on the bees that the user wants to support. Instead of only giving this advise and thus providing options, the user is asked to give feedback on the plants they would choose to add. The tool recalculates the effect based on the input of the user and feeds it back to the user. This elaborated interaction brings forth two opportunities. Firstly, by asking for a reaction from the user, the user is inclined to actually take action (to choose plants in this case). Secondly, by reacting to this input from the user, the user receives a positive reinforcement which can have a motivating effect.

Insights

- **Some tools provide exercises, but few of them actually guides this exercise in the garden.** Some for instance assign the user to go in the garden and observe, but there is no guidance in this during that moment and in the actual context. Only one of the tools is used in the garden, to count the animals that are present in the garden. Another example of a tool that can be used close to the context is a calendar that shows which ecological behaviours you can perform in which month.

- **Offering a form of positive reinforcement might be a promising way to change peoples behaviour and mind-set.**

J - COOPERATIVE BRAINSTORM

Introduction
The goal of this brainstorm session was to kickstart the idea generation with a bunch of out-of-the-box ideas in a relatively short amount of time. As I have been working on the project for a while, my mind is clouded with all the gathered information and this can block my creativity. Therefore I chose to set-up and facilitate a cooperative brainstorm in which people from outside of the project would provide fresh input.

Approach

Participants and roles
Three (former) design students participated the brainstorm as idea generators. They had an IPD or DFI background, so they were familiar with the concept of How-to's and idea generation.

I adopted the role of facilitator. I announced the excersizes and asked questions, but did not declare any opinions or thoughts, as I did not want to interfer in their process and influence their train of thought or their feeling of freedom of expression. This gave them agency over the outcome and avoided them to feel as if they were trying to solve my problem, because that would give them the idea that answers can be right or wrong, which is to be avoided for a succesful generation of out-of-the-box ideas.

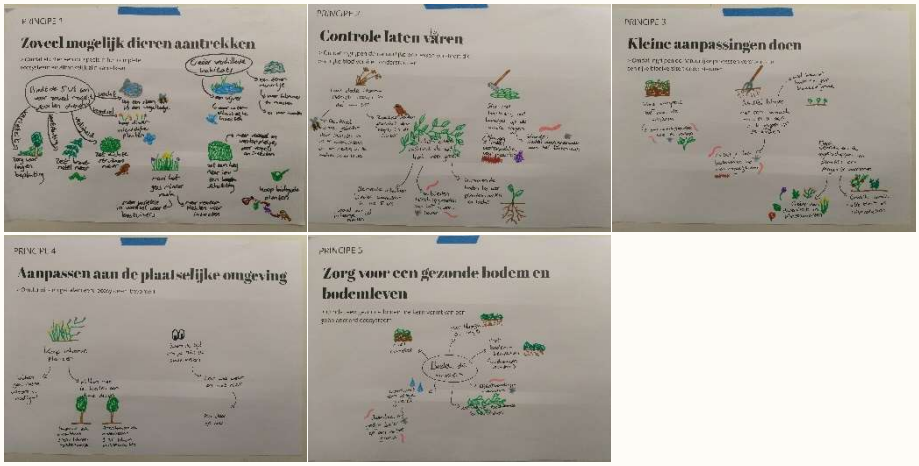
Process steps

1. *Energizer*. As mentioned in Creative Facilitation written by Marc Tassoul, it is helpful to start a creative session with an energizer to get creativity flowing.
2. *Introduction to the project*. To give the participants a basic level of knowledge on the project, a brief explanation was given of:

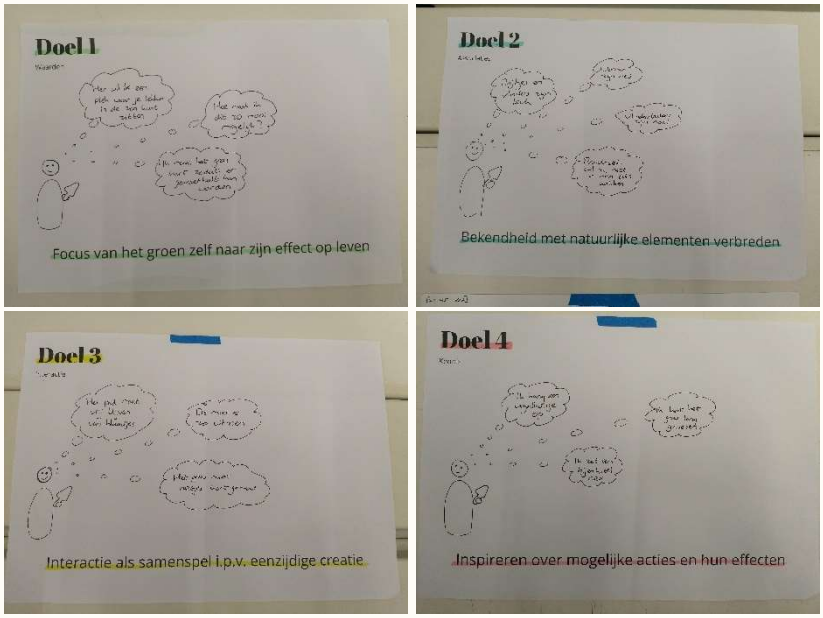
    i. The target group

ii. The goal of the project

iii. The five guidelines for natural gardening and some examples of ecologically responsible behaviours that resulted from the ecological gardening research.



iv. The four chosen solution spaces.



v. From these four solution spaces, a total of six How-to's were created:
1. How to experience/see/observe the life that you facilitate with your self-created green, and feel pride about it? (Doel 1)
2. How to get acquainted with varying (unfamiliar/unappealing) plants and animals, and their role in the ecosystem? (Doel 2)

3. How to experience the interaction with green as interplay with natural elements and processes instead of a one-way creation? (Doel 3)
4. How to offer examples of ecologically responsible actions/behaviours? (Doel 4)
5. How to gain understanding of the needs of plants and animals that get provided through these actions/behaviours? (Doel 4)
6. How to get stimulated to find more information about this? (Doel 4)

3. *First round of idea generation: Brainstorm on the How-to's*. Each participants got 2 minutes to write down thoughts and ideas on one of the six how-to pages. Then they passed on their paper to the next participants and worked for 2 minutes on the next page. This was repeated until every participant had worked through all 6 pages.

4. *Discussion of the results*.
   The results of the brainstorms were discussed per page among the participants. The most appealing ideas were picked (1-3 per page).

5. *Second round of idea generation: Random Stimulus*.
   The How-to pages were equally divided over the participants. Each participant picked one (or a combination) of the best ideas of each page to combine with a randomly picked Dixit-card. The Dixit-card provides a to expand on the first round of ideas. They got 5 minutes per idea. They all created 2 ideas in total.

The session was recorded to catch the reasoning behind the ideas and the ideas which were not written down but communicated verbally during discussions.

Figure 1 - Set-up of the cooperative brainstorm session

Results

Many interesting ideas came out of the How-to brainstorms (see figure [ref] below). The twelve ideas that the participants rated as most appealing are marked with a green star.

