PROSUMERISM IN OOSTERWOLD:

DESIGNING A TRANSITIONAL PRACTICE OF FOOD GROWING

DIY HUBS
Oosterwold

MASTER THESIS BY

YAĞMUR GÖKÇE

Author's Notes

The ones who know me would easily relate with the urge of mine that comes from childhood, being able to do something good for the world that we live in. When I first heard about this project from my supervisor Elisa, I thought this might be the opportunity to touch into people's lives in a way that I've been dreaming of.

In a way by understanding the complex relationships among humans but also humans and other things: living but non-speaking things, non-living things, or more abstract things like personal preferences, social mechanisms, invisible infrastructures. I believe if we start perceiving the world with the lenses of "unlimited relationships", then we would be able to understand and further design for the mechanisms that compose those relationships. This way, we can shift from a human-centered way of thinking and living to a more-than-human way of living. Once this is established, then I believe it would be possible to talk about sustainable futures ranging from eco-friendly designs to collaborative societies; which wouldn't be possible if we only concentrate on and design for human needs and interests. At the end of this 2 years in the faculty, I believe that I've got closer to my childhood dream by exploring and designing for a transitional practice.

In this thesis, I explored how the practice of food growing is in a neighborhood where citizens build their own houses, make their own roads and grow their own food. It was a great pleasure for me to work in this kind of a context, that is pretty different than our everyday urban lives.

This 5-month journey was a blast both in terms of my own development as a human being and a designer. I hope you will enjoy reading it!

TU Delft

Project chair:
Prof. dr. Elisa Giaccardi
e.giaccardi@tudelft.nl
Professor and Chair of
Interactive Media Design
Industrial Design | HCID

Project mentor:
dr. Taylor Stone
t.w.stone@tudelft.nl
Postdoctoral Researcher
Industrial Design | DA

WAGENINGEN
UNIVERSITY & RESEARCH

Research mentors:
dr. Esther Veen
esther.veen@wur.nl
Department of Social Sciences
Rural Sociology, WUR

ir. Jan-Eelco Jansma
janeelco.jansma@wur.nl
Wageningen Plant Research Field
Crops, WUR

Author:
Yağmur Gökçe
me.yagmurgokce@gmail.com
Design for Interaction
Industrial Design
Engineering, TU Delft

Acknowledgments

Before we get into the thesis itself, I would like to thank some special people that touched my life and indeed to this project together with me.

First of all, I would like to thank my supervisory team for all their efforts and great support. Thank you Elisa for opening up the opportunity for me to work on a project where we thought and talked about more-than-humans. Thank you for asking me the right questions and letting me find my own path.

Thank you Taylor for being there with me every single week in this 5 months. Thank you for listening my chaotic-sounded mind and guiding me with your step-ahead questions.

Thank you to WUR team, Esther and Jan Eelco for trusting and giving me freedom in the project.

Thanks to all Oosterwolders, who helped me understand their world better and provided great insights throughout the project: Arjan, Jos, Gence, Savino, Linda, Koos, Thea, Mirjam, Mark, Tom, and Shirley. Thank you also to my Delft friends who supported me with their creativity: Ece, Alara, Chenye, Sieb, Omar, Mert, Jiwei, Barkın, Xiaomin, Ashni and Pablo.

Thank you to my dearest friends, Nazlı for being 7/24 around, Selin for letting me see this part of my masters, Pelin for being a superwoman in the most needed moment, Anniek and Hannah for being my last minute Dutch editors.

A big thank you to my family, Dilek and Volkan for giving your unconditional support and love. Thank you Suzi for being an especially great sister in this 2 years of my life, Akay for being my *bitki eşi* and providing endless drives to Oosterwold.

Executive Summary

Imagine a neighborhood where almost all of the decisions are left to its inhabitants; a neighborhood where all of the inhabitants cultivate soil to grow their food for their own consumption, in other words prosumerism*. This newly established neighborhood is Oosterwold which is located in the intersection of Dutch cities Almere and Zeewolde. Oosterwold is specifically designed to include agriculture activites into everyday life of its inhabitants which would enable sustainable ways of living in the area.

This project is an attempt to explore the opportunities that prosumerism holds to enable the transition towards sustainability in Oosterwold. It explores and designs for prosumerism in Oosterwold as a means to foster the transition in the area. By framing prosumerism as a social practice and making use of ideas from transition design; the project offers a bottom-up approach to foster sharing and exchange of gardening things in the neighborhood.

In order to understand and further design for the elements of prosumerism, the project makes use of both human and thing-centered design research methods. The project advocates that once the needs and desires of prosumers together with the role of gardening tools in the practice are discovered, then it would be possible to design for prosumerism to foster sustainable ways of living.

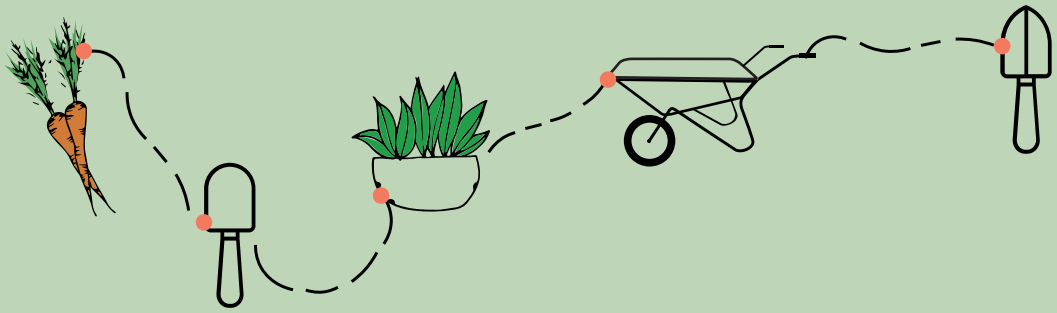
The broader project question of "how can we enable the ongoing transition in Oosterwold through the food growing practices of inhabitants?" is narrowed down to the design goal of "how can we enable community building of prosumers through supporting their meanings of food growing in Oosterwold?". The project choses sharing, exchanging and collaboration as mechanisms which enable community building in Oosterwold. Through increasing involvement in prosumerism activities and facilitating know-how sharing of individuals about gardening, community building can be reached.

The resulted design is DIY Exchange Hubs that are cube-like boxes for Oosterwolders to exchange gardening things like tools, books, seeds and excess produce. The hubs can be built by Oosterwolders with the help of building manual which includes drawings of the pieces, instructions about how to put them together and extended features section that includes tips about coloring and functional differentiation of the hubs. Further, the hubs can be traced and tracked with the mobile application. Through the app, Oosterwolders may see the current status of the hubs, how to make use of the things that are in the hubs and further make a hub building request.

**: A made up word which is derived from the combination of "producer" and "consumer": "prosumer" refers to the ones who grow their own food where "prosumerism" refers to the practice of prosumers.*

Table of Contents

For a **transitional** context, what is the **meaning** of **food growing** and **how** can it be **fostered**?



1. Project

This chapter explains the background and aim of the **research project** on prosumerism in Almere which forms the **foundations** of this graduation project. It further provides an overview of this graduation project through setting the **aim, research questions, structure and process.**

1.1 Introduction

1.1.1 Prosumers Research Project in Almere

This graduation project contributes to an ongoing research project that aims to understand and describe the practice of growing one's own food (prosumerism) and its impact in Almere. This project is conducted by Wageningen University and Research (WUR) and funded by Amsterdam Metropolitan Solutions (AMS). Specifically, the research investigates who the prosumers are, what, how and where they do their activities, and what their motivations are for participating in the practice of prosumerism. Through this research, the aim is to collect insights regarding the products and services that might be beneficial to prosumers and the merits of prosumption to Almere.

In order to achieve the latter, WUR was asking opinions of scholars from different disciplines. This is how they contacted Prof. Elisa Giaccardi with the question: how can design help to open up new approaches to human imagination and capabilities, for the individuals who grow their own food in Almere? This question forms the basis of this project.

At the end, the outcomes of this graduation project will be added to the research project of WUR and presented in AMS as a possible design direction for the individuals who grow their own food in Almere.

1.1.2 Transition Design for Prosumers in Almere

Mentioned in the prosumerism research of WUR, growing one's own food is one of the activities that inhabitants of Almere are practicing at the moment and its impact is worth investigating.

For this project, the context was narrowed down to Oosterwold, an area that is specifically designed to include agriculture activities into everyday life which would contribute to the sustainable organic development of this unique neighborhood (Jansma and Veen, 2012). In that sense, prosumerism, is an essential bottom-up practice for Oosterwold that contributes the area's sustainability goals and visions.

This project is an attempt to explore the opportunities that prosumerism holds to enable the transition towards sustainability in Oosterwold. What are the elements which affect prosumerism practices of inhabitants and how do these interact with each other? To maintain and further sustain these relationships, what are opportunities of this transitional context and how can we revive them? In other words, **how can we enable the ongoing transition in Oosterwold through the food growing practices of inhabitants?**

1.2 Project Aim & Structure

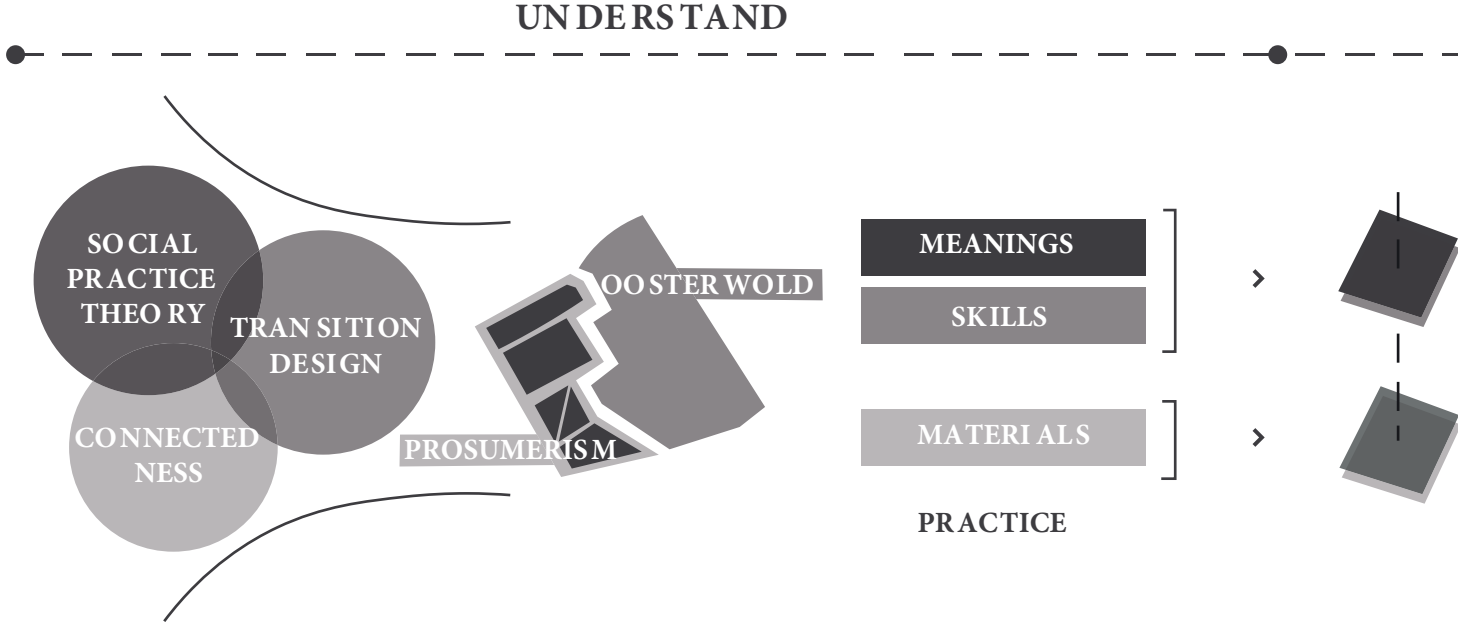
1.2.1 Aim and Research Questions

Researchers have been working on the ways in which sustainable ways of living can be achieved through analyzing practices' historical backgrounds, current ways of doing and futuring. Through deconstructing practice elements, adding new ones, or re-framing the existing practices some scholars argue that practices can be influenced in an intended way (Kuijer, 2014). While doing this, it is important to consider practices and their elements as a web of relations. So, instead of focusing only on human desires and needs; it is crucial to understand why these needs occur, in relation to what and how they are performed in daily lives.

This project makes use of both human and thing centered design methods to understand prosumerism practices as a whole; more importantly, how the relations between its elements currently is and how these relationships shape the practice of food growing in Oosterwold. Thus, the project aims to develop a bottom-up design which would enable and strengthen the ways in which prosumerism is performed in this transitional context. Accordingly, the sub-research and design questions are as follows:

- How the elements of food growing practice (meanings, materials, competences) are experienced and performed by the prosumers of Oosterwold?
- How these elements influence each other?

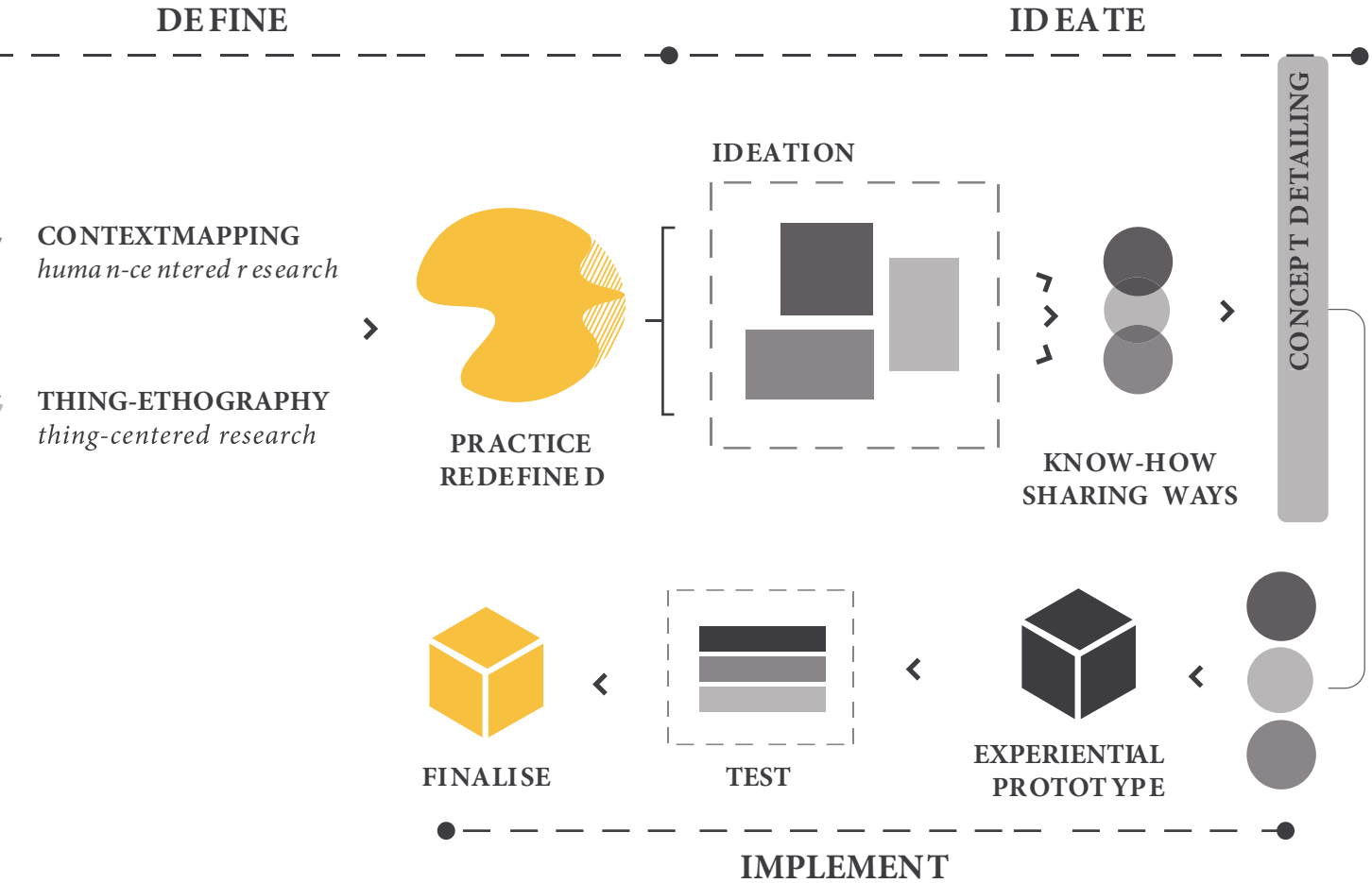
- What are the ways of including more inhabitants who actively performs the practice of prosumerism?
- How can design enable transition through food growing practice?