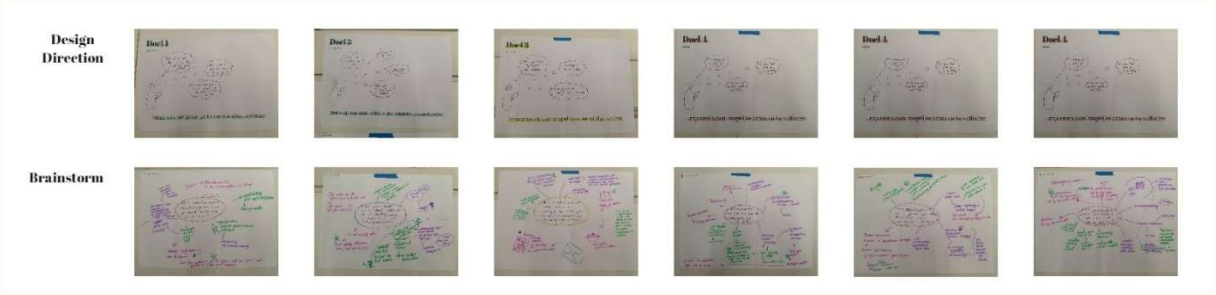
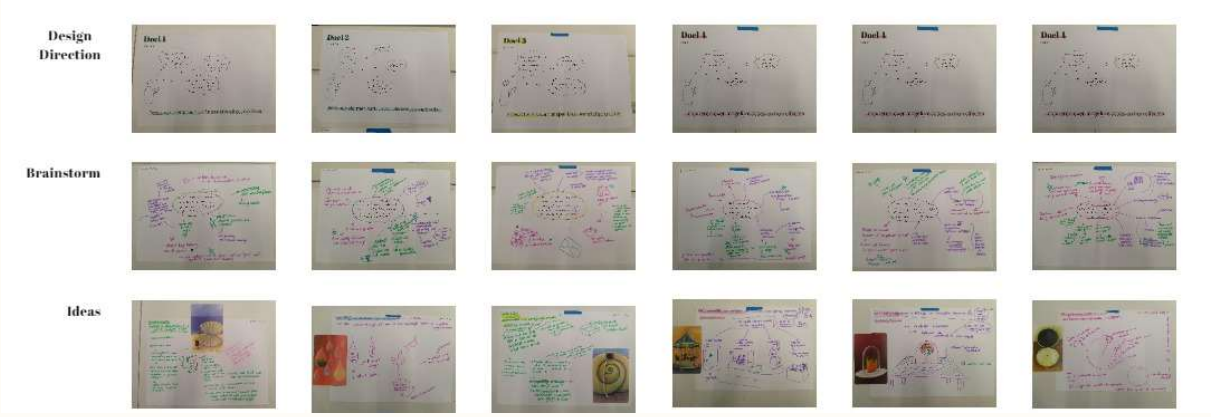


Figure 2 - The ideas that were generated in the first round of the session

6 of the most appealing ideas were used for the second round with the random stimuli. One idea was created per How-to page (see image below).



After the session, I made a concise overview of all ideas from the first round of the session on one page, which can be seen in figure [ref]. This gave me the opportunity to add the ideas that came out of the recordings and switch ideas to different design directions when it seemed a better fit. The ideas which the participants found most appealing, are marked with a black asterisk in the left corner.

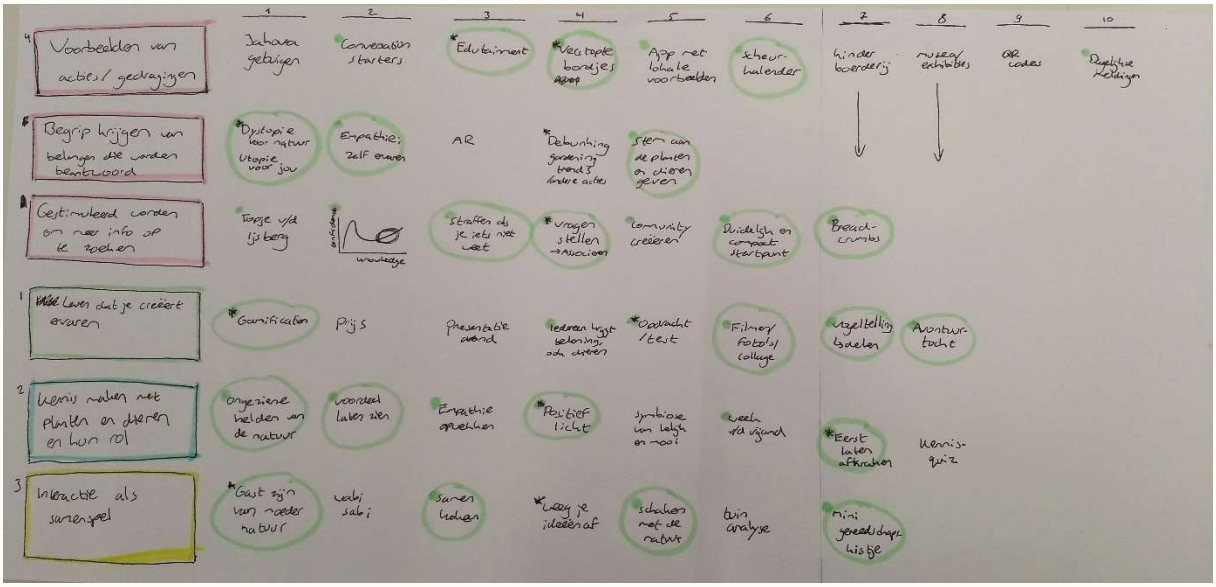


Figure 3 - Concise overview of the ideas that were generated in the first round of the brainstorm

For efficiency, this session was done in a short amount of time. This indeed resulted in a large amount of potential ideas, of which only a few were worked out in the second round of the session. Therefore I decided to continue the idea generation by expanding on the brainstorm individually with some of the remaining ideas that I selected (see appendix [ref] – Brainstorm Expansion). These are marked with a green dot in the left corner.

K - BRAINSTORM EXPANSION

Intro

After kicking off the idea generation with the cooperative brainstorm session, I decided to expand on this individually. There were multiple potential ideas in the first round of the brainstorm that had not been used to expand on in the second round. I selected those to work out further individually.

Approach

Because the random stimulus exercise was a success, I decided to expand on the brainstorm by repeating this exercise on the remaining ideas that I selected. I took 5 minutes per idea.

Results

I created 16 ideas, which adds up to 23 ideas in total (see figure [ref])

Figure 4 - The ideas that resulted from the cooperative brainstorm and the individual expansion

L - DISAGGREGATING THE IDEAS

Introduction

I realised that some of the 23 ideas of the brainstorm could be broken down into multiple components which represent separate ideas. To be able to select these individually for further concept development, I decided to disaggregate the ideas into separate elements, to have a clear inventory of ideas.

Approach

I filtered out the individual elements of each idea from the complete brainstorm and wrote them down on cards. This makes it easy to mix and combine them for further concept development. I colour-marked the cards with dots to show which element provides solutions in which solution space. This makes it visible which solution spaces are included during the concept development.

Results

The ideas were broken down to 37 elements (see figure [ref]). Some of these fitted multiple solution spaces and are therefore marked with multiple colours.

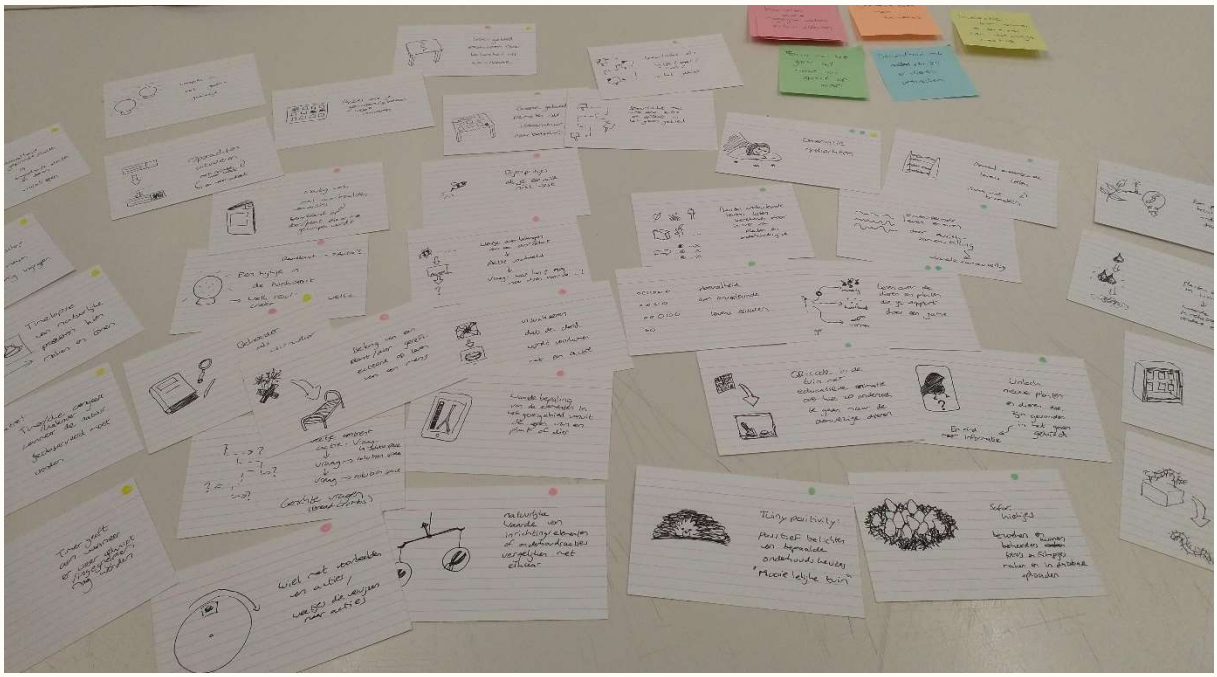


Figure 5 - The elements that were filtered out of the ideas from the brainstorm

I noticed that some of the ideas already fit requirement number [ref]: “The design should assist in communication to outside visitors”. I realised that this requirement could act as a space to design in, and therefore I turned it into a fifth solution space.

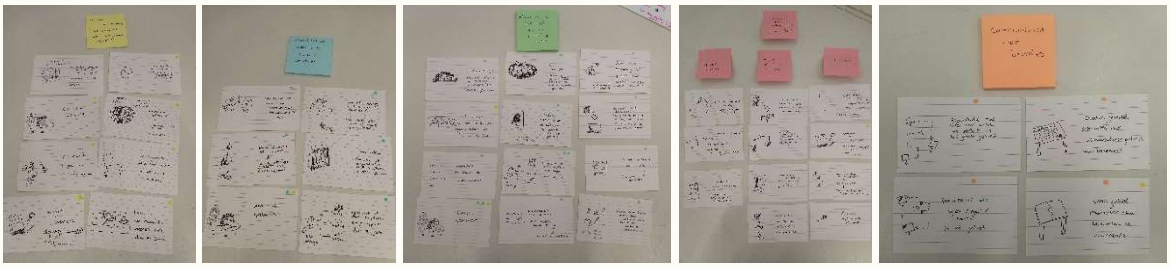


Figure 6 - The elements per solution space. Some of the elements fit in multiple solution spaces.

M - DEVELOPING THE FIRST CONCEPT IDEAS

Introduction

All the previously generated ideas provided enough inspiration to start forming the first concepts. The goal of this first concept development was to use these ideas to create the first concepts with a better fit to the user and the context.

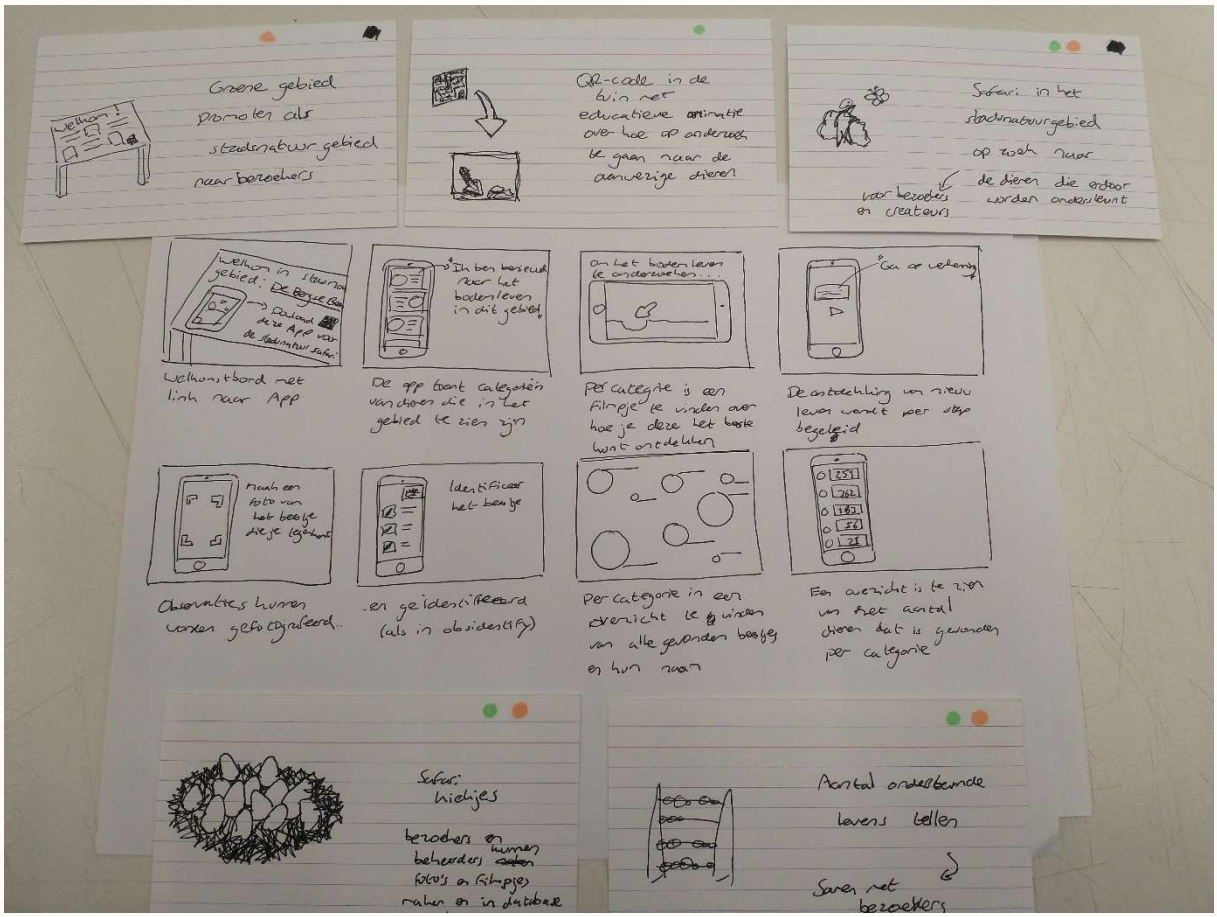
Approach

I flipped through the 37 elements and selected the ones with the most potential. I combined these to create concept ideas. I created and presented these through the use of scenario's, to be able to sketch the usage and function of the concept clearly.

Results

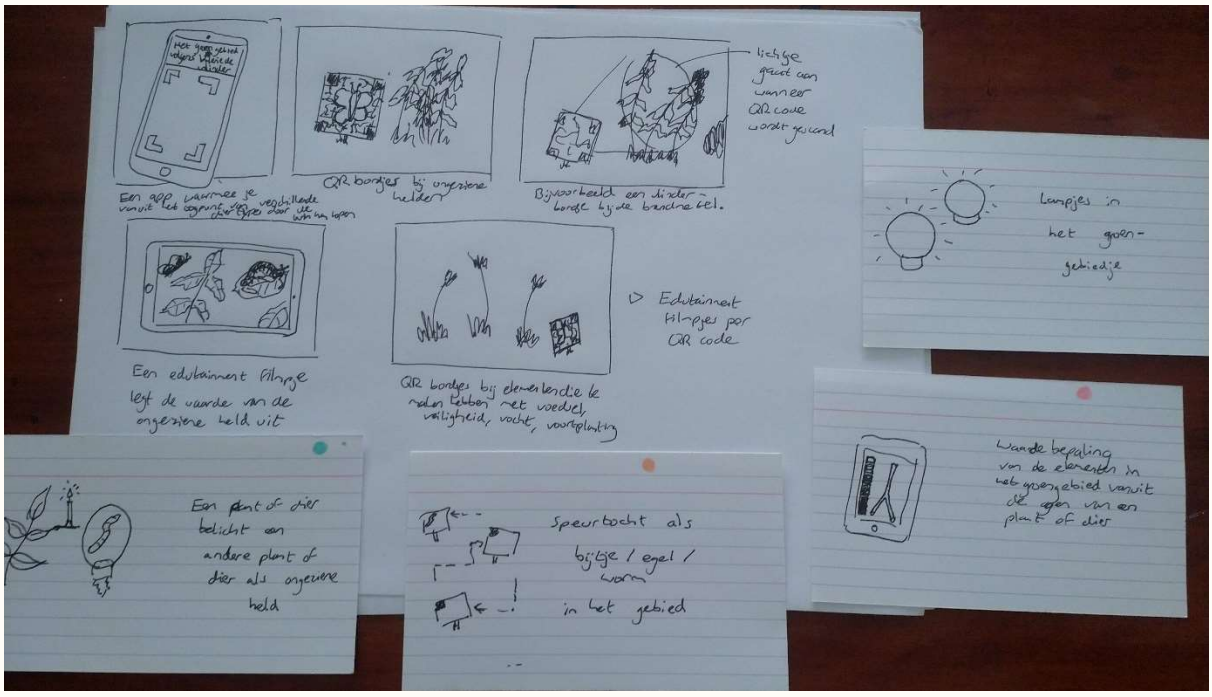
This resulted in the following five concept ideas.