1.2.2 Structure and Process

The graduation project builds on social practice theory through combining human and thing-centered design methods. By following an iterative design process, the project first **sensitizes** with the prosumers of Oosterwold. To establish this, a background literature review; followed with the design research methods of contextmapping and thing-ethnography are conducted. In the background review, we provide an overview of Oosterwold, together with urban agriculture practices in Almere and social practice theory, which create theoretical foundations of this graduation project. When it comes to the preference of this kind of a combined design research method is that the project seeks for a comprehensive understanding of the food growing practice from different perspectives.

After understanding the context, with the insights generated at the end of background review and on field research, the project aim is **redefined**: how can we enable knowledge sharing of the prosumers without disturbing their current connection with nature in Oosterwold? In order to answer this, the project then goes to the **ideation** phase where concepts are generated for the above described question. Once the concepts are discussed with prosumers, the most promising design qualities are translated into design elements. The final design concept is prototyped and further tested in a community event.



2. Background Review

This chapter constitutes the basis of the project through explaining the **context** and **theoretical background**. **Growing one's own food** as an identificatory practice of **Oosterwold** is demonstrated in detail; together with **foundational sustainability goals** of the neighborhood. To interpret this **transitioning context** better, **social practice theory** and its ability to **elicit change** are elaborated.

2.1 Understanding Almere

2.1.1 Background of Almere: Transformed Lands

In essence, Almere is built on reclaimed land, in order to fulfill the need for housing space in the 1970s (Zhou & Commandeur, 2009). Furthermore, it was envisioned as a polynuclear garden city composed of greenery between the cores, surrounded by farmland, forests and water (Dekking, 2017). Due to the growing demand for new housing around Amsterdam area, Almere will have to double its size (Jansma and Dekking 2016), which would require precautions in terms of practice for the city to be sustainable, carbon-neutral and as self-sufficient as possible (Almere, 2009). Together with the economic and demographic expansion happening in Almere, the land itself became valuable, since it also has remarkable amounts of green areas and potential for growth (Portscyh, 2015). Since the city holds a considerable amount of open landscape with vegetation spreading towards the residential areas and planned green zones; it offers opportunities for development when it comes to cultivation and agriculture.

2.1.2 Urban Agriculture in Almere

Since Almere is a place where urban life and nature intersects, there is also a great potential for urban agriculture activities. This potential is supported by the larger governmental bodies with policies and visions. For instance the city council of Almere created the Almere Principles which includes ecology and sustainability as their central themes (Jansma & Visser, 2011). The principles consist of sustainable urban development entry points such as cultivating diversity, combining city and nature, anticipating change, continuing innovation, designing healthy systems and empower people to make the city (Almere, 2008).

In addition to these, to explore opportunities that would lead towards reintegration of agriculture into modern Dutch city life, a virtual city concept called Agromere was developed for the region of Almere Oosterwold. This concept further contributed to the municipality's development plan which was launched in 2009 (Jansma et al. 2011). Agromere's design principles include establishing closed nutrient cycles within farming and urban systems, ensuring locally produced energy, and organic farming. Another key idea of the Agromere concept is that public areas should be used for urban agriculture activities. While designing the concept, stakeholders such as local farmers from the Oosterwold region, city councils of Almere and Flevoland, nature and environmental organizations and the board of small-medium enterprises' (SME) in Almere and Ministry of Agriculture were also included. Through this process, the design of Agromere inspired city planners to include urban agriculture practices in the design of Almere Oosterwold.

Image 1. An impression of Agromere

In the light of these policies and developments, organizations like Almere Development Center for Urban Farming and Flevo Campus are established to support urban agriculture initiatives. The initial is a collaborative organization with Wageningen University and Research, Aeres MBO and HBO, and Flevoland Development Company that aims to contribute to the development of the city through making urban agriculture a natural part of everyday life; whereas the latter is a place for students, researchers and companies come together to explore and innovate about the future of food and urbanization (Dekking, 2017).

2.1.3 Prosumers in Almere

Growing the food that you are going to eat started to be a common practice due to the lack of transparency in the production conditions of large companies (Veen, 2013). Term prosumer refers to the ones who are both producers and consumers of their own food. It includes the ones who actively participates in the practice of growing and/or processing it afterwards. In Almere, there are 140 initiatives that are established for urban agriculture activities (Dekking, 2017).

Small scale initiatives are usually located within the city, whereas medium scale ones are usually located in the green fields where districts and industrial areas intersect and big scale initiatives are outside of the city (Dekking, 2017). Also, the reason why people are engaged with urban agriculture activities varies from social to commercial.

For the sake of this project, we will disregard the activities that are done for commercial interests which composes around 40 initiatives out of 140.

When it comes to the urban agriculture initiatives that carries non-commercial interest, they are diverse in terms of their focus. In other words, they have unique functions of urban agriculture. Dekking (2017) lists the types in 10 categories, from the most common to least common, which are food production, recreation, education, social cohesion, management of public spaces, short circuits, biodiversity, care, circulation and energy. It is also the case that an initiative may perform different types of urban agriculture at the same time.

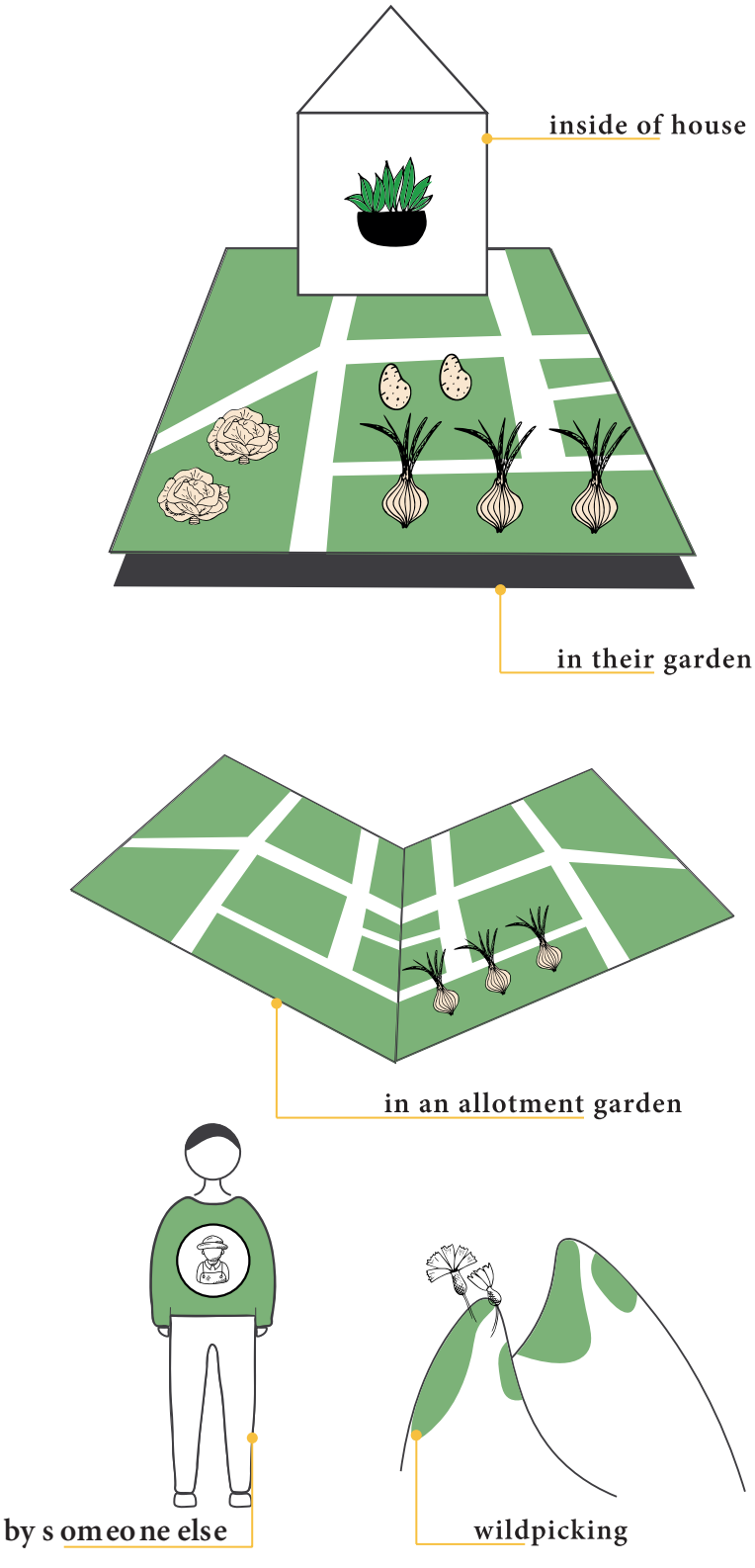
Prosumerism research project takes into account the initiatives that focus on food production which is more than 80% of the above mentioned initiatives.

Different types of initiatives with variety of focus

For an activity to be named as prosumerism, it should be done for the consumption of the individual; so it doesn't include the ones who grow for supermarkets or any other catering purposes. Hence, prosumerism are the non-commercial food activities that you do with your own labor and time.

Initial results of the ongoing research by the Wageningen University and Research suggest that prosumers in Almere are active in different geographical levels and with different degrees of ownership. For instance, Almere Oosterworld is specifically envisioned and designed in a way that stimulates inhabitants to participate in organic urban growth through DIY public green and urban agriculture. Alternatively, in Almere Buiten there are examples of allotments under glasses which are independent from each other (2019). Accordingly, there are three levels of prosumerism which are in-and-around the house, in the neighborhood and in the city region. In-and-around the house includes activities ranging from growing tomatoes on the windowsill to harvesting walnuts that grow on the garden.

Growing food in the neighborhood means individuals grow their food either in allotments, vegetable gardens, or food forests; in places that are different than their houses. This can be done either individually or collectively as a group. Lastly, wild picking and outsourced production which are performed on a larger scale, at the city region. In wild picking, prosumers deal only with harvesting of the food, like picking mushrooms and berries. In the case of outsourced production, prosumers are not physically involved with the activity, but she has control over it to an extent; she decides how it happens.



2.1.4 Oosterwold

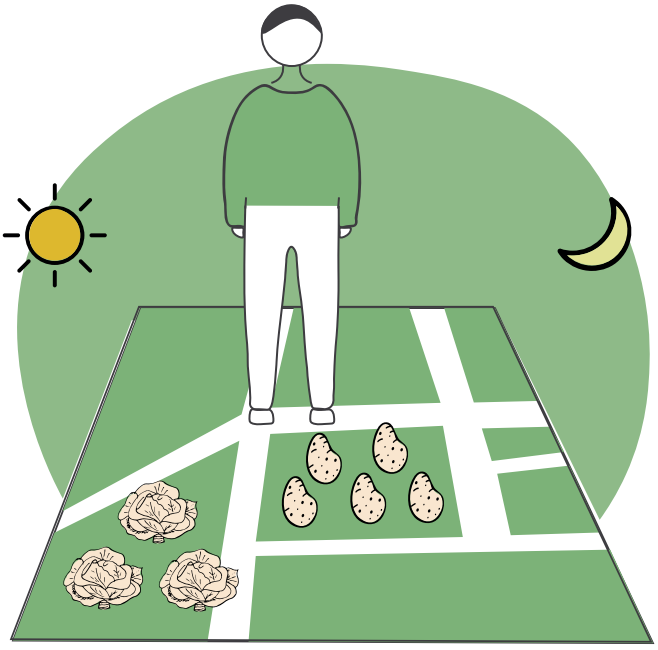
Oosterwold is the area that is located in the northeast part of Almere. In the plans of Almere 2.0, the driving force of the Oosterwold area is identified as urban agriculture (Almere, 2009). Inspired from the previously mentioned virtual city planning of Agromere, Oosterwold is designed with an aim to develop a continuous productive urban landscape for producing food, energy and resources for the city (Viljoen ed. 2005). It is expected that the region will be transformed into a rural urban area by 2030 with the support of reinforcements from the government and citizens initiatives (Van Oost & Noord, 2010). As a part of Almere 2030 Structure Vision, MVRDV, an architectural firm focuses on urban issues, provided a proposal for Oosterwold. Through empowering people to design their neighborhoods, inhabitants would be able to create their own public garden and urban agriculture activities.

Accordingly, it is expected to grow in the following years into a landscape where nature and living will be combined (Maas, Rijs, & Vries, n.d).

Currently, 50% of the whole land of Oosterwold is designated for urban farming, where individual plots must allocate 59% of their activities into urban agriculture in order to maintain the rural character. This proposal also allows the government act as a facilitator instead of a director. City councilor Adri Duivesteijn expresses this as a creation process of people making the city. As Jansma and Visser explains, all of these would lead into a transformation within the region of Oosterwold (2011). As mentioned in the previous sections (see 1.2.1), we approach prosumerism as one of the ways that enables inhabitants to perform sustainable everyday practices. In a context like Oosterwold, which creates a huge opportunity for individuals to cultivate their own land, prosumerism becomes an

Image 2. One of the representations of Oosterwold from the proposition of MVRDV

inseparable part of everyday life. Then, prosumerism itself can be the actual transition that is happening in Oosterwold. Thus, it is crucial to understand the mechanisms and enablers behind this transformation that is happening in Oosterwold and further design systems that fits and promotes this transition.



Writer's first impression about Oosterwold

Image 3. Some scenery from Oosterwold

2.2 Food Growing as a Transitional Social Practice

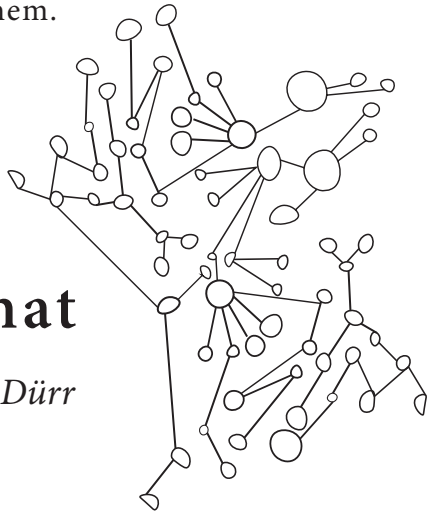
After the analysis of Almere and more specifically Oosterwold, it became clear that the food growing of inhabitants is one of the main features of the region (Jansma et al. 2011). But what is the actual meaning of food growing in a place that promotes sustainable ways of living? In order to answer it, this project approaches prosumerism as a social practice; and further a practice that is not isolated but instead connected with its surroundings. For this reason, this projects considers the larger field of actors – both humans and things – as a way to understand the above-mentioned ecosystem, and identify the points of intervention that can make an impact.

2.2.1 The Meaning of Being Connected

We, as humans create things and in return those things shape our relationships with ourselves and with the rest of the world (Giaccardi, Speed, Cila & Caldwell, 2016). There is a continuous interaction cycle between things and humans; and actually this looped relationship holds for all the other agencies of the world, for both living and non-living systems (Irwin, 2011). According to Capra, this interconnectedness can be understood only through thinking in terms of networks and relationships instead of seeing them as separated entities (1997). Similarly, Actor Network Theory (ANT), argues that in order to understand an actor in a system, one should analyze the relationship and activity between its surroundings (Bogost, 2012). ANT further puts emphasis on mapping the complex relationships of human and non-human in any kind of network; in which one actor is defined based on the relations to other actors.

Since the practices of our everyday life are not done in isolation from the other things, it becomes crucial to take into account all the agencies of the context that we talk about (Kaptelinin & Nardi, 2009). This repeated communication, suggests an acknowledgment of equal roles among agencies (Giaccardi et al, 2016). In other words, humans are only "a single factor in a larger system of relations of interactions between humans and non-humans" (DiSalvo & Lukens, 2011). Once this kind of mindset is established, then it becomes easier to understand, analyze and further design for a particular practice.

In our case, we consider the practice of prosumerism as a connected activity between the inhabitant; and the tools she is using, other inhabitants and living agencies around her. We further focus on the relationships and networks of these in order to design for them.