Concept idea 1:

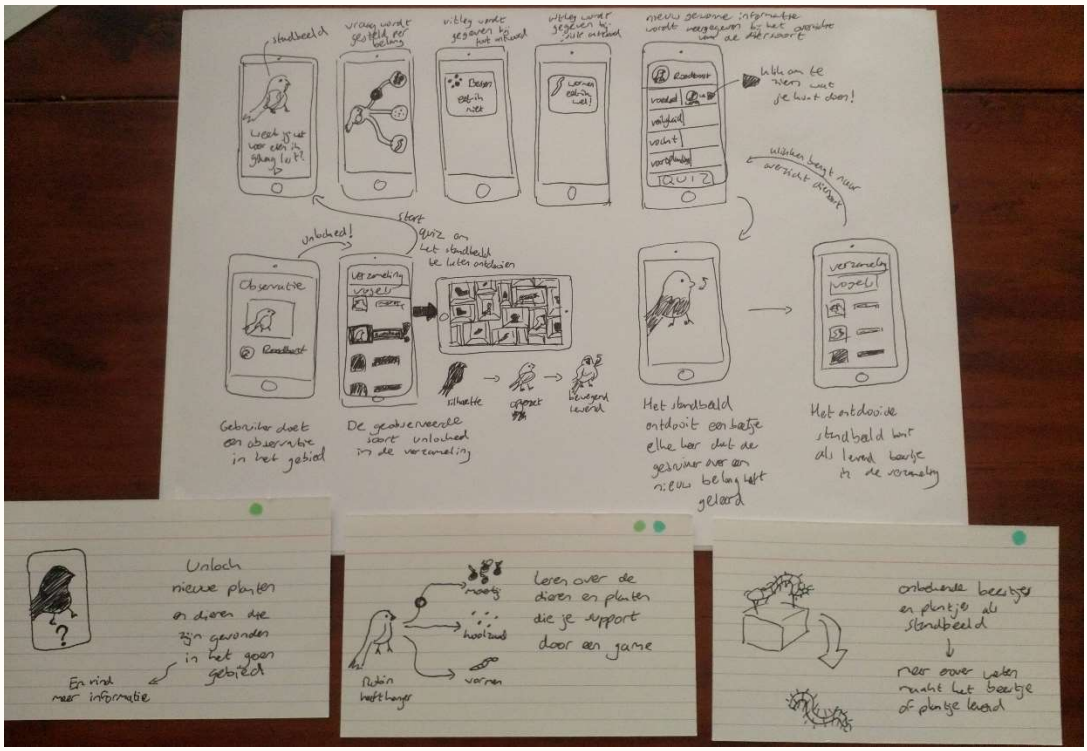

Groene gebied promoten als stedelijk natuurgebied naar bezoekers
QR-code in de buurt met educatieve animatie over hoe op andere manier te gaan naar de aanwezige dieren
Safari in het stedelijk natuurgebied op zoek naar de dieren die elders worden onderteund
voor bezoekers en createurs
Welkom in stedelijk gebied. De Bergse Bos
Download deze App voor de stedelijke safari
Welkomstbord met link naar App
De app toont categorieën van dieren die in het gebied te zien zijn
Je bent bezig met het bodemleven in dit gebied
Per categorie is een filmpje te vinden over hoe je deze het beste kunt ontdekken
Ga er verkenning
De ontdekking van nieuw leven wordt per stap beloond
Maak een foto van het beetje dat je gevonden
Identificeer het beetje
Observaties kunnen verder gefotografeerd
-en geïdentificeerd (als in observation)
Per categorie in een overzicht te vinden van alle gevonden beetjes en hun naam
Een overzicht is te zien van het aantal dieren dat is gevonden per categorie
Safari hiehijes
bezoeken kunnen beheerders zoeken foto's en filmpjes maken en in database
Aantal onderbrande levens tellen
Save met bezoekers

Concept idea 2:

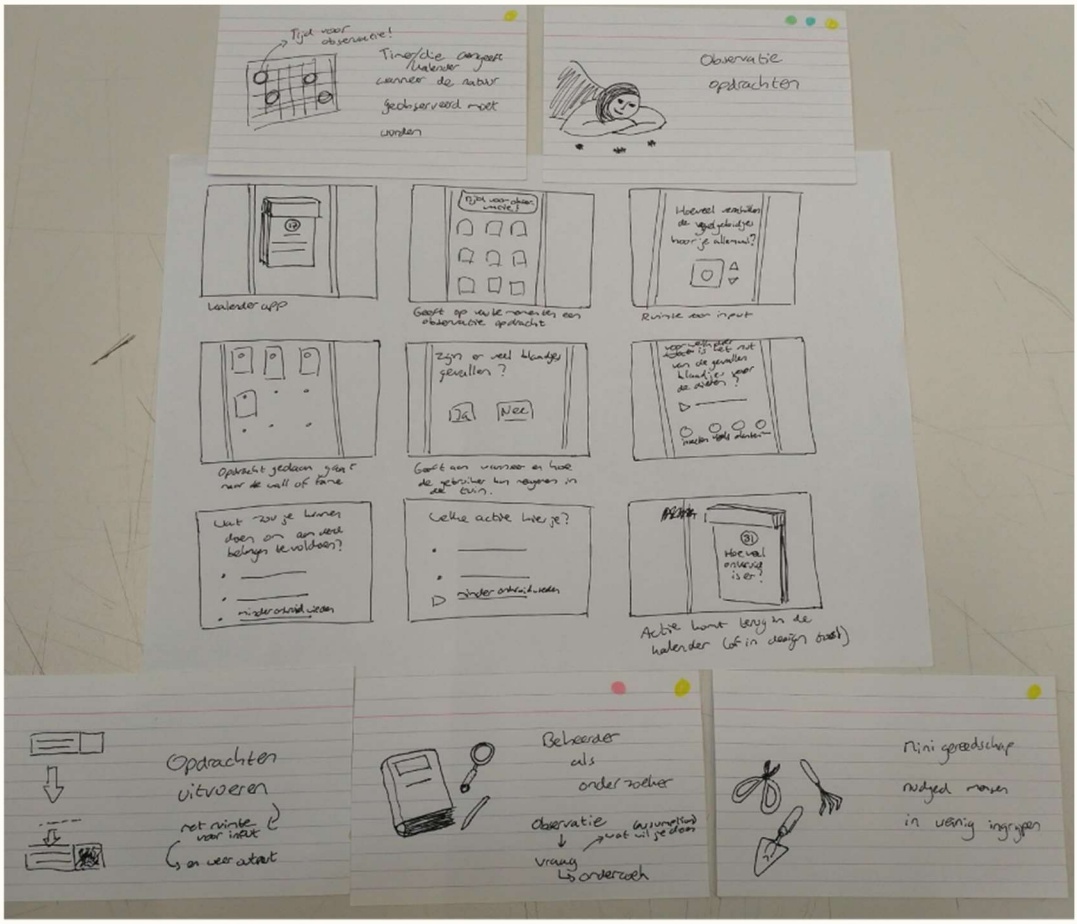
Concept idea 3



Concept idea 4



Concept Idea 5:



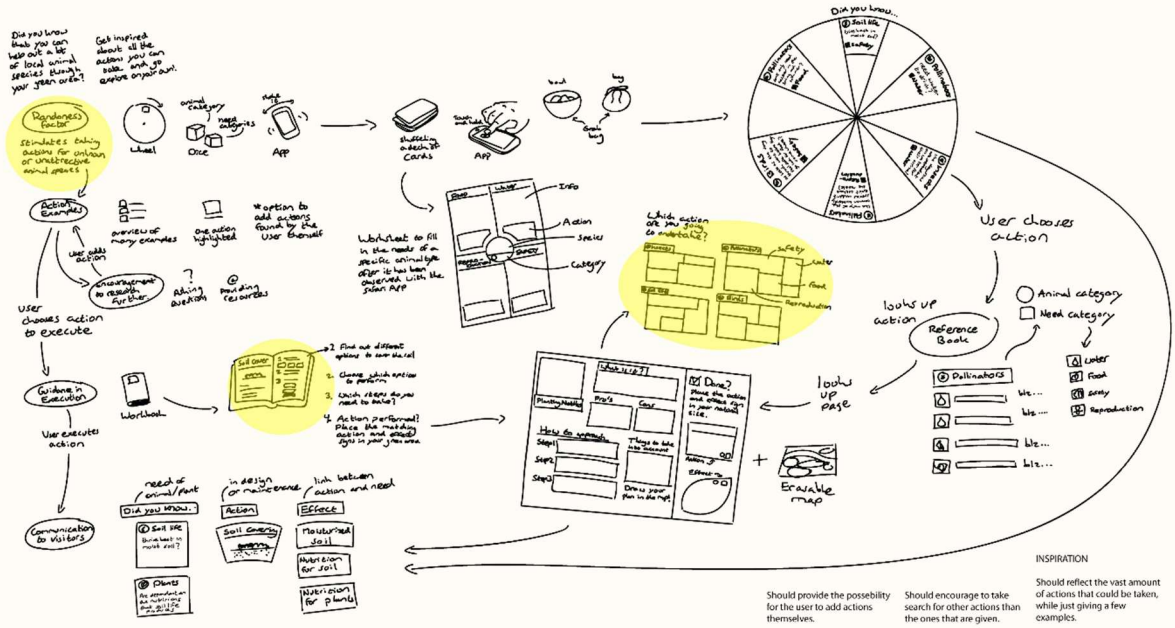
N - TOOLKIT CONCEPT ITERATIONS

Introduction

The next step was to bring the concept ideas together to create a toolkit. This toolkit concept should not only answer to the five solution spaces, but the users perspective as well. It should be fitting to the target group, their approach and their context. The design requirements came into play here as well.

Results

<u>Designing the green space and execution</u>



Inspiration:
A tool that provides examples of actions that should inspire the user to take action

Should include:

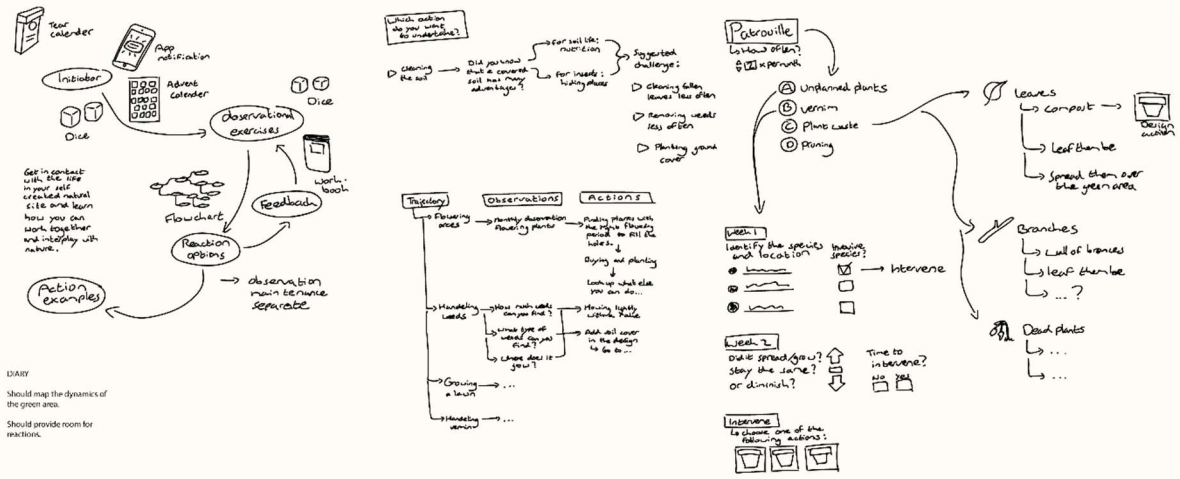
- A randomization factor, to stimulate the user to get to know and take action for unknown or unattractive plants or animals.
- Encouragement to search for other actions and add these themselves

Guidance in execution:
A tool that provides a step by step plan of which activities the user needs to take to perform a chosen action

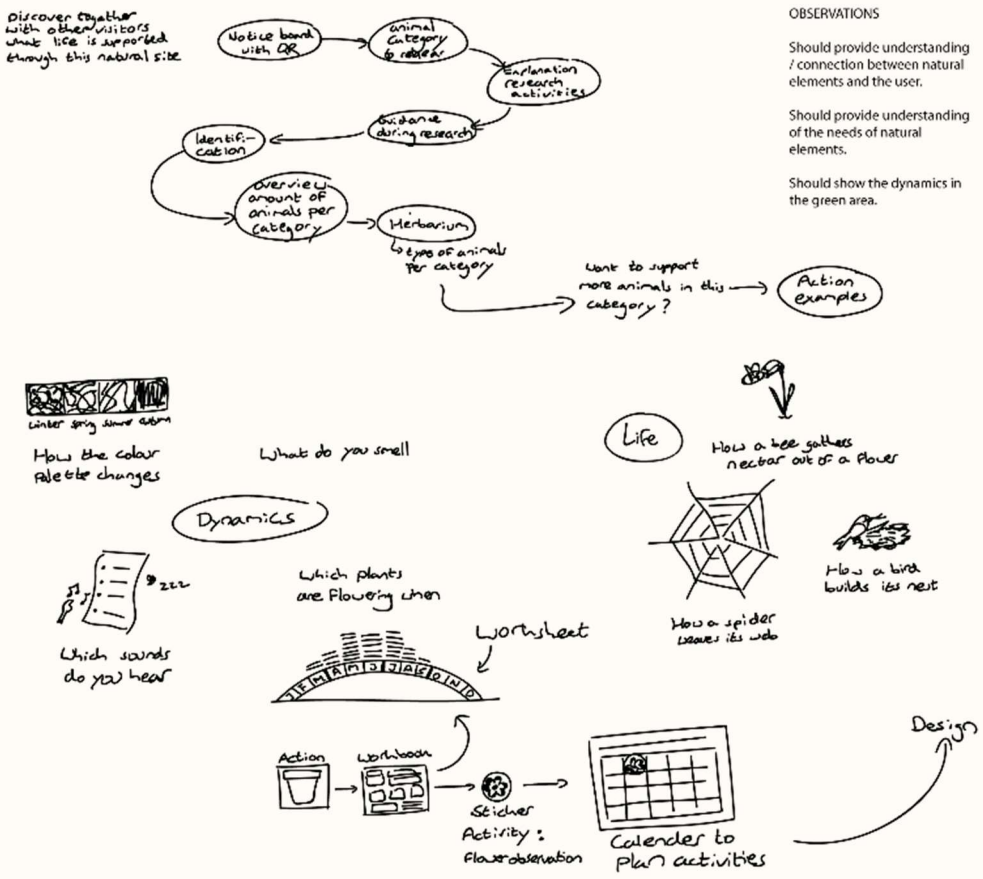
- Encouragement to add actions themselves

Positive reinforcement:
A tool that tracks the progress of the user; the actions that they have taken.