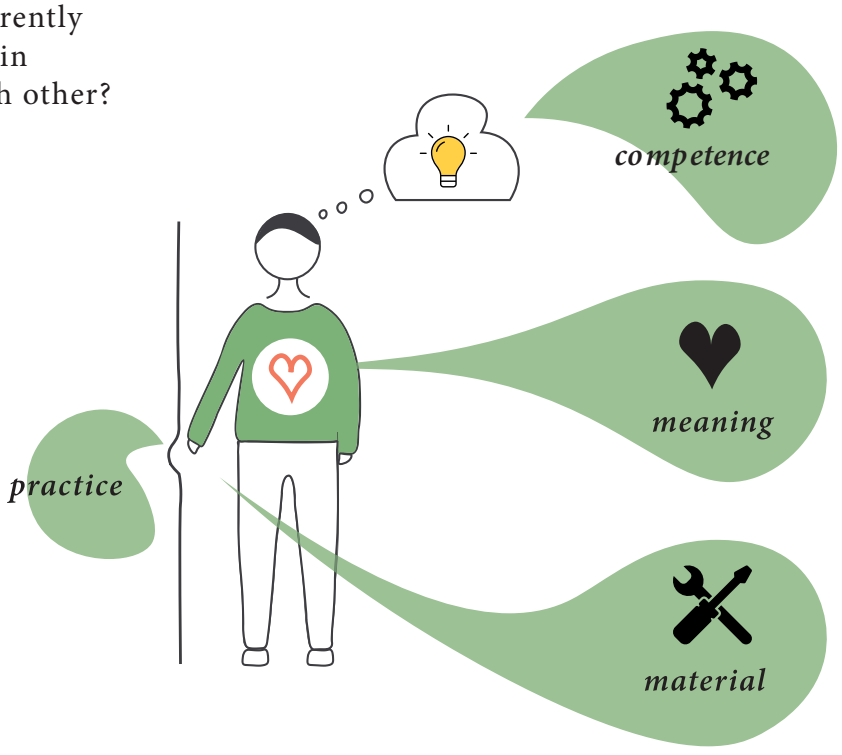
"What is primary is only the interrelationships that exist - that which connects." *German physicist Hans Peter Dürr*

2.2.2 Social Practices in a Connected Network

The core of social practice theory relies on the idea of connectedness. However, it takes the idea one step further and argues that social structures (collective norms and regulations) and human agency (individual actions) interacts back and forth in a dynamic relationship. This way, it offers a perspective to understand social reality. The theory puts practice in the center which is shaped by human subjects and social structures (Shove, Pathzar & Watson, 2012). Thus, one's behavior is not solely based on individual values, beliefs or knowledge but instead is shaped by practice infrastructures such as materials, competences and meanings which are instrumental to these practices (Vercauteren, Quista & Veen, 2013; Giddens 1984). Building on this idea, we look at the practice of prosumerism as an integration of materials that are used in the practice (technologies, and physical entities), competences of growers (skills and know-how) and meanings they have (symbolic meanings, ideas and aspirations). Practices come into being through the links between these three elements (Shove et al., 2012). Then how these elements currently are for the practice of prosumerism in Oosterwold and how they affect each other?

As Dobernig and her colleagues argue how these links are formed and balanced are dependent on the context (Dobernig, Veen & Oosterveer, 2016). They further argue that for instance when a practice is emerging it might be the case that a new technology is introduced, which requires novel competences that would generate new meanings. Here, materials shape the other two elements and ultimately how individuals experience the practice. It can also be the case that a practice emerges due to embedding new meanings, which might be followed by emergence of new competences and materials. For example, inhabitants may realize that they are getting socialized through gardening and create a meeting place out of that garden and further allocate time to improve knowledge regarding cultivation.

The examples reveal that there are different relations and balances among the elements of a practice, and further these elements are interdependent. If so, what is the meaning of this interplay among practice elements when it comes to growing one's own food in Oosterwold?



Three components of a practice

2.2.3 Food Growing Practice in a Transitional Context

As we discussed earlier, Oosterwold is transitioning towards a community that is fostered through urban agriculture activities, of which one of the most dominant is growing one's own food (2009). In that sense, the practice of food growing -in other words prosumerism- requires attention, so that it can cultivate change and enable transition for sustainable ways of living.

Social practice theory suggests that, in order to establish change, it is essential to develop tools through systematically exploring processes of transformation while maintaining stability within social practices. Together with this, Dobernig and her colleagues argue that understanding how social practices emerge and continue may help finding out and assessing social change (2016). Furthermore, to promote sustainable ways of living it is crucial to understand the elements that are materials, meanings and competences of which the practices and systems are formed with the connective tissue that holds them together (Shove et al., 2012).

Several scholars investigate this "connective tissue" through behavior change in order to address sustainability issues. For example, Hielscher et al. suggest that if we want to influence change, then we need to think about all the elements of practice such as ideas, conventions, expectations, substances, products, available infrastructures that constitutes the practice itself (Hielscher, Fisher & Cooper, 2007). Only after understanding material things that shape the practice, we can change practices. Scott et al. propose a collaborative process through deconstruction and experimentation for practice-oriented design examples (Scott, Bakker & Quist, 2011). Borja et al. propose more sustainable meat eating practices through introducing alternative systems of materials, conventions and skills (Borja, Kuijer & Aprile, 2010). All of these examples suggest that to promote change within a context, it is crucial to understand the relations among the practice elements and how they affect each other. In our case, Oosterwold's transitional state brings another layer to the equation. How can we design to promote change in a transitional context for the practice of food growing?

Interestingly, a newly emerging area of design research, transition design, proposes ways of design doing for societal transition that would enable sustainable futures (Irwin, 2011). They further argue that the notion of transition is central to a variety of current discourses concerned with how change manifests and can be initiated in communities, ecosystems, societies and even individuals (Irwin, 2015). Here, Oosterwold's raison d'etre is quiet valuable to mention as a region that is specifically designed to become the rural-urban through inhabitants' cultivation practices. In other words, as a community Oosterwold becomes a place that experiences "transition" through prosumerism.

Since transition design sees everyday life and lifestyle as the most fundamental context to design for, it incorporates knowledge from fields like social sciences, anthropology and humanities. Accordingly it argues that to come up with these new ways of designing, a deep understanding of dynamics within complex and natural systems is needed (2015). That is why using the elements of social practice theory to deeply understand the actual meaning of growing food for a prosumer, together with her abilities (competences) and the things (materials) that are used during the process, is essential to further offer directions which enables the ongoing transition in Oosterwold.

3. Methodology

This chapter depicts the ways in which this project is **constructed.** It explains how the practice of prosumerism is examined through **both human and thing centered design** research methods. It further argues that why this kind of a **combined method** is **valuable** for exploring transitional practices.

3.1 Sensitizing to Understand Meanings and Competences

People are the experts of their own experience, says Sanders and Stappers, in their book about generative design research techniques (2013). Generative design research focuses on the idea of understanding human needs, desires and everyday of doing things through emphasizing with individuals. The aim in generative methods is to gather narrative data of human experiences. Contextmapping, as a way to step into users shoes and understand their everyday practices is one of the generative design research methods (2013). Rather than focusing solely on the product itself or user, it takes practice as the main unit of analysis.

Once a practice is analyzed, then this can create a chance to explore the future of it as well as identifying opportunities for change (see 2.2.2 and 2.2.3 for more details). This project makes use of contextmapping to elicit food growing habits of individuals; why they do it, what are the meanings associated with that practice. After the analysis, the project aims to identify opportunity points which can enable change.

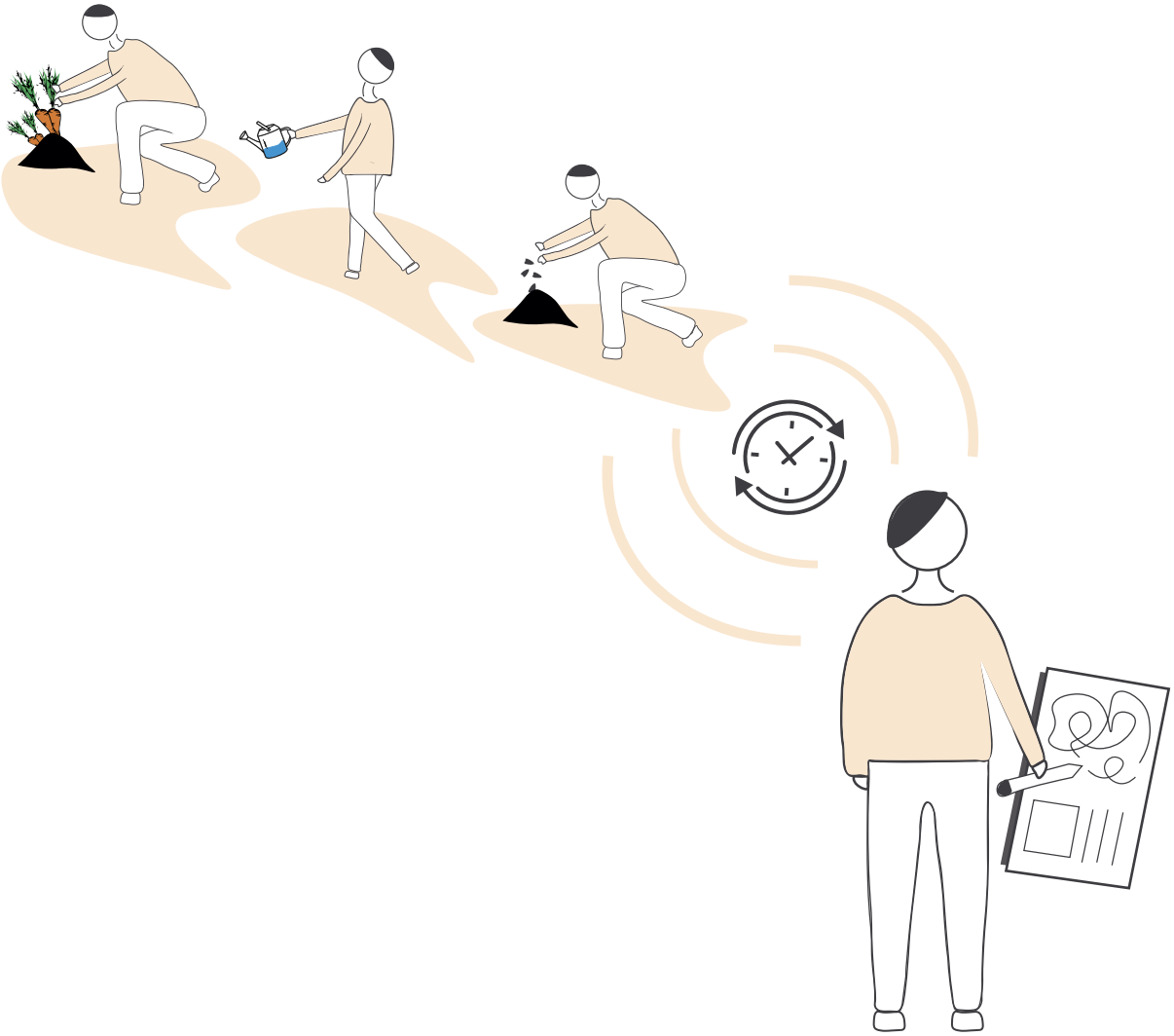


Image 4. Contextmapping let individual recall their routines and way of doing things

3.2 Thing-Centered Approach to Understand Materials of Practice

Materials, as one of the three constituents of practice theory are deserved to be studied in this kind of a context where the aim is to enable transition through practice. Here, it is important to underline that materials are important since (1) they are an inseparable part of practices and (2) they have a role in understanding and further promoting change which is especially valuable for this project's context.

The role of materials in practices is important both for the ways the practice is organized and further spreads and changes. As Latour advocates the material world should be understood as things, that also participate in social practices as humans do (as cited in Reckwitz 2002b:202). In other words, to understand the roles of material objects in social systems, it is important to examine what they do (Atzmon & Boradkar, 2014).To instrumentalize this, thing-centered design offers ways, through focusing on things that are imbricated in ecosystems and networks. As Giaccardi (2019) puts it "a thing is integral to what we do and how we live". Meaning that things by themselves affect how we do and shape our practices. In that sense, being able to see the world from things' perspective, may present unique and unthought relationships by providing new ways of framing problems and beyond-human collaborations (2016). At this point it's valuable to mention Reckwitz's description of social change and practice. He argues, "if social change is a change of complexes of social practices, it presupposes not only a transformation of cultural codes and bodies/minds of human subjects, but also a transformation of artefats (2002b: 213)" which underlines the importance of things in process of change.

Thing-ethnography as one of the thing-centered design research methods is used to discover the context from a thing's perspective. By collecting perspectives of things through sensors, cameras or recording devices; it becomes possible to see the world through their lenses (2019). This project, uses thing-ethnography in order to understand how tools, as one of the materials of practice, experience the gardening process. Further, it looks for the hidden, horizontal relations of prosumerism. Once these are discovered, then it would be possible to explore the possibilities that materials of prosumerism bring to foster sustainable ways of living.

Daily experienced human-perspective

How thing-centered perspective sees

3.3 Human & Thing-Centered Approach for Transitional Practices

The preference of this kind of a combined method is in order to throughly depict the practice of prosumerism in Oosterwold. As Giddens (1984) suggests through cooperating both with the materials (thing-ethnography), and humans to figure out their associated meanings and competences (contextmapping followed by interviews), sustainable ways of living can be designed. The project sees prosumerism in Oosterwold as a practice that enables transition. That's why it uses a combination of human and thing centered design approach to deeply analyze the practice itself; figure out the needs and desires of prosumers together with the role of tools that are used in the practice which would give the chance to design for the transition in Oosterwold.

By enhancing hybrid modes of thinking and further expanding our perception towards dependencies and relations, we would be able to better address the challenges of today's world (Forlano, 2016). Use of this kind of a combined methodology is an attempt for a transitional context, Oosterwold, that is designed specifically to be sustainable; and for a practice, prosumerism, which is one of the means that contributes to the sustainability aims of the neighborhood.

4. Research Phase

This chapter explains the research activities conducted during this project. Starting with the interviews to **have a grasp** on the **prosumerism** practice itself; our research makes use of this activity by designing the **contextmapping booklet** with its insights. With contextmapping, we map out **the needs, desires and everyday routines** of prosumers in Oosterwold. Building on top of that, we have **practice materials' perspective** that enables us to see the **unthought relations** of the food growing practice.

4.1 Data Collection & Analysis

4.1.1 Preliminary Interviews

Goal

The focus of the interviews is understanding to what extend inhabitants of Almere grow their own food, what type of food they grow, where they grow, how much time does it take, how does the food is preserved and what do they make later on with that food.

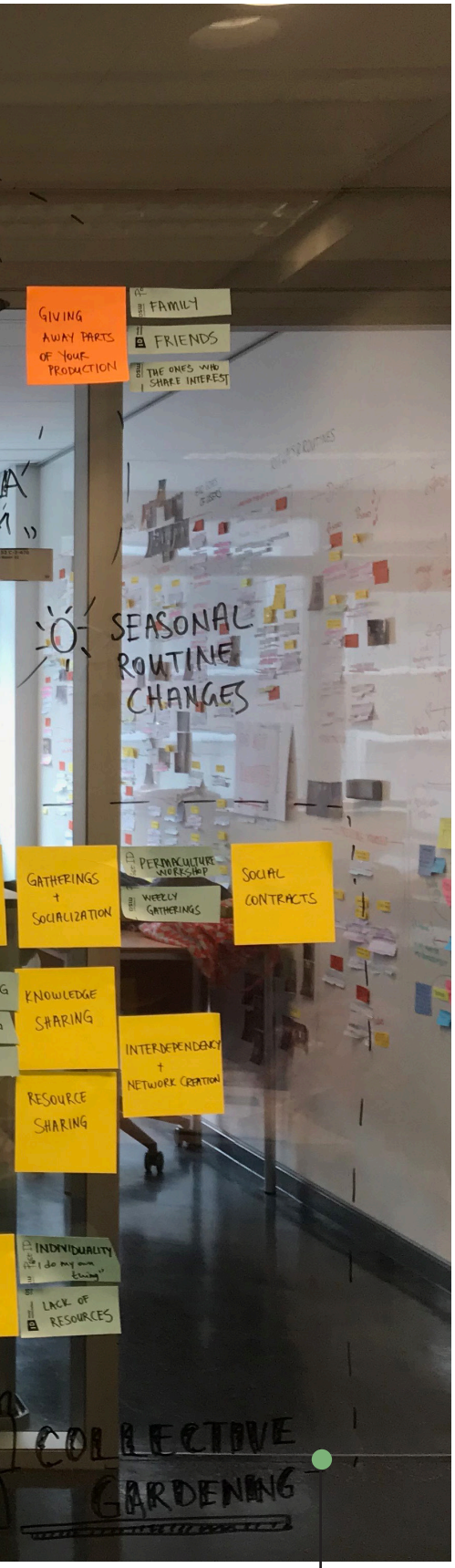
Method

The interviews are conducted with 12 prosumers from Almere for the research project of WUR by Esther Veen. The interviews also collected data regarding the consumption habits of these prosumers, specifically to what extend they buy seasonal food from outside and whether they pay attention buying organic food or not. The interviews are voice recorded and then transcribed. Further, the transcribed data is read and the meaningful quotes are extracted. After that, the quotes are clustered as shown in image 5.

After this initial categorization, the clusters are moved onto a wall to see the relationships better among them. The outcome of this initial analysis is used to design the upcoming research explorations of this project.

Image 5. Analysis process of the interviews

Data Analysis



A priori

Responsibility towards gardening in terms of keeping nature's balance as it is and do not disturbing the living conditions of animals are found as conditions for food growing.

Motivators

There are variety of reasons why people grow their own food. First, most of the participants indicated that food growing was coincide with daily practices such as; buying organic and local food, having a sustainable lifestyle and paying attention to lessen plastic consumption. Similarly to this, all of the participants prefer the fact of knowing where the food they eat comes from, which makes them sure about the food quality. These motivators are related with the environment or society.

When it comes to inner motivators, growers say that they enjoy the process of creating. Also, they told that they appreciate the effort they put to their garden once they see the results. For them, this is related with autonomy. Individuals also indicate that spending time with their plants feels like doing meditation, a way of being mindful. Some of the participants told that they also like to be actively doing something which positively influence their health.

Collective Gardening

When it comes to people who grow their food with others, participants indicated that collaboration is key to their practice. Interestingly they also perceive it as a drawback since it may lead to competition. Competition was applicable especially for the ones who do wild picking since "if a lot of people know where the mushrooms are, then one day the mushrooms would be gone" as expressed one of the participants.

The others who grow their food in allotments or their own gardens see this activity as a way of socialising, knowledge and resource sharing since they also organise weekly gatherings and workshops. One of the participant says "We are interdependent to each other" when we were talking about knowledge about the gardening, which highlights the importance of communication and collaboration.

Reasons to Withdraw

Movement restrictions, gardening taking too much effort and being nasty are mentioned as physical reasons to withdraw, whereas lack of know-how is expresses as a mental barrier towards food growing.

Conclusion

Interviews mainly revealed 4 different aspects for people to grow their own food; a priori conditions, motivators, reasons to withdraw and collective gardening. The first three helped to understand how the process of food growing is like for the individuals in Almere; whereas the latter provided the ways in which knowledge is perceived and further communicated in between them.

This was interesting since most of the growers declared that they are interdependent with others since it is not always possible to know everything about a particular plant or even what to do with it afterwards. However, not all of them have the means to establish this connection with other growers which hinders their potential of food growing network in Almere. Referring back to social practice theory, competences, meanings and materials compose how individuals perceive and interact with a practice (Shove, et al. 2012). Data suggests that how knowledge is gathered and further used during the gardening process are key factors for people who grow their own food in Almere. However it is still not fully grounded for everyone due to the fine line between knowledge sharing as a collaboration or competition. The project aims to learn more about this knowledge sharing spectrum for prosumers in Oosterwold with the upcoming study.

When it comes to the meaning of growing one's own food, it is highly associated with individual's lifestyle and later supported with a sense of accomplishment, which creates autonomy. Materials and their usage mentioned by participants while they were explaining storage of and producing something with their food. However, no particularly interesting point is drawn from there.

Overall, these interviews provided insights about prosumers in Almere and helped designing the contextmapping booklet.

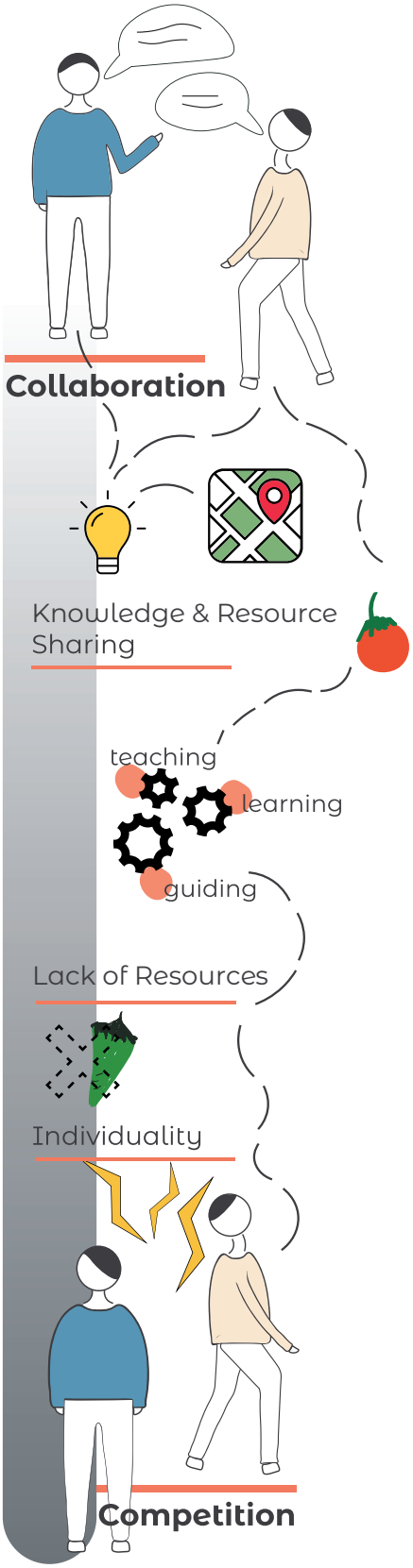


Image 6. Spectrum of knowledge sharing for prosumers of Almere

4.1.2 Contextmapping of Food Growing in Oosterwold

The initial interview analysis, enabled the project collect insights regarding prosumerism in Almere. In this part, the study goes deeper in project's actual context, Oosterwold. Through contextmapping, the project aims to build on the previously mentioned four aspects of food growing through focusing on social practice theory.

Goal

The goal of this study is to find out the meanings associated with prosumerism, existing ways of doing, wishes and desires for the practice of growing one's own food in Oosterwold.

Method

To find people who grow their own food in Oosterwold, invitation brochures are posted to Whatsapp groups through the help of Arjan Dekking, who is both a researcher of urban agriculture and an inhabitant of Almere. These invitation brochures are also sent to Yolanda Sikking, communication manager of Oosterwold development area. In total 10 booklets were sent, however due to personal reasons of participants, only 6 of them successfully filled out the booklets. Thus, 6 interviews were conducted in total. The study composes of two parts. First, the individuals who are willing to participate were sent sensitizing booklets through post. These booklets allowed growers to actively think through, recall and further reflect on their practice (Sanders & Stappers, 2014). They had a week to fill out the booklet. Afterwards, face-to-face interviews are conducted with them. The interview questions were designed in a way that would walk them through the booklet and elicit the details about the things they write or draw on the booklet (see apendix A1.2 for interview questions). Overview of participants is shown in Table 1.

The booklet sections were as follows:
1. Nice meeting you! - In this opening section, participants are asked to introduce themselves through their name, profession and age as well as the things they do in their spare time.

Name	Age	Gender	In Oosterwold for (years)	Gardening State	Edible Plant Variety
M	54	M	1	planning	15 +
K	71	M	2	established	15 +
S	48	F	1	newly established	3
L	55	F	2	established	3 - 15
V	44	F	1,5	newly established	3 - 15
T	45	M	2,5	established	15 +

Table 1. Overview of the participants for contextmapping study

2. Your way of growing food - This section allowed them to explain the edible things they grow and make afterwards, why and whom they grow with as well as the importance of food growing to them.

3. Your relationship with growing your food - Here, they were asked to fill out an imaginary dialogue with their plants. This was to understand how they approach to their plants and how they imagine to hear back (expectations). Later, they were asked to think of the meaning of food growing to them and write it to meaning cards.

4. How was your last memory? - In this part, they were asked to think about the last time they took care of their edible plants and write it down as before, during and after. They were specifically asked, which tools they use and how they did it.

5. Pains and gains of growing your food - Based on the previous question, this section was to make a positive and negative sides comparison of food growing. This was in order to understand the things they like and dislike, good and bad moments again in a similar time line of before, during and after.

6. "In a different world, growing my food"- They were asked to imagine how it would be like to grow food in an ideal world. Through thinking on; how they would be and their magical power, others around them, what would materials and overall world look like, participants asked to map an ideal world.

7. Now your call - This final section was left empty and asked them to write down any comments, remarks about the previous questions or food growing in general.

Booklets can be found on appendix A1.1.

Image 7. While interviewing with one of the growers

Data Collection

The data collection part of this study is both through collecting booklets and voice recording interviews. Only participant T didn't complete the booklet; however during the interview, we did it together. When the booklets are collected, the answers of participants compared to find similarities and differences per section. In addition to that the interviews were transcribed and read carefully to compose statement cards (see appendix A1.3), which enabled easy categorization of the words of participants.

Data Analysis

1. Sensitizing Booklets

Nice meeting you! - When they were asked about their spare time, all of the participants said that they spend their free time by taking care of the garden. Participant M, S and V who is either in the planning phase of his garden or has a newly established garden, spend their time really paying attention to every detail and making sure that their plants are and will be growing healthy which requires more attention and thinking compared to the rest who has established gardens. For participant M, his time goes mostly for designing the garden; whereas participant S, with a vineyard, spends all of her time keeping the garden clean and make sure that the plants get enough sun. Participant K and L told that they take their time in the morning and afternoon to take care of their plants; whereas participant T deals with them in the morning. Participant L says "you need to stop for a moment and enjoy your garden, appreciate the things you've done". All of the participants, regardless of their garden type, told that it feels good and relaxing to be outside. This suggests that in the beginning of the process, garden requires more thinking and doing but once it is established the workload diminishes.

Your way of growing food - Five of the participants grow apple and pear trees, participant M is thinking to grow large variety of vegetables and fruits. All of the participants either make or want to make jams and cider from these. Again, all of the participants eat fresh what they produce and half of them freezes the beans. While growing food, for all of them it is important to grow without chemicals. Participant M, L, K and T eat fully biological even if they buy from outside. For participant M and K it is important to be self-sufficient. All of the participants said that it is important for them to know where the food they eat comes from. When they were asked why they grow their own food, all of them said that it connects them with the whole world we live in and gives a good feeling to be outside and in open air. Half of them mentioned independence as one of the values that this practice provides to them.

Your relationship with growing your own food - Participant M and L filled out the imaginative dialogue as a monologue and the rest as a dialogue. Interestingly, in all of them we saw an expectation component. All of them were expecting their plants to grow healthy and give good produces. One says "We gave you a good place, now grow!" and the other "Do you need more to grow well?" and the plant replies "It is like an investment you put effort and, I will pay back". When it comes to the meaning of food growing for them, for participant S and L it was about the balance in life and being aware of the possibilities of nature and for the others it was a great deal since you eat from what nature gives you and organically. These inputs suggest that, growers have expectations and they are willing to give what their plants require. Furthermore, they would be satisfied once their plants give them produces.

How was your last memory? Pains and gains of growing your own food- These two sections are explained together since they are highly related. Participant S, M and V find "before" part of taking care of their plants unpleasant; M mentions as "Hmm, this is complicated" with an annoyed face next to it, whereas S finds it hectic and stressful.

Participants with established gardens don't have particular struggles before starting and one says that "You have to do it everyday". All of the participants become relatively relaxed and happier while taking care of their plants. Participant M expresses himself as "Wow, it grows all by itself and it gives tomatoes" with a smiling face next to it. As a negative point, the same participant declares that "finding that some things don't work and not understanding why". For participant S it is "more peaceful, concentrated and happy". When the process of taking care is over, all of the participants feel satisfied. To be specific, one of the participants said that "relaxed and proud to make such a big switch in life, feeling satisfied" whereas another one referred as "feeling good about the hard work, great satisfaction and proud".

These results suggest that, for the growers who don't have a complete garden yet, things are more complicated in terms of planning, timing and actual work that has to be done compared to the ones with established gardens. Also, before starting to take care of your plants is a relatively negative and complicated phase compared to during and after for all of the participants. The positive shift comes with being peaceful, proud, happy and relaxed at the end for all of the participants.

"In a different world, growing my own food.."- For all of the participants, in an ideal world, nobody uses chemicals to grow food and everyone grows their own food organically. Participant M imagines himself self-sustaining through selling what he produces. He also identifies "knowing exactly what the plant needs in a perfect ecosystem" as his magical power. In his ideal world, it "..returns to sustainable local food production instead of our current 'sick' system". For the participants with the grown-up garden, in the ideal world no one uses chemicals people can exchange their products. Whereas for participant S in the ideal world, the garden still requires hard work but fun to do and she can experiment freely. The whole world is growing food without chemicals and appreciating what nature gives. Also, her magical power would be "growing water" for everywhere.

To sum up, every participant dreamed of a world where everyone grows their own food and that would be sufficient. Knowing what a plant requires, or experimenting are mentioned as ideal ways of food growing.

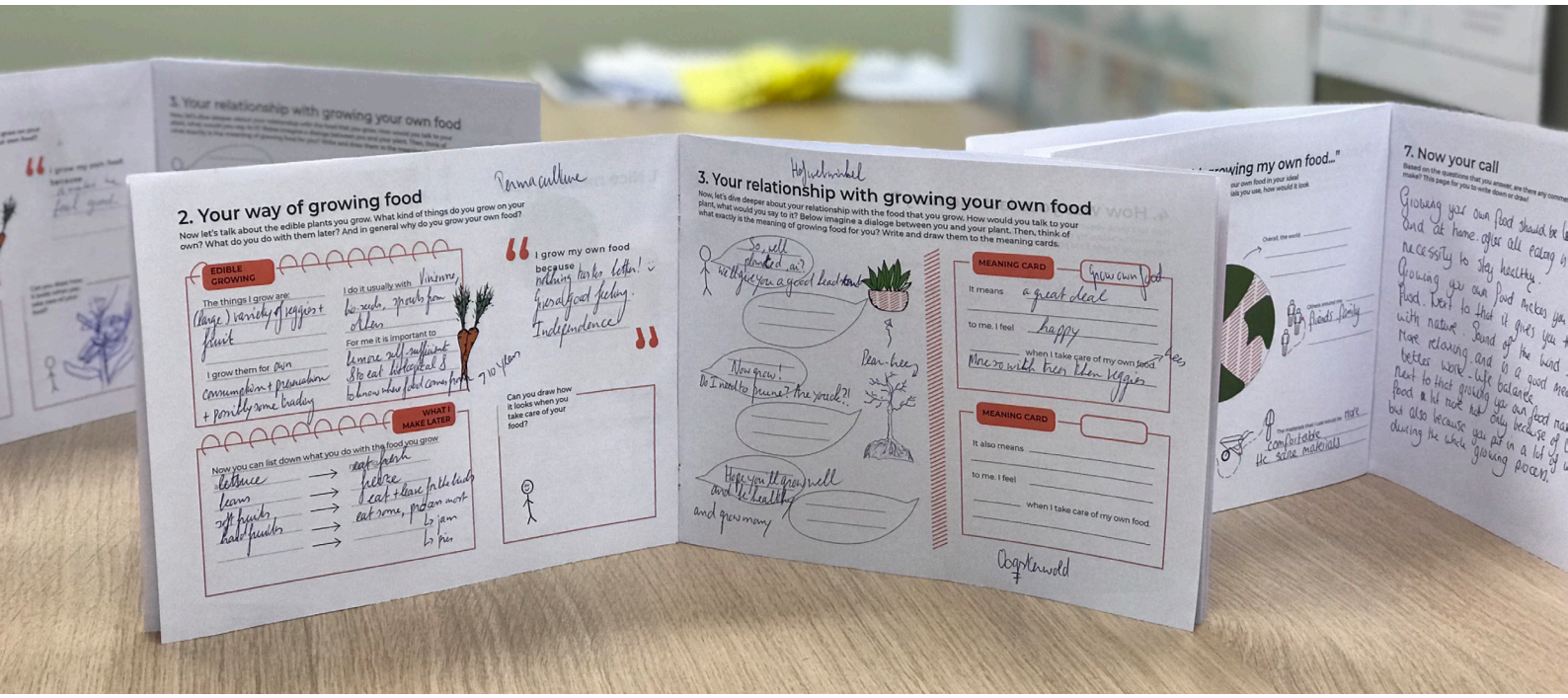
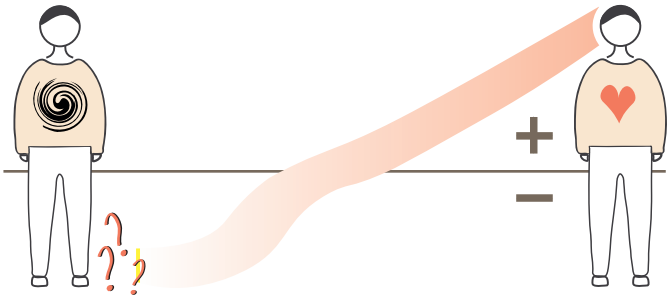


Image 8. A feeling of how filled sensitising booklets look like

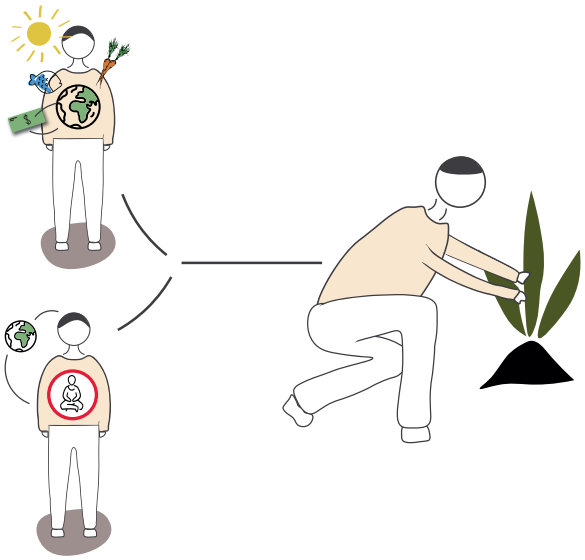
Now your call- Participant M, L, and S shared their thoughts through this section. It was expected to hear more about the booklet itself; however they wrote about their overall experience of food growing which shows that the booklet managed to immerse participants into their own experience with food growing practice. Participant M, expressed his concerns as "..I know nature requires time but I am in a hurry... I am anxious to start, there are obstacles and too much things to think about." From his words, it is clear that he has doubts about whether he is going to be successful or not. Combined with his previous words on an ideal world, it can be concluded that this is due to lack of practical know-how about gardening. However it is also important to highlight that he wants to establish ".. a self-sustaining mini ecosystem and a habitat paradise for fauna". In other words, he sees his garden not only for himself but also as an inseparable part of nature, also for other species. When it comes to participant L, she says "My vegetable garden makes me feel connected with myself and other around me and with nature". From her words, it can be concluded that she sees food growing as a meditative experience. Participant A expresses ".. it should be learned in a young age, at school or at home". Furthermore, she underlines the fact that while growing your own food, you become aware of the use of food. Here she refers to everyday life consumption of individuals, things bought from supermarket, eaten in restaurants etc. She continues as "Next to that it gives you the possibility to be with nature" which is for her "a medicine".