<u>Maintaining the green space (planning and execution)</u>



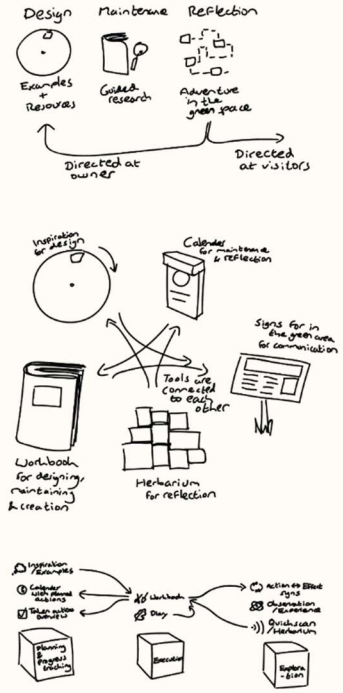
Reflecting on the results



General toolkit

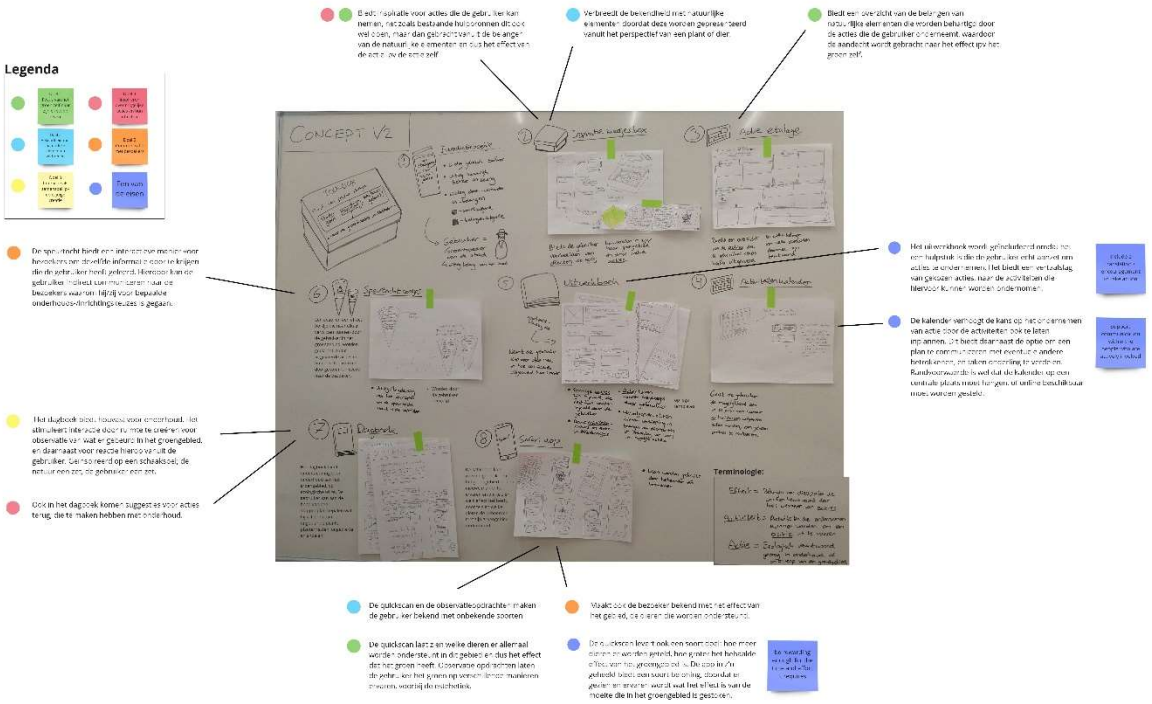
Presentation & Name of the Toolkit

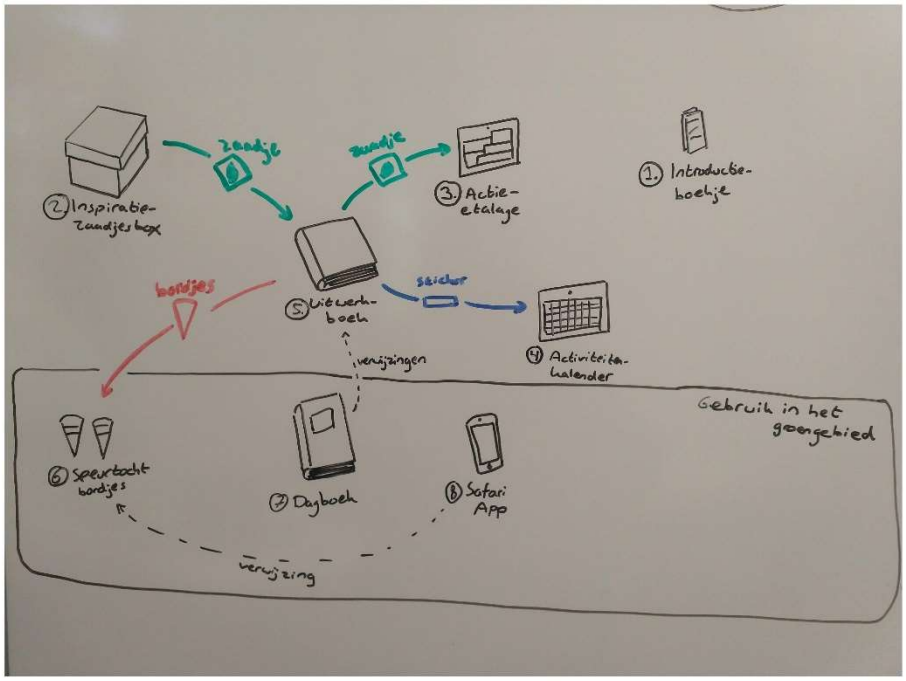
Set up of the Toolkit



Final version

Deze toolbox is gericht op de groenhoeders van Rotterdam: de stedeling die zich bezig houdt met het vergroenen van de stad, op welke manier dan ook. Het biedt ondersteuning en inspiratie om het natuurgebied dat ze hiermee hebben gecreëerd midden in de stad, tot zijn recht te laten komen en te optimaliseren. "Van stadsgroen naar natuurgebied". Het bestaat uit 8 items met allen een eigen functie en doel.





- Een deel van de tools kan in de context van het groengebied zelf worden gebruikt.

be used in the context of the green space

- De gebruiker kan zelf bepalen hoeveel tijd hij/zij eraan besteedt. Het product biedt opties voor verdieping door zelfstudie maar geeft ook genoeg kant en klare informatie.

be rewarding enough for the time and effort it requires

let the tg acquire the required knowledge themselves

provide a deeper understanding of ecological responsibility while not requiring too much time and effort

- De toolkit is er op gericht dat de gebruiker een slag maakt in zijn of haar groengebied, en spoort daardoor aan in een verandering in ontwerp en onderhoud, die de gebruiker zelf kan toepassen en er is ruimte voor de gebruiker om zelf ideeën te ontwikkelen.

provide room for the TG to create

- De opzet van de toolkit is dat het gebruikt kan worden door een groep of het individu en dat het geïntegreerd kan worden in elk soort aanpak en project,.

be applicable for different group dynamics

be applicable for different group approaches

be applicable for different types of projects

- De opzet van de toolkit is dat het het proces naar een meer ecologisch beheer en inrichting vergemakkelijkt maar ook dat het leuk is om mee te werken.

be experienced as a fun addition to the current process

O – COST ESTIMATIONS

Explanation of selected products

ivn natuur educatie

Zoekkaarten Set

7 zoekkaarten
- 10x Stenen
- 10x Diersporen
- 10x Boomvruchten
- 10x Bladgallen
- 10x Muggen, vliegen, bijen en wespen
- 10x Spinnen
- 10x Paddenstoelen

€ 66,-

Bordje vriendelijke tuin

Heb je jouw tuin gecheckt met de Tuincheckkaarten? En heb je een vriendelijke tuin voor mens, plant en dier? Gefeliciteerd! Bestel dan hier je Vriendelijke Tuin bordje. Er zijn zes verschillende bordjes beschikbaar, spaar ze allemaal!

€ 5,75 (x6 = € 34,50)

Natuuractiviteiten boek

Het grote Natuuractiviteitenboek staat boordevol leuke buitenactiviteiten, natuurweetjes, leestips, zoekkaarten en spannende opdrachten.