Overall, knowing how to grow your food, planning and actually executing the overall practice requires deep knowledge. However, not all of the prosumers have that kind of knowledge. Also, for all of them one of the most dominant meaning is being part of nature, either through contributing to create a fauna or through appreciating what nature gives you.

To conclude, analysis of the sensitizing booklets suggests that before individuals actually start taking care of their own food is the moment where they face struggles the most. This can be due to lack of know how and willingness to do a lot in a limited time. Furthermore, analysis reveals that the understanding of nature as a whole is the urge that lets individual start growing food, or even moving to Oosterwold. There is a slight difference when it comes to the source of that urge. It can either start by realizing the malfunctioning of the society or the "sickness of our current system" as participant M describes it or it can be ".. an urge to move to the ground and be the same with nature" as participant L puts it. Even though they don't have very distinct boundaries, it is valuable to differentiate these two. The initial concerns with societal issues whereas the latter holds personal ones and both share environmental concerns.



Emotional shift experienced during the process of food growing



Societal and individual concerns leading prosumerism

2. Interviews

Overall 265 quotes were chosen and statement cards were formed. Statement cards are used in order to easily understand and categorize the quotes of participants (see appendix A1.3 for complete set of statement cards). While categorizing, the project first let lenses of social practice theory goes. Once the categories are complete and narrative is roughly created, then the project makes use of elements of practice theory; knowledge, meanings and materials, in order to make the narrative meaningful.

The analysis suggests a journey of growing food. It starts with a **trigger,** in other words by realizing that individuals are also part of nature or being not comfortable with the existing system in general. The latter includes not only natural systems but also financial and social ones. As one of the participants states ".. it goes back to the bank crisis where we realized that the whole system in society is pretty much corrupt and destroying the world". They are labeled as two trigger categories: **sustainable growing** which includes going with nature, following nature, connection through growing and **systemic benefits** like, willingness to be self-sustained, changing existing food chain, consuming locally, creating house for species, being environmentally friendly being against over production and having a systemic approach. The initial has more spiritual and personal concerns, "..just experiment with what nature gives you" like a participant says; whereas the latter has more environmental and societal concerns. Nevertheless, the boundary between two is not sharp and both of them act as triggers for one to start growing her own food in Oosterwold.

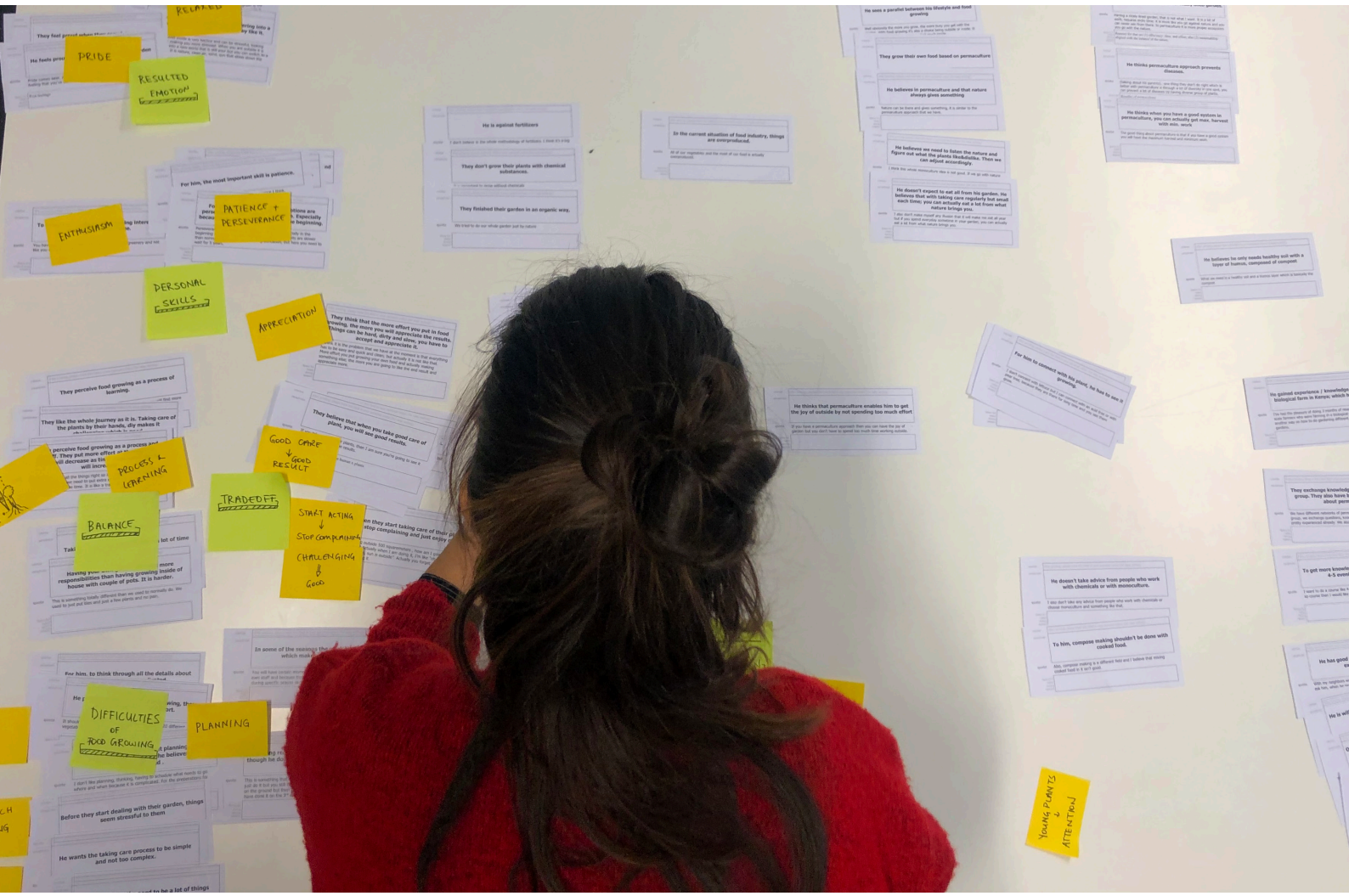


Image 9. In the process of clustering the statement cards

After they'd got triggered, they start to grow their own food but they face with **difficulties of growing their own food**. These difficulties are usually in the planning and thinking process of growers and especially if they are at the beginning of establishing their gardens. Also, if they deal with a garden where only one or two types are growing, then taking care process requires more effort compared to a permaculture garden. Because in the latter "you plant it once and with small care, they grow on their own"; whereas in a mono culture garden "..all of them need to get sunlight, so you have yo make sure that there are no leaves affecting sunlight, which is too much effort; one by one..". In other words, planning, thinking and effort are perceived as difficulties the more if (1) you are at the beginning of your gardening journey and you don't have a complete garden yet or (2) you have a mono culture garden that you need to take care of.

Interestingly, growers also named some qualities to cope with difficulties when they were asked to explain "skills", "essentials" that they need to have. These are **personal skills** they need to have to grow their own food. All of the participants mentioned that they need perseverance, patience and further appreciation. Also, half of the participants mentioned enthusiasm and ability to take care.

In the interaction space of these two categories (difficulties of growing and personal skills); a trade-off mechanism is identified that every participant has or believes, that is **balance and trade-off** between their plants and themselves**.** All of the participants believe that if they take good care of their plants, they will get good results. They also believe that in the early stages they need to put more effort, but once their garden become mature; it will "pay back". Lastly, they think that growing one's own food is a process of learning: ".. then you understand that you don't have to give that much of water, or put next to that potato, it is a process". All of these at the end, creates emotions; that are named as **resulted emotion.** These emotions are happiness, pride, autonomy and relaxation which act as inner motivators through enabling practice to be repeated.

The analysis suggests that this is like a looped narrative of one's growing own food in Oosterwold. An important point which is not mentioned but often cuts the process is **the ways of doing** of growers. These are the gardening methods, daily life practices that they perform **regardless of** but also in order to **overcome** the difficulties of food growing. These practices are doing organic groceries, buying plants from biological source, using no chemicals, doing natural agriculture and applying permaculture principles, planting grown-up trees, making a mixed garden and experimentation. Even though there are some general knowledge on how things should be in the garden, when it comes to actually doing it the knowledge of prosumers in Oosterwold stays limited. Especially when it comes to timing (when to plant and harvest), plant supplements, seasonal changes, interactions between plants, and unexpected things. For example, "I don't like when there is something I don't understand why in my plants.. Once we found black dots on our tomatoes.." and he didn't know what it was. This lack of know-how leads to first, not being able to take care of their garden properly as well as frustration afterwards. When we asked them how they get knowledge, all of them said that they have books they check before they take an action. Half of them told us that it is through Whatsapp and Facebook groups of Oosterwold and through their neighbors. For example the Facebook group Oogsterwold is a page where inhabitants of Oosterwold may exchange products and knowledge. One of the participants told that they had a Whatsapp group with their neighbors that share the same road.

Two of the participants attended to workshops before and they'd learned how to do things there, the other one wishes to attend to this kind of a workshop which ideally would last for 4-5 nights. Also, participant K gave workshops two times a year through previously mentioned Facebook group, Oogsterwold and participant L helps running the Facebook page.

When it comes to imagining the future of food growing in Oosterwold, all of them said that they are pretty satisfied with how the things are. Participant V says "I am already living my dream". All of the participants said that they would like to share knowledge, and exchange products with each other in the future.

Overall, as one of the aspects of practice, **knowledge** was the one that all of the participants are missing in terms of an enabler that would enhance the practice of prosumerism. For most of the participants gaining experience through doing or in other words learning through process is the key to improve their know-how. As participant L puts it ".. it is all about the process, sometimes you cannot do everything that you plan to do, or the perfect way that they should be but you have to remember that it is a learning process". The only issue here is that for growers who don't have that much experience, like participant M and S; this can be frustrating. Because they would need some kind of tools, sources that would let them to access to the know-how; which will later build experience.

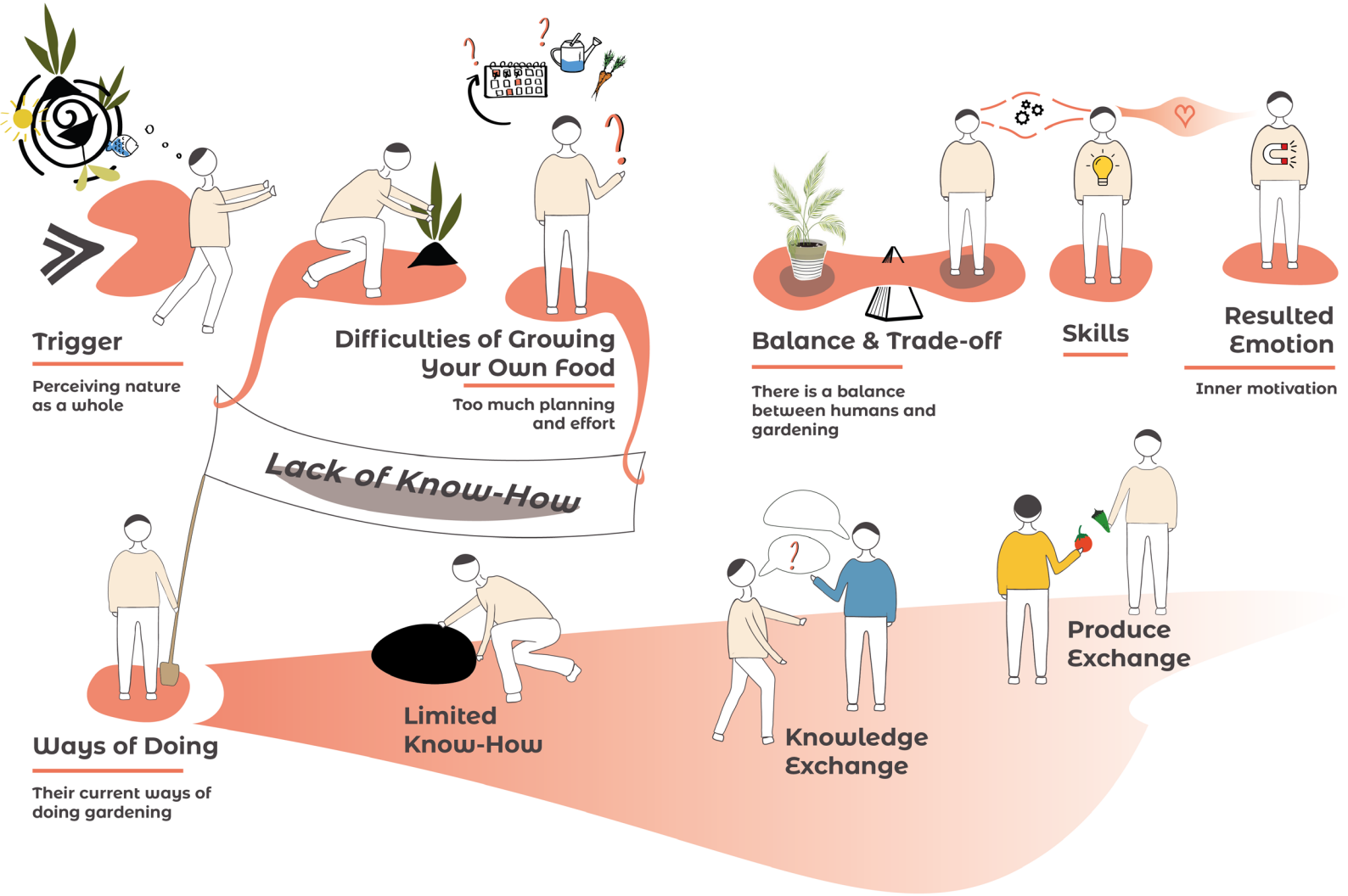


Image 10. Overall representation of a food growing journey

At this point, it is valuable to discuss the existing ways in which growers gain knowledge. Image 10 summarizes the current ways of gaining knowledge. Further elaboration on the alternative ways of accessing knowledge will be discussed in the following conclusion section. To stick with the existing sources of knowledge, participants K, V and T had experiences with gardening starting from their childhood. Participants T joined a 4 months workshop about organic agriculture in Kenya, whereas participant S stayed in a vineyard for 3 months. Participant K, gave two workshops for now for the inhabitants of Oosterwold, of which participant L was also part of. Participant M is looking forward to attend to a 4-5 nights workshop if organized any nearby Oosterwold. These suggest that, places where individuals can learn and practice their knowledge like workshops help them to strengthen their know-how. On a more daily basis, all of the participants, except participant T, are a part of a Whatsapp group with growers from their street. Questions, suggestions, offers regarding food growing are shared in these groups. All of the participants again are part of a Facebook group, Oogsterwold, initiated by participant L, where people can exchange their knowledge, products and ask questions regarding food growing. Whatsapp groups and Oogsterwold page are collective means to gain knowledge for people who grow their own food in Oosterwold. Besides, every participant has their own books, calendars which help them to plan and act upon. When all of these ways combine, they form the activity of one's growing food in Oosterwold.