Bij het boek hoort ook een website: www.allekinderennaarbuiten.nl

€ 29,95

Kriebelbeestjes pakket

Met dit 'Kriebelbeestjes pakket' kunnen kinderen volop kennismaken met de diversiteit onder de torren, spinnen, duizendpoten en andere insectensoorten. Inhoud van het pakket:
- 1 x een witte flexibele verzamelbak
- 1 x insectenzuiger
- 1 x pincet van kunststof
- 1 x schepje
- 1 x potloep
- 1 x rol petrischaaltjes (15 stuks)
- 1 x zoekkaart bodemdieren (ongeplastificeerd)
- 1 x zoekkaart spinnen (ongeplastificeerd)
- 1 x zoekkaart muggen, vliegen, bijen en wespen (ongeplastificeerd)
- 1 x boek Kriebelbeestjes

€ 39,95-

Vogels in de winter pakket

Bij het pakket wordt een informatieblad geleverd met daarop het wachtwoord waarmee u de handleiding en andere benodigde bestanden kunt downloaden.

Inhoud van het pakket:
- Raamstickers voor vogelherkening
- Vogelzaden 200 gram
- Pinda's 200 gram
- Birdswing
- Vetbollen (zonder netje)
- Een pot pindakaas

€ 27,95

Tuincheckkaarten Vriendelijke Tuin set

Check het met de Tuincheckkaarten. Dit pakket bevat zes verschillende kaarten waarmee je ontdekt hoe vriendelijk jouw is voor dieren, insecten en planten. De kaarten zijn op A4-formaat en scheur- en watervast en daarmee duurzaam en gemakkelijk vaker te gebruiken.

- 6x tuincheckkaart A4

€ 17,50

Herfstpakket paddenstoelen

Met het herfstpakket wordt het leren herkennen en determineren van verschillende paddenstoelsoorten een makkie!

- 1 Steelloep dubbel lens
- 1 Spiegeltje
- 1 Compact Gids paddenstoelen
- 1 IVN Zoekkaart paddenstoelen met doe-opdrachten

€ 15,-

Obsidentify app

Obsidentify is een gratis fotoherkenningsapp die wilde planten, dieren en paddenstoelen uit Nederland en België op naam kan brengen. Door middel van een database met gevalideerde referentiebeelden herkent de app meer dan 13.000 soorten. Met elke nieuwe herkenning wordt deze database verder uitgebreid en verbeterd. Wanneer je waarnemingen opslaat met deze app zie je ze direct terug op Waarneming.nl.

Natuurmonumenten

Kijkkaarten bundel

Alle vijf de kijkkaarten van Natuurmonumenten bij elkaar. Voorzien van tekeningen van Jasper de Ruiter en informatie over de dieren. De kaarten hebben een handig formaat en zijn gemaakt van stevig materiaal. Ideaal om (tuin) dieren mee te herkennen!

- 5 kijkkaarten

€ 14,95

Jaarkalender en agenda

Elk jaar brengt Natuurmonumenten haar eigen agenda en kalender uit. Ook voor het jaar 2023 zijn er weer unieke exemplaren gemaakt met prachtige natuurfoto's en voldoende ruimte voor al je afspraken

€ 30,90

Boek van OERRR

In 'Het boek van OERRR' van Natuurmonumenten word je geïnspireerd om lekker de natuur in te gaan. Wil je buiten spelen, maar weet je niet wat je moet doen? Met dit boek beleef je de tofste avonturen en leer je allerlei leuke weetjes.

€ 20,-

KNNV
vereniging voor veldbiologie

Guerrilla Gardening

Handboek 'Guerrilla Gardening' laat je zien hoe je je eigen leefomgeving eenvoudig kunt vergroenen. Met praktische tuintips en inspirerende voorbeelden van duurzaam tuinieren waarmee je jouw buurt mooier, gezonder en levendiger maakt. En de bijen, vlinders en vogels helpt.

€ 22,50

Improvement suggestions

		Production costs per toolkit				
		Subject	**Price**	**Per..**	**# per toolkit**	**Price per toolkit**
1	**Container**	Total production	1903.99	1000.00	1.00	**1.90**
2	**Introduction boolket**	Total production	563.69	1000.00	1.00	**0.56**
3	**Seed 'packages'**	Purchase bag	17.50	50.00	1.00	**0.35**
		Production 'packages'	233.02	1000.00	20.00	**4.66**
4	**Design workbook**	Production workbook	7871.80	1000.00	1.00	**7.87**
		Production stickers	2764.02	1000.00	1.00	**2.76**
5	**Signs**	Signs purchase	19.99	50.00	20.00	**8.00**
		Plastic bags purchase	15.87	500.00	40.00	**1.27**
6	**Calendar**	Total production	3359.93	1000.00	1.00	**3.36**
7	**Maintenance notebook**	Total production	4932.37	1000.00	1.00	**4.93**
8	**Inventory shed**	Total production	219.24	1000.00	1.00	**0.22**
9	**App**	Licenses	1.5	1000	1000.00	**1.50**
					Total	**37.39**

		One-time costs				
		Subject	**Price**	**Per**	**# needed**	**Price total**
1-8	**Everything else**	Graphic design printables	54.45	hour	80	**4356.00**
9	**App**	Graphic designer app	54.45	hour	40	**2178.00**
		Animations	5000	animation	6	**30000.00**
		Software developer app	113.14	hour	400	**45256.00**
					Total	**81790.00**

- A change that would likely have the biggest influence would be to take out the animations of the application, and exchange them for static image and text frames that can be swiped through by the user. Costs for app development and graphic design will increase, but the complete costs per toolkit will likely be diminished significantly.
- According tot the consulted app development expert, choosing for a different programming framework would result in a slight reduction of the apps performance, but also reduce the required hours of software development by around 25%.
- Options that could reduce costs for the design workbook and other printed products in general, are to look for cheaper materials or printing companies.
- Combining some of the items like the Introduction booklet, the Design workbook and the Inventory shed into one item might reduce costs as well.
- For this cost estimation, the form of the signs is chosen as purchasable plastic sign holders that were found through a quick web-search. As its functions (it should clamp a card and stand by being pricked in the ground) can be achieved through many forms, there are likely many more options on the market, so a further search might result in a cheaper option.

P – EVALUATION SESSIONS

Introduction

The goal of these sessions is to evaluate the concept, to find out what could be improved. There are two main questions to be answered:

> Does the concept reach its goal and how can this be improved?
>
> Does the concept fit the target group and how can this be improved?

Approach

Participants

As participants are included people who know the target group well, so they have seen different initiatives and understand the variety within them.

My role was that of the facilitator.

Process steps

- Before the session: Participant watches showcase video (see file in repository [ref]) at home to get an idea of the toolkit.
- During the session:
    - Introduction:
        - Explaining the goal of the session
        - Explaining the target group
        - Explaining the goal of the project
    - Explaining the toolkit:
        - Rewatching the video
        - Explaining the tools in more detail with the use of the prototype in the same order as presented in the video, allowing questions after each tool
    - Questions:
        - 5 statements are shown, each followed by five questions.

          Statements:
          1. I think that the toolkit would inspire me as a green guardian to manage my green area in a more ecological responsible way."
          2. "I think the toolkit fits my capabilities as a green guardian well."
          3. "I think that I as a green guardian would like to use the toolkit."
          4. "I think the toolkit would incite me as a green guardian to take action."
          5. "I think that usage of the toolkit would give me as a green guardian satisfaction."

          Questions asked for each statement:

A. “Use the indicator on the slider to show to what extent you agree or disagree with this statement?”
B. “Could you point out the aspects of the toolkit that make you agree?/Can you name any pro’s?”
C. “Could you point out the aspects of the toolkit that make you disagree?/Can you name any cons?”
D. “No think what this would be like for other green guardians, would you change your opinion?”

E. “What should be changed to make it better?

- The participant is asked to rank the tools from the ones that they like the most to the ones they like the least. Their choice is discussed further to find the reasoning behind it.