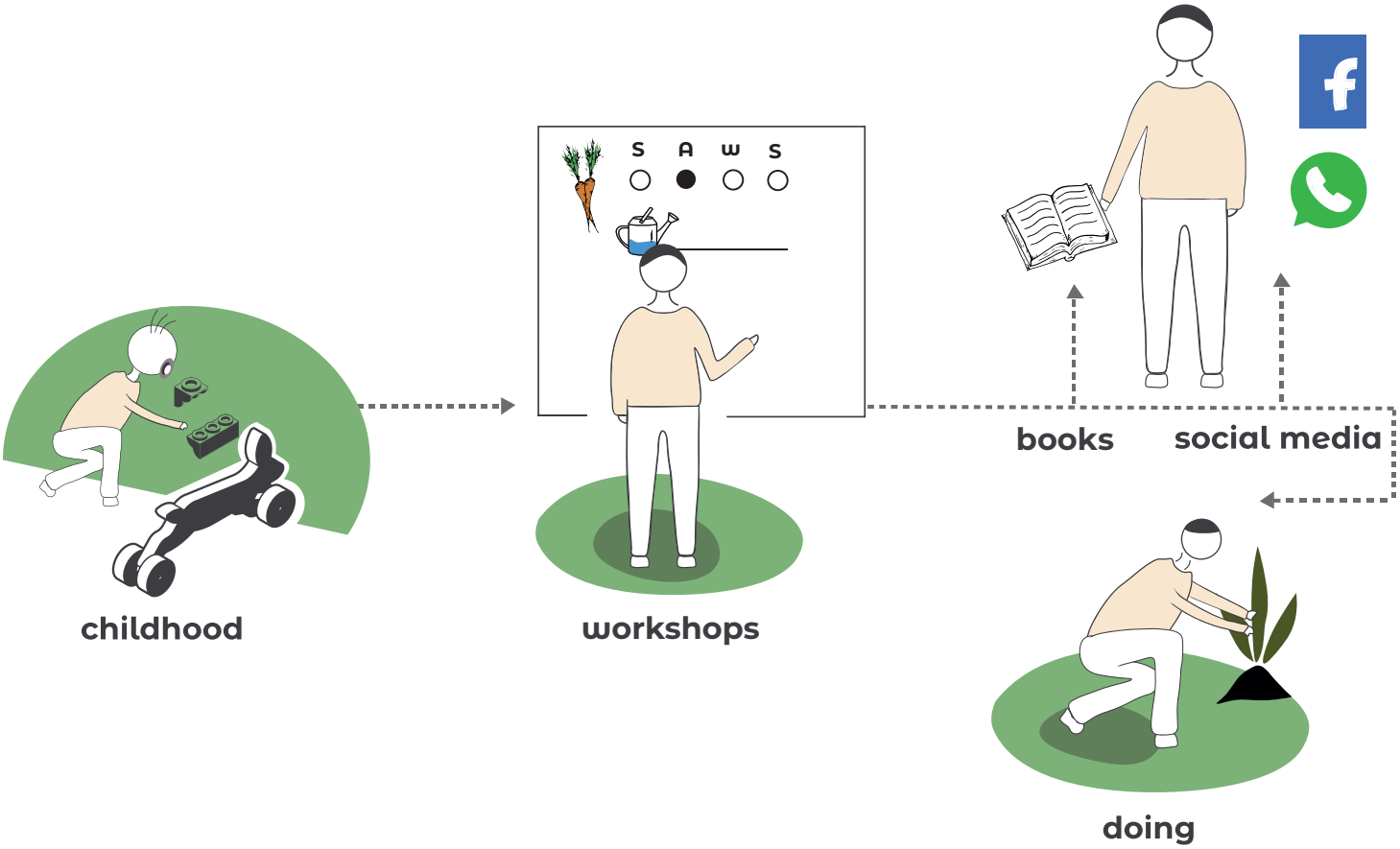


Image 11. How knowledge is gained in food growing practices

Conclusion

1. Knowledge Building

As a conclusion of contextmapping study, it is learned that knowledge is the most essential enabler that lets inhabitants of Oosterwold to grow food. Without knowing when and how to grow seeds, how much water to give, when to harvest etc. it wouldn't be possible to grow food. Since Oosterwold is still developing, it holds room for improvement when it comes to knowledge sharing and collaboration among its inhabitants. Image 12 illustrates, some of the possibilities that Oosterwold may contain based on the insights retrieved from this contextmapping study.

Image 12. How knowledge can be used to enhance prosumerism

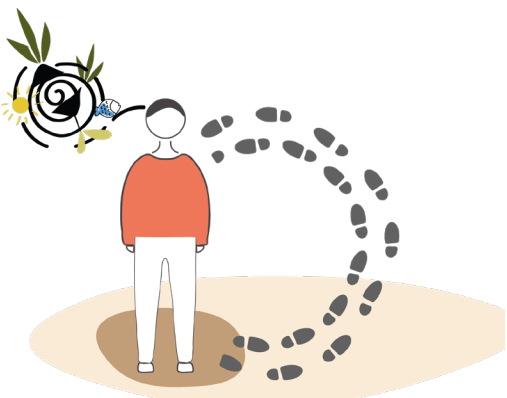
2. Meaning: Being one with Nature x Convenience

Meanings associated with Oosterwold, and specifically food growing of one, lets this practice cycle continue. These meanings are in most of the cases associated with prosumers' everyday lifestyle as well as their consumption habits, the way they spend their day and the things they enjoy. Concerns of people define the meaning of food growing for every individual. All of the people whom participated in the research carry collective concerns such as environmental and social. They also have personal concerns such as health, which aligns with the urge of growing organic vegetables. As another personal concern, mindfulness, in other words the idea of spending time on nature as a meditative practice was visible in prosumers.

At this point it is crucial to think about the prosumers who didn't participate in this research. There are still a lot of people whom the project could not reach and take opinion from. The findings of the study reveal that participants of the research were so-called fundamentalist growers. They were growing food because they really want to do so. However, it is a fact that there are inhabitants who moved to Oosterwold due to cheap housing offers and ability to access cheap food by growing your own. It is expected that those inhabitants act upon individualistic concerns such as financial and health compared to the collective ones. If they fall under a category it wouldn't be wrong to name it as "growing your own food for the sake of convenience". The second group of people may have different associations and meanings with growing food and they are worth to consider in the upcoming phases (see section 6.2.1) of the project.

These findings propose that there are specific material actions that prosumers perform while they are in their garden and also in their everyday life consumptions and habits.

One other interesting point is that the participants are pretty strict about shopping from the local market, buying organic and local food. This suggests that they act upon their values and concerns; preserving nature and the whole ecosystem they live in. Besides their consumption habits, for some of them the way they interact with their surroundings is also as sustainable as it can be such as driving hybrid car, having a plant-based diet and so on. These findings were interesting since they suggest that it is not only about growing your own food, but the practice itself is one of the entry points to the whole lifestyle that they have. Furthermore, it's expected that above explained situation holds for the "convenience seeker" prosumers as well. Meaning that they would have other types of habits, material actions which corresponds with their concerns.



4.1.3 Thing Ethnography in the Gardens

To build on top the analysis of contextmapping, this section provides analysis of thing-ethnography which is a method used in order to access to the perspective of things in the practice of prosumerism, which otherwise wouldn't be possible through human perspective.

Goal

The goal of this study is to reveal the ways in which the tools that are used while gardening bring new insights about the practice of prosumers in Oosterwold. Thus, the aim to reveal the effect of tools on other components of practice such as meanings and competences.

Method

Following contextmapping interviews, the participants are asked to pick one of the most useful tools that they use while they grow their own food. Due to some personal reasons, participant T didn't consent to join to this study. That's why in total there were 5 thing-ethnographies. Then we let growers to take care of their gardens as if they would do it with the selected tool.

Data Collection

The practice was recorded through attaching a GoPro camera on the selected tools. The recording started when participants brought their objects to the ground and ended when they finished taking care of their plants.

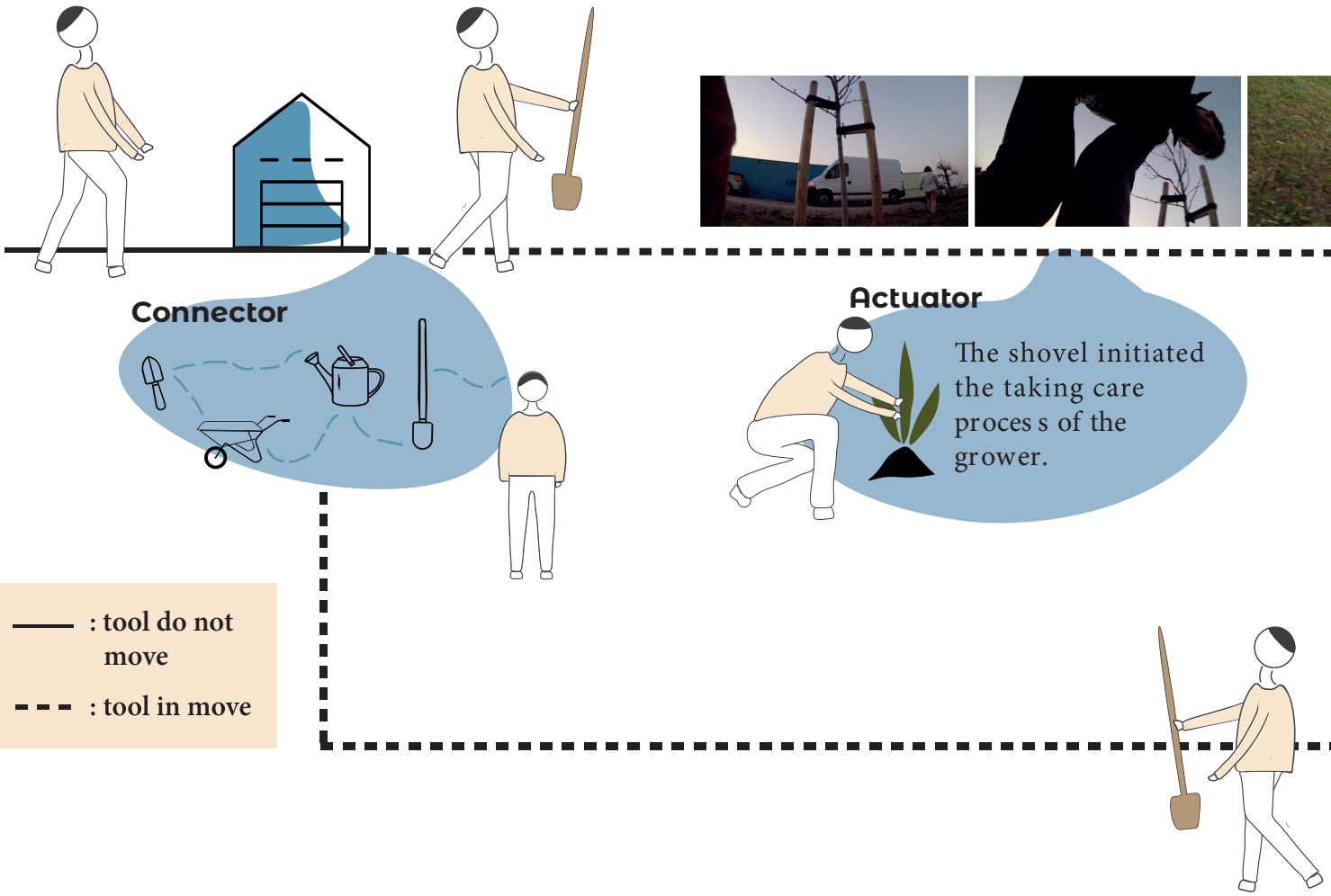


Image 13. Journey of the shovel revealed by thing-ethnography

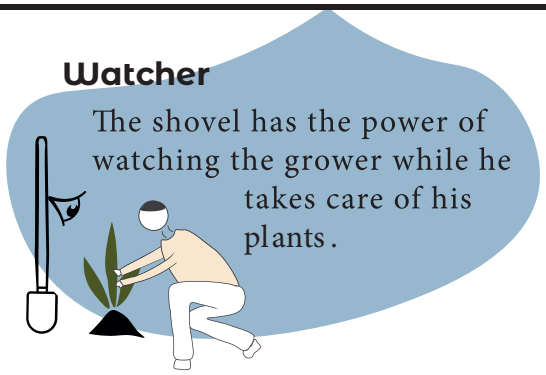
Data Analysis

The analysis of the recorded data were based on the overall footages as suggested by Giaccardi et al. (2016). Furthermore, while categorizing the footages, the three aspects of thing ethnography were taken into account: movement, temporal and agency of things (2016). The analysis phase investigated the journey of the tools; for instance what are the moments of movement and stability, how is their relationship with time and other actors around them and what do they bring to the practice of prosumerism.

Then, based on the outcomes, the possible contribution of these tools as materials of practice (Shove et al., 2012) to the meanings and competences of growers are discussed. The selected tools were, a tapener, a shovel, a hand shovel, a rake and a multi functioning shovel.

The Shovel - Participant M used the shovel to plant new strawberries. He first went to his depot to take the shovel. As image 13 illustrates, the shovel normally stays with other tools for gardening in the depot but once it is taken from there, it passes into another ecosystem, into the garden in this case and becomes a **connector** between its previous and current place (Giaccardi et al., 2016). After that, participant uses his shovel to dig the soil where the shovel acts as an **actuator** of the practice. Once he puts the shovel away and continues interacting with the soil by his hands, the shovel becomes a **watcher**. Similar to one of the agencies of things as mentioned by Giaccardi et al., by acting as a watcher, shovel actually becomes a tool with power (2016). Later on, he realizes that he needs to dig more, and he repeats the steps in which shovel again becomes an actuator, or successor in this case, and watcher afterwards. At the end it is taken back to the depot.








The Tapener - Tapener is used by participant S who has a vineyard. She uses it in order to let her saplings grow horizontally. She first took her tapener from the cellar where she also stores other gardening materials. Then she directly walked into the vineyard and by holding the saplings, she taped the young branches to the supports she built. Similarly to the shovel, this tapener also acted as a **connector** and **actuator** of the practice. However, it didn't act as a watcher of practice. This is related with the type of the activity and the form of the tool.

The Hand Shovel- Participant V chose to use her hand shovel to plant radish. She first took it from the bucket where she stores small gardening tools and walked towards the part of her garden where she will plant the radishes. Then she used the shovel to aerate the soil in order to put the seeds; she further used the side of the shovel to crumble the bigger parts of the soil. Before she started putting the seeds in the soil, she left the shovel to the ground horizontally. This way the shovel **witnessed** even the movement of the worm. After, she took the shovel back and covered the seeds with soil. Then again she put the shovel on the ground and went to pick the rose to irrigate the soil. Meanwhile the shovel kept witnessing all the movements going on the ground and also in the gardens surroundings. Once she finished watering, she took the shovel back and put it in the bucket.

While the hand shovel is witnessing the practice

The Rake- Participant K, who is the most experienced one and also the one who gave workshops, chose his rake to plant potatoes. He first took it from his depot where they store a lot of things ranging from gardening tools to potatoes and beverages. Then with the rake he prepared the soil. Afterwards, he handed the rake to his wife. The rake acted as a **companion** to his wife while he is busy with pricking stakes that would help him to draw an alignment line for his potatoes. After that he used another tool to take some of the soil from the ground where he will drop the potatoes. Meanwhile, together with his wife the rake was **watching** him. Then he needed the rack again to go over and straighten the soil.

Multi functioning Hand Shovel- Participant L chose to use her multi functioning hand shovel which lets her both clean the unwanted weed from the soil and dig the soil to prepare for cultivation. She first picked her shovel from the storehouse and brought it next to her garden where she will plant a row of cabbages. She started by removing the weed around the soil with the front part of her shovel. Once this was done she measured the distance between the neighbor row to identify the place where she would dig the first hollow. Up till now, the shovel had multiple functions, it acted as weed remover, distance measurer and digger. Besides being an actuator of the activity, by performing different roles, it acted as an **enabler** of the whole activity. Then participant L put her shovel to the ground so that she could put the small cabbage plant to the ground, cover it with soil and later water it. In all of these activities, the shovel was **witness**ing what other actors were doing. This process is repeated five times and at the end the shovel was returned to the storehouse where it is stored with other gardening materials.

Conclusion

Thing-ethnography was used in order to learn about the unseen relationships between the actors of prosumerism. The findings propose that the most essential tools used during the gardening process have different roles in the practice. Each of these roles provides different abilities and brings different meaning to the practice. Furthermore, thing-ethnography enabled to map all other ecosystem members of the practice. These actors of gardening practice are important since they are an inseparable part of the practice and may bring design opportunities in the future.