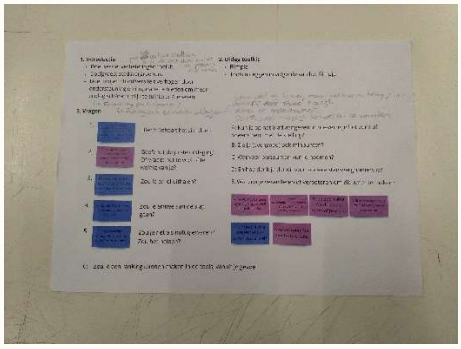


Figure 7 – Cheat-sheet for facilitator

Figure 8 - Introduction support sheets

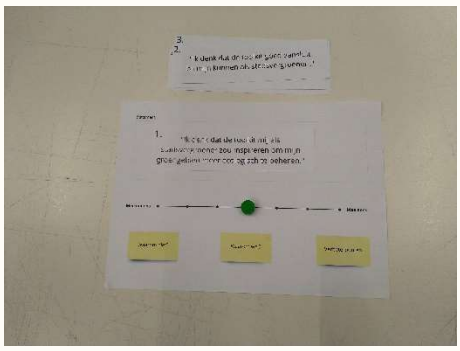


Figure 9 – Question support sheet statements

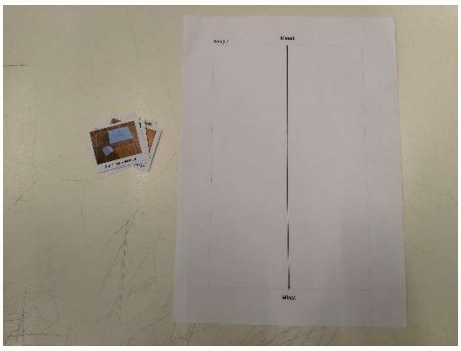


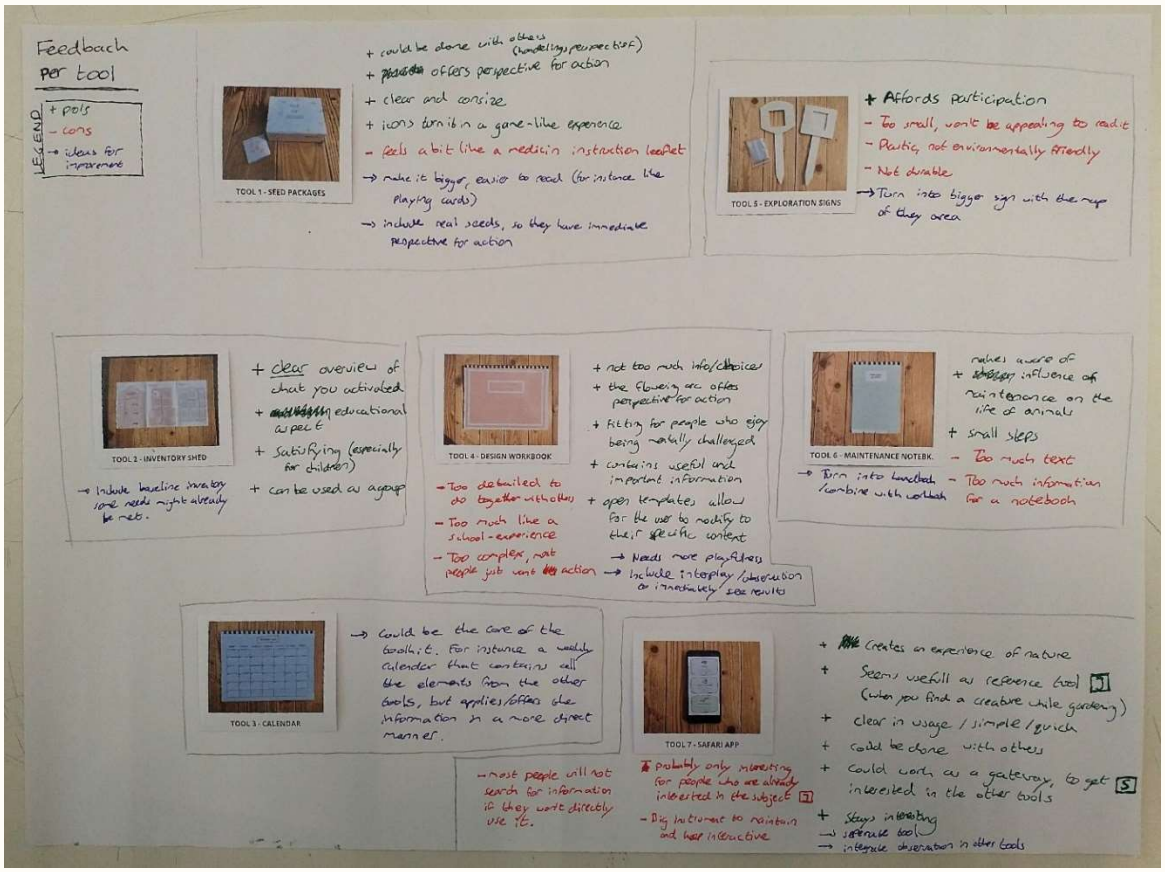
Figure 10 - Question support sheet ranking

Results

Two participants where interviewed in separate sessions.

P1: Employee at Stek de Stadstuinwinkel, she gives planting advise to gardeners, including citizens who are involved in public green initiatives. She is also administrator of an allotment association and green guardian herself, as she created green façade gardens together with the residents association (vve) she is part of. She tries to stimulate an ecological balance in all her work.

P2: Project manager at Opzoomermee where he assigns micro budgets (subsidies) to green initiatives in the neighbourhoods Charlois and Hillegerberg-Schiebroek. He is a green guardian himself in Dordrecht, where he added planters to the streets he lives in. He is involved in ecological gardening and is looking for a way to improve ecological quality of the initiatives they financially support.


Feedback per tool
LEGEND
+ pros
- cons
→ ideas for improvement
TOOL 1 - SEED PACKAGES
+ could be done with others (handelings perspective)
+ offers perspective for action
+ clear and consize
+ icons turn it in a game-like experience
- feels a bit like a medicin instruction leaflet
→ make it bigger, easier to read (for instance like playing cards)
→ include real seeds, so they have immediate perspective for action
TOOL 5 - EXPLORATION SIGNS
+ Affords participation
- Too small, won't be appealing to read it
- Plastic, not environmentally friendly
- Not durable
→ Turn into bigger sign with the map of the area
TOOL 2 - INVENTORY SHED
+ clear overview of what you activated
+ educational aspect
+ Satisfying (especially for children)
+ can be used as a group
→ Include baseline inventory some seeds might already be met.
TOOL 4 - DESIGN WORKBOOK
+ not too much info/choices
+ the flowers are offer perspective for action
+ Fitting for people who enjoy being mentally challenged
+ contains useful and important information
+ open templates allow for the user to modify to their specific context
- Too detailed to do together with others
- Too much like a school-experience
- Too complex, not people just want action
→ Needs more playfulness
→ Include interplay/interaction or immediately see results
TOOL 6 - MAINTENANCE NOTEBK.
+ makes aware of influence of maintenance on the life of animals
+ small steps
- Too much text
- Too much information for a notebook
→ Turn into handbook /combine with others
TOOL 3 - CALENDAR
→ Could be the core of the toolkit. For instance a weekly calender that contains all the elements from the other tools, but applies/offers the information in a more direct manner.
- most people will not search for information if they want directly use it.
TOOL 7 - SAFARI APP
- probably only interesting for people who are already interested in the subject
- Big investment to maintain and keep interactive
+ Creates an experience of nature
+ Seems usefull as reference tool (when you find a creature while gardening)
+ clear in usage / simple / quick
+ could be done with others
+ could work as a gateway, to get interested in the other tools
+ Stays interesting
→ separate tool
→ integrate observation in other tools

General Feedback

LEGEND
+ Pro's
- Cons
→ Ideas for improvement

+ Inspiring
+ Has potential to offer perspective for action
+ Contains aspects that motivate to take action
+ Positive note / examples
+ Creative / playful
+ Offers different levels in which ecology is exerienced
+ Offers something interesting for everyone
+ Has potential to be used with others, can be passed through
+ hightfull
+ Whole year through

- Too complex. People might drop out.
- It tends more towards a handbook then a toolbox, due to its complexity and the large amount of information.

→ More visuals, less text
→ Present in parts with different functions
→ Simplified toolkit that immediately prompts action.
→ Step by step approach:
  1. This would be good for...
  2. This is what you can do...
  3. Action
  4. Explanation
→ The calender as a base
→ Use gardening actions as practical entrance to convey the information about biodiversity.