Roles of the Tools

Connector: In all of the ethnographies, the tools used are stored either in a depot or storehouse together with other tools and produces from the garden like potatoes and onion. Once they are brought out to be used, they become the selected one from the crowd of materials; thus they act as a connector between their previous place and the garden. This role may further bring the opportunity of transferring an unknown but useful knowledge from the storehouse to the garden.

Actuator: By enabling the practice; the tool becomes an actuator in all of the cases. It seems like an obvious role to have but it is valuable since the actuator is the one who knows how a journey of *taking care of cabbage* looks like based on its previous experiences.

Watcher: In case of the shovel and rake; they are in a position where they were watching the practice of prosumers. From the way that prosumers put them, stand still and staring at them, tools become watchers. They may provide their know-how about how much distance a prosumer should leave while planting strawberries or just check if everything goes smoothly during the practice.

Witness: Similar to watchers, but the role of witness carries less hierarchy since they are placed to the ground horizontally. Like the hand shovels of participant V and L; they stayed on the ground together with the worms, weeds and soil and witnessed all of the practice. Witnessing may be valuable to make suggestions to prosumers while they take care of their garden.

Companion: When a prosumer is together with someone else while she takes care of her garden, then the tool -when is not used- becomes companion of the one who is helping the prosumer. It stays with the other person, usually the other person holds it, and accompanies her.

All of these provide insights regarding the unthought roles of tools besides just being tools. They hold an important value for this project since they keep creative design opportunities with themselves.




connector

actuator





watcher — actuator

witness

companion

Other Ecosystem Actors

All of the tools used, enabled us to see the surroundings of the practice from an unbiased perspective. The common gardening things around tools while doing the practice of taking care of one's own food are gardening boots, plant that is taken care of, soil, worms, other plants close by, watering pot and hand of the grower.

These things are usually present in taking care practice of a prosumer. The importance of this ecosystem actors is that they may bring a unique opportunity to communicate what is needed during the practice. They may even communicate with each other regardless of their prosumer owner.

















4.2 Overall Conclusion

Meanings create the practice, competences let it happen and materials shape it. In Oosterwold, growing one's own food, so-called prosumerism, is the main characteristic of the neighborhood. To deeply understand the meaning of this practice for growers and Oosterwold in general; contextmapping and thing-ethnographies are conducted with prosumers. The reason to choose this kind of a combined method is to study elements of practice in detail; meanings, competences and materials. Through contextmapping the project aimed to distill the habits, everyday doings, needs of prosumers which would provide insights about the meanings and competences of them towards gardening. The study revealed that prosumers currently do gardening in their own way and not all of them are always confident with what they do. Lack of practical knowledge is the main aspect that leads to this situation. Even though there are some personal initiations such as Facebook, Whatsapp groups and yearly workshops organized by experienced inhabitants; some kind of a comprehensive knowledge sharing way still lacks which leads to difficulties such as having hard time in planning, hesitation of what to do when etc. When these come together they create frustration especially for inexperienced prosumers.

Appreciating, accepting imperfection and finding the balance between the effort put and taken is almost the thing every prosumer does. However, above explained lack of knowledge usually hinders appreciation. Also, not all of the prosumers appreciate what they do while they are in the gardens but usually afterwards when they see results.

All of these let us imagine a world where prosumers may access the knowledge that they need easily and on time which would lead appreciation of their effort and outcomes.

With thing-ethnography, the ways of realizing above mentioned world are investigated. It is found that tools used during the practice may have different roles and one tool may have various roles based on the specific activity that is performed by the prosumer. All of the tools act as a connector and actuator of the practice. Depending on the form and positioning of the tool, it may either take the role of watcher or witness. Finally, if the practice is going on with someone else, then in most of the cases the tool becomes a companion. Building on top of these roles, mapping of the other common members of the ecosystem is made to see the possibilities of collaboration with selected tools.

The roles of the selected tools suggest that materials used during the process have a possible impact on how the practice takes place. After understanding the current meanings, competences and materials of prosumers and collected insights regarding the possible futures of the practices; now the project aims to transfer these into concept ideas which would enable the ongoing sustainable transition of Oosterwold with the practice of prosumerism.

5. Design Goal

This chapter redefines and deepens the goal of the project based on the findings of the previous sections through illustrating current and desired situation of prosumers in Oosterwold.

5.1 Problem Definition

Analysis in the previous chapters suggest that lack of know-how of prosumers; undermines the whole process of gardening. What it is referred as “lack of know-how” is about practical disabilities caused by lack of knowledge in gardening process. Inability to make proper planning about the whole garden, failure to estimate chemical interactions about the plants, not being sure when to plant/harvest what, and difficulties in daily care of plants are some of the examples to the lack of knowledge of prosumers.

Even though prosumers have other means such as books, Internet and neighbors; a comprehensive and compact access is missing in the region. Meanings that they associate gardening with; are on the other hand, despite of their lack of knowledge, let them continue their practice of food growing.

Image 14. illustrates the current and desired situation of gardening practices for prosumers in Oosterwold.

Accordingly, the project approaches current lack of knowledge that prosumers have as an opportunity space that can be filled by other prosumers in various forms such as knowledge, produce or tool sharing. Furthermore, similar to what was mentioned in the conclusion section of the research phase, the project approaches the meaning of food growing for prosumers in Oosterwold as a means that support their practice.

Thus, in the following sections the project will look for the ways of enabling knowledge sharing by keeping the existing meaning as it is; if not enhancing it as a natural consequence.

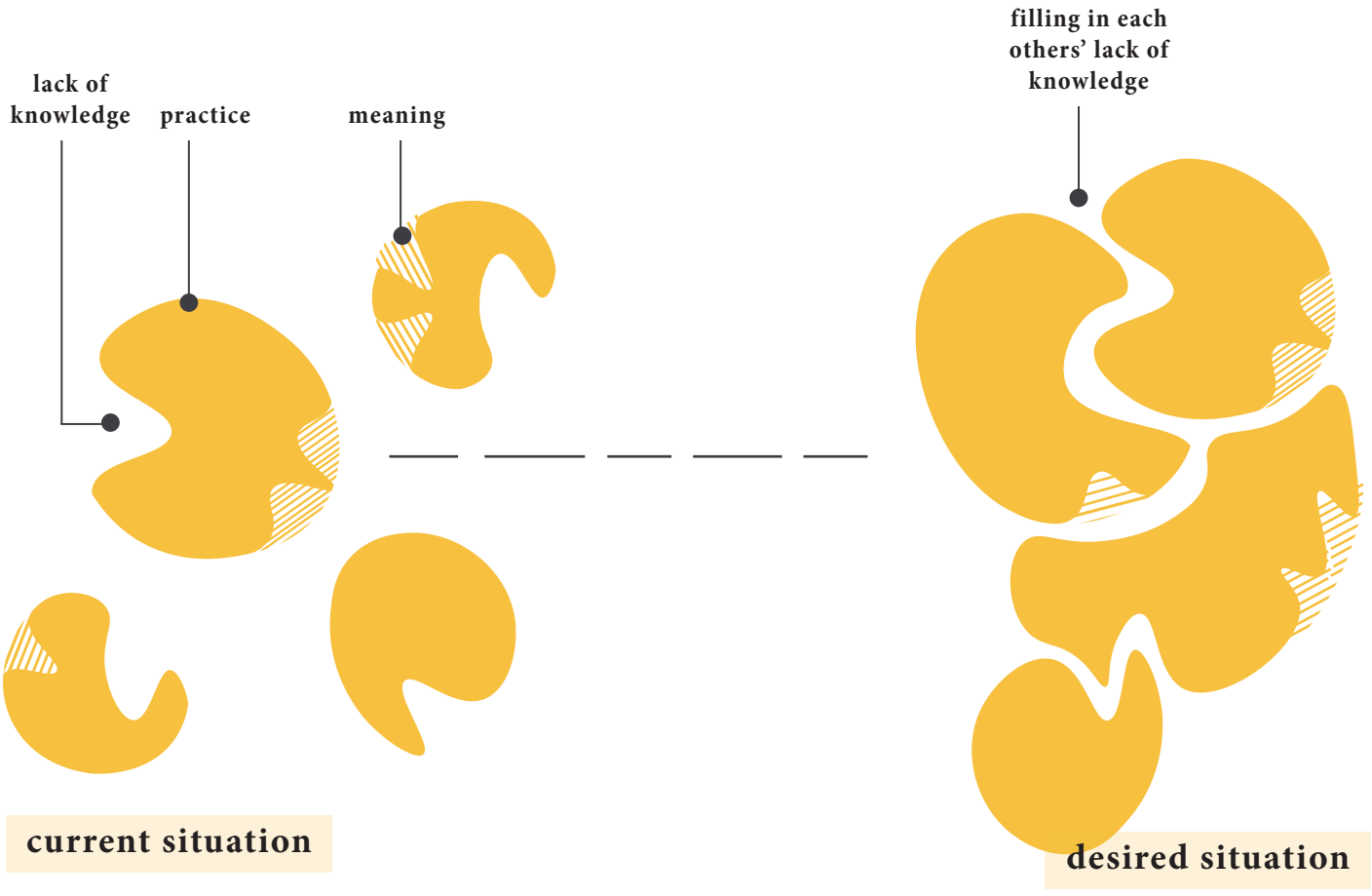


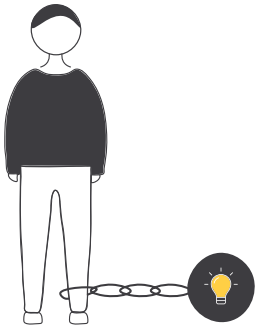
Image 14. Current and desired situation of prosumerism in Oosterwold

5.2 Design Goal

The transition that is currently happening in Oosterwold towards the community's sustainability and self-sufficiency, is the key point of this project. Previous chapters explained how the project approached and further researched this transition. Based on the insights gathered from the background review and research phase, the project reformulate it's design goal as:

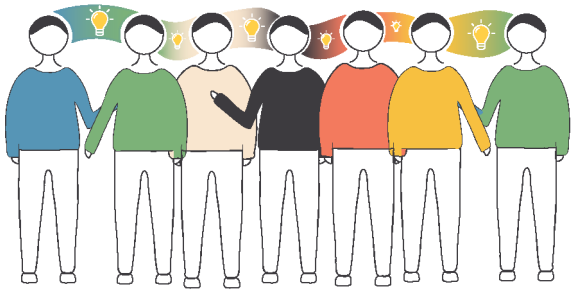
How can we enable community building of prosumers through supporting their meanings of food growing in Oosterwold?

Here **knowledge sharing** is chosen as a mechanism to enable community building in Oosterwold. Through **increasing involvement** in prosumerism activities and **facilitating know-how sharing** of individuals about gardening, community building can be reached. This will be possible through supporting and empowering prosumers' meanings of food growing which are different among prosumers. Through finding the correct balance between qualities like forceful vs playful, random vs foreknown, fast vs slow, and collective vs personal ownership, the project aims to meet the design goal.

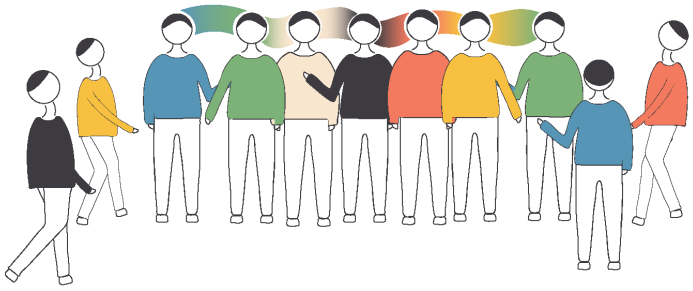


1. Knowledge of one prosumer

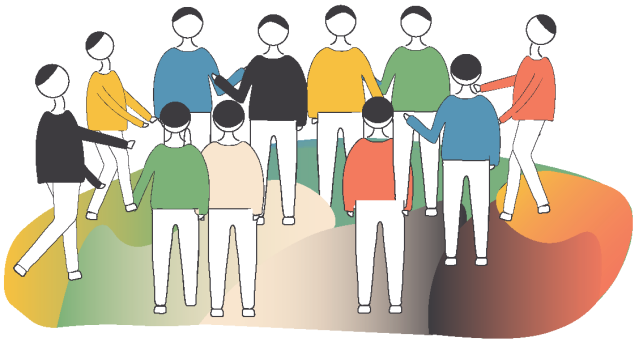
2. Knowledge and experience of others also exist



3. Through sharing, other ways of doing can be explored and unknowns can be learned



4. That would automatically attract other growers and result increase in prosumerism



5. Community can be built on a shared ground

The described scenario may be possible through different designs and design qualities. In order to move into the exploration phase, some design qualities are defined which would meet the design goal. Those design qualities form the design space of this project. This design space is created in order make ideas more tangible. The final design may take any shape within that design space like shown in Image 15. Where the final design will allocate itself will be based on the insights that will be collected through the synthesis of research findings, brainstorming workshop and feedback results; which will be explained in the following chapters.

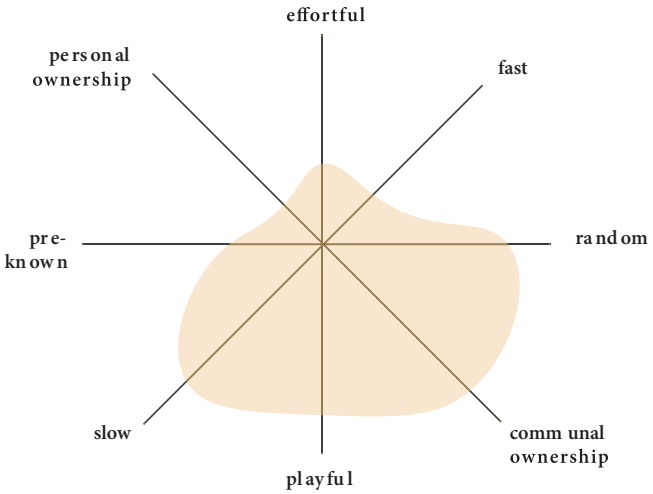


Image 15. An example of a design space with the design qualities

6. Concept Development

This chapter presents the very first concept directions as three possible knowledge sharing ways; which are later detailed and tested with a brainstorming workshop with designers. To see pros and cons of each concept, feedback calls are made with prosumers of Oosterwold as well as WUR. This was done to see to what extend concepts fit with Oosterwold.

6.1 Knowledge Sharing Ways

This chapter explains three alternative ways of stimulating knowledge sharing. These ways, in other words initial concept directions, are outcomes of the initial background review (2.2.3, 3.3) which is synthesis of theoretical and practical design research phase (4.1, 4.2): Subtle Advice Giver, Hackable Hood and Comprehensive Planner. They are created to show how community building in Oosterwold can be variously facilitated through knowledge sharing and how the neighborhood may look like (detailed sketches of concepts can be appendix A2). While creating the concepts, different meanings of food growing for different prosumers (collective and personal) are taken into account through speculating on; how they would act/prefer based on the design space in Image 15.

The process of creating different knowledge sharing ways and forms starts by digesting all the research and exploration insights so far. These insights form **qualities** of the initial concept directions which will be discussed in the upcoming pages.

They are adopted as an entry point to construct knowledge sharing ways of prosumers. It is important to mention here that those ways, concepts, are interrelated; in other words, there may be overlaps among them.

Subtle Advise Giver

Voluntary Action

One takes the initiative to start the act of advice sharing and it spreads throughout the community. Here the definition of advice is not strict and it should be determined by the prosumers. The mechanisms behind the spread should target prosumers with different motivations. One of the ways of doing this can be establishing a common ground through focusing on the universal needs. This way, voluntary action can be fostered and maintained.

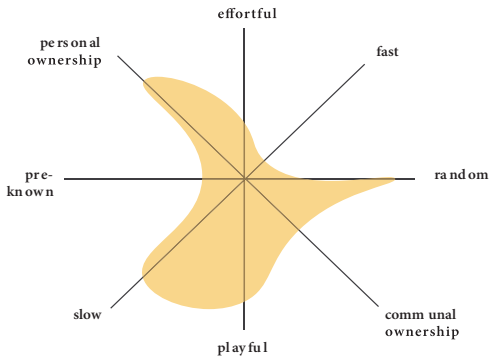
Surprising Retrieval

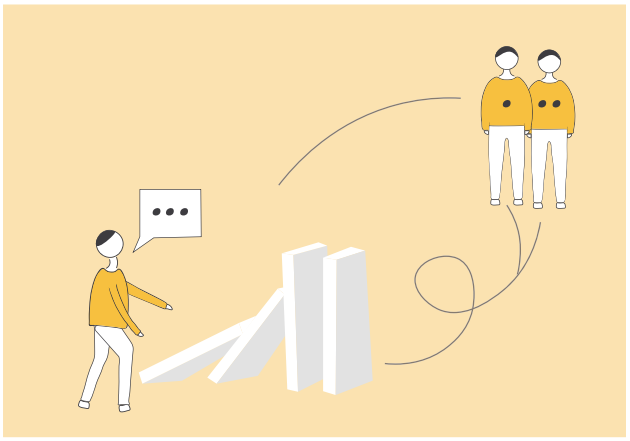
The way that inhabitants access advice should be in a surprising way, to keep the wondering level high and also to avoid repetitions. This coincidental access is expected to be perceived as effortless and fun.

Unconscious Interpersonal Interaction

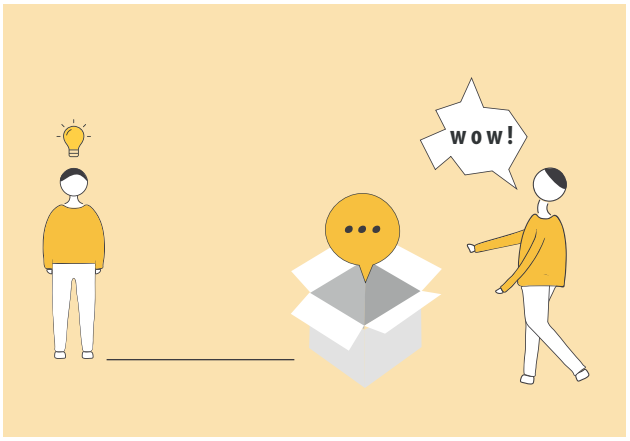
The way that advice is transferred should not require too much effort and it should be anonymous. Inhabitants are expected to come across with a particular advice without consciously being aware of the source of it. This aspect is expected to attract people who are not too enthusiastic about keeping contact with others.

Design Space of Subtle Advice Giver

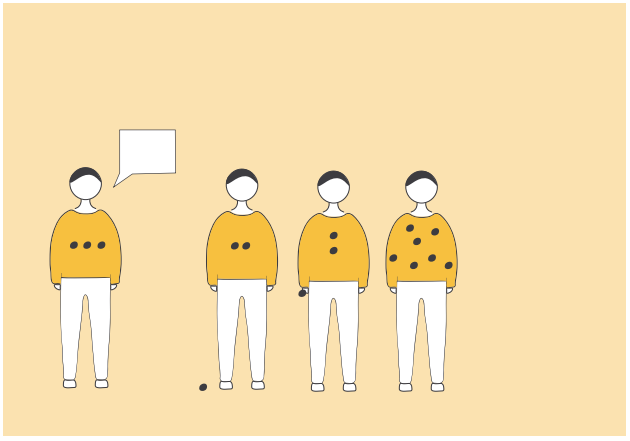




Like a domino effect, once experiences started to be shared, they loop continuously.



It is important that this domino effect is surprising and it spreads through time, with word of mouth.



One of the ways of ensuring is keeping the knowledge anonymous. Based on receiver's necessities, the knowledge can be interpreted and used accordingly.

Image 16. Storyboard of Subtle Advice Giver

Image 17. Collage of subtle advice giver


hout
ing
USA
Manual to
Initiate

Hackable Hood

From Prosumers to Makers

Food growers become creators, makers and hackers of their own neighborhood. Aligned with raison d'etre of Oosterwold, do-it-yourself area development is supported by giving power to people to create their own living hood. Since prosumers are inclined to make things with their hands, this attribute is expected to be liked by inhabitants.

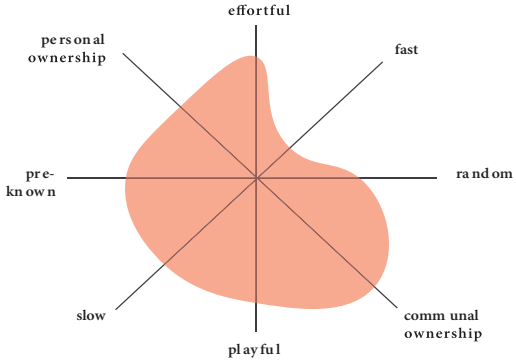
Neighborhood as a Communal Resource

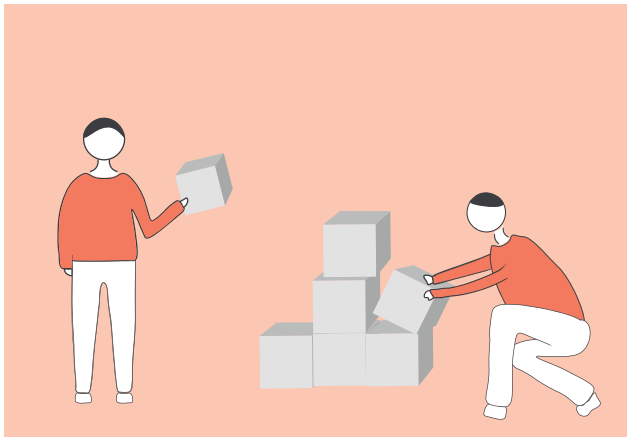
In this bottom-up concept, the physical space with all of its elements becomes a communal resource for Oosterwold. Through having a utopian approach, the neighborhood sees space as a shared ground instead of private plots. Roads, gardens, public greenery and even walls of houses provide dimensions to express and share practical knowledge.

Shared Wealth Creation

By transforming the neighborhood into a lively sharing environment that is created by its own people, overall subjective wellbeing of Oosterwold is expected to improve. This shared wealth creation may foster the notion of taking care and further ownership. Those two are perceived as mechanisms which would let the creation continue.

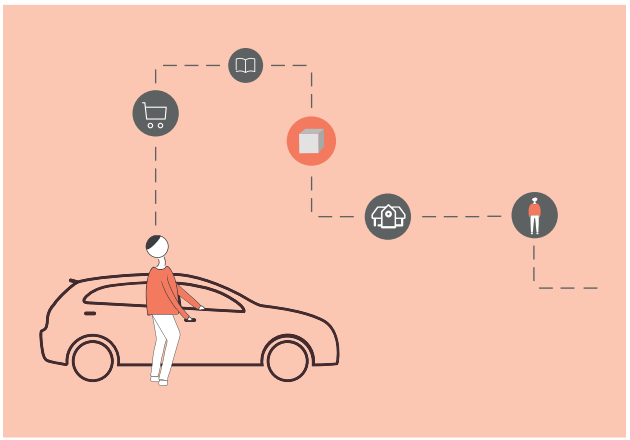
Design Space of Hackable Hood





▶ Prosumers become makers and creators, together they build the neighborhood. This is expected to create a feeling of care towards the neighborhood.

▶ The created artifact becomes a space for exchange of knowledge where personal resources are transformed into community resources.



▶ This interaction should be as neutral as possible through being a part of prosumers' everyday routine like going to supermarket, reading a book etc.

▶ The open source knowledge should be accessible to prosumers from everywhere.

Image 18. Storyboard of Hackable Hood

Image 19. Collage of Hackable Hood


PRIORIDAD

Comprehensive Planner

Accessible Neighborhood

Through data, gardens of prosumers become visible to each other. The plants they grow, step-by-step how they do it, as well as questions and answers regarding gardening and plants will become accessible. To do that, the concept collaborates with gardening tools such as shovels, rakes and hoes to understand real time actions of prosumers. Once that is understood, they offer suggestions, tips and tricks regarding that particular gardening action.

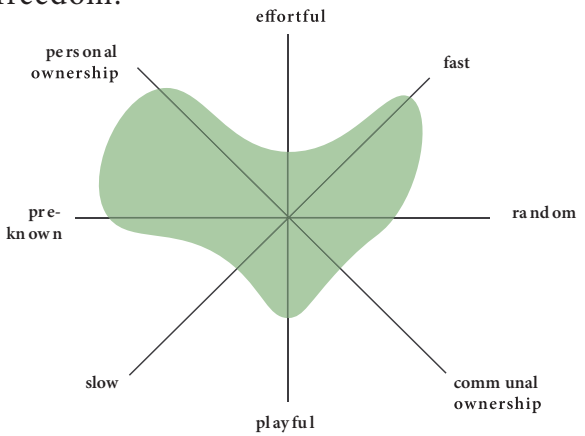
Smart Houses & Smarter Gardening

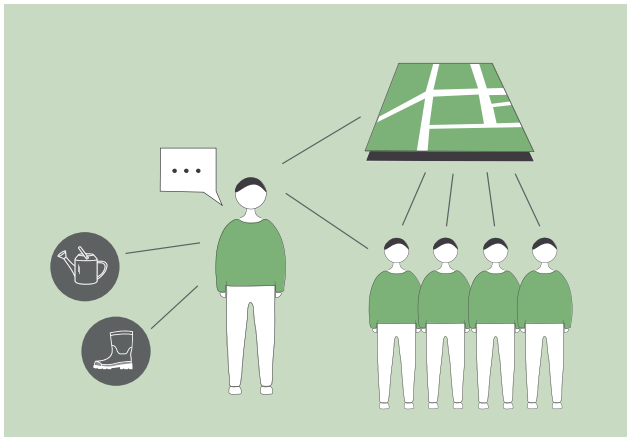
In an environment where comprehensive garden planning is possible beforehand, different opportunities arise. As such, the system takes away the pre-thinking load from prosumers. This ease of planning is expected to be preferred by the prosumers especially for the ones who are new at growing their own food.

Direct Digital Interaction

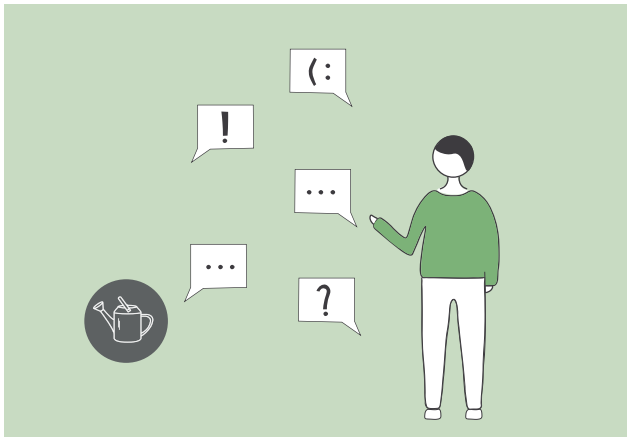
By establishing a communication that is mediated with smart systems, prosumers will be able to interact with each other. This interaction can be based on active practical knowledge sharing via question and answers or simply based on sharing the current status of your garden. The preference of which is given to the prosumer which creates a space for freedom.

Design Space of Comprehensive Planner

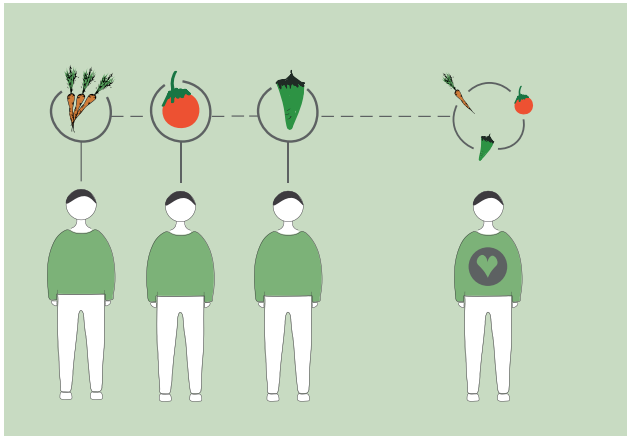




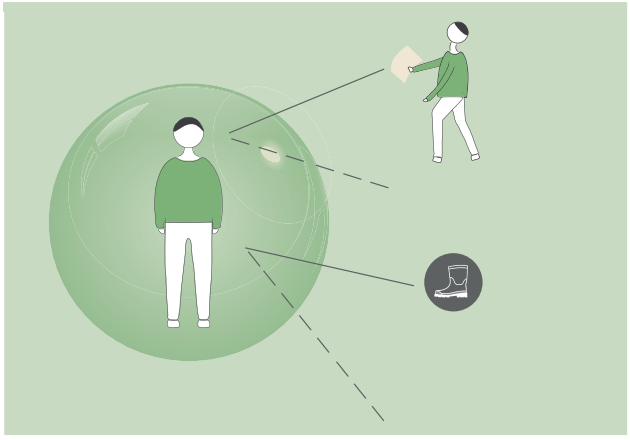
The imagined system enables prosumers to reach information through the agencies of their network such as gardening tools, other prosumers.



The tools may communicate with their owners to answer their questions and even make recommendations.



Through generalizing the mostly produced vegetables, or the least preferred plants, the smart system may act as a guide for the inhabitants of Oosterwold.



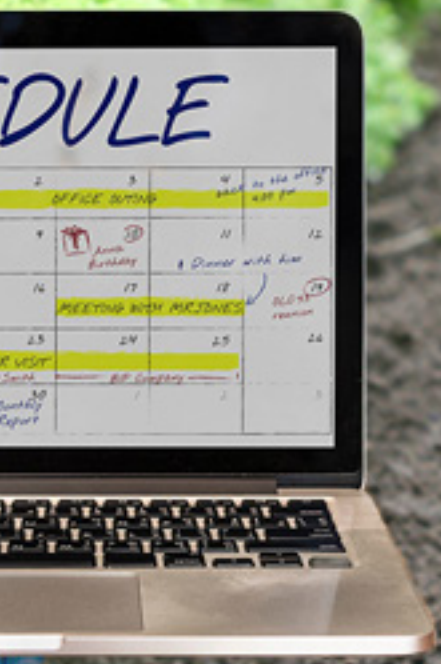
By being accessible from prosumers' comfort zones, the concept aims to attract more people to grow their own food. Thus, improve prosumerism practices in Oosterwold.

Image 20. Storyboard of Comprehensive Planner

Image 21. Collage of Comprehensive Planner

ls, other gardeners and your own garden will become accessible.

A connected life with multiple parties of gardening...



Conclusions

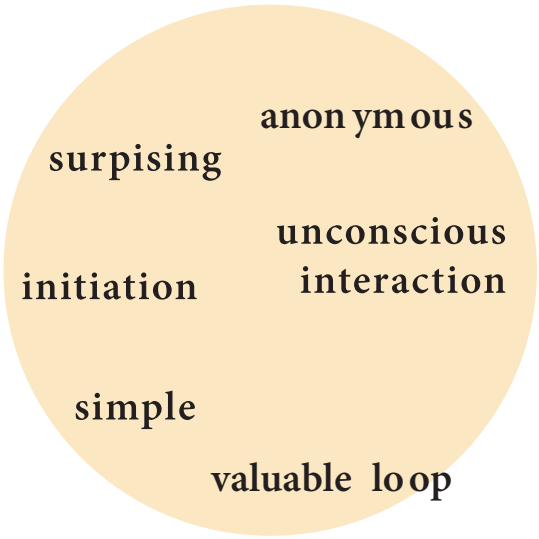
With the help of storyboards and collages, three initial concept directions are explored which later formed qualities of each concept as shown in the page.

To summarize, Subtle Advice Giver seeks for surprising and simple way of knowledge sharing by keeping the source of knowledge provider anonymous. This way, it aims to target inhabitants who prioritize convenience and ease. By giving power to the ones who like to share what they know about gardening, the concept aims to include experienced and enthusiastic prosumers.

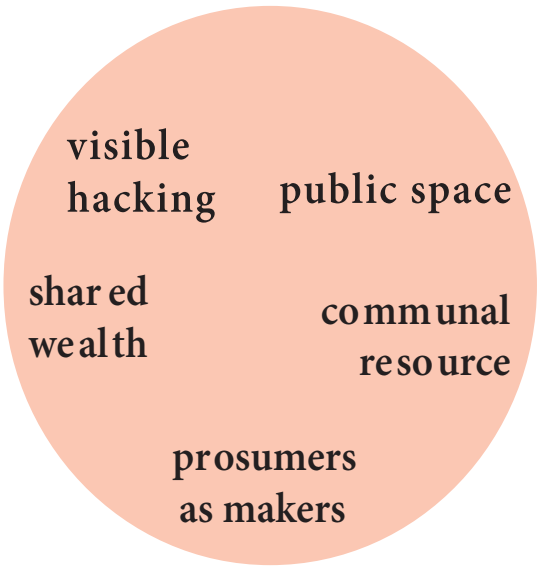
Hackable Hood's idea of making public space through visible hacking aims to stimulate contribution to the creation of neighborhood. By transforming the public space into a communal resource, the concept looks for multiple different ways that prosumers may share and/or exchange knowledge.

Finally, Comprehensive Planner draws a world where plots become smart, even smarter than prosumers. Through technology, the concept brings neighbors gardens to each other and make suggestions based on the popular trends of the neighborhood before and during the practice of taking care of the gardens.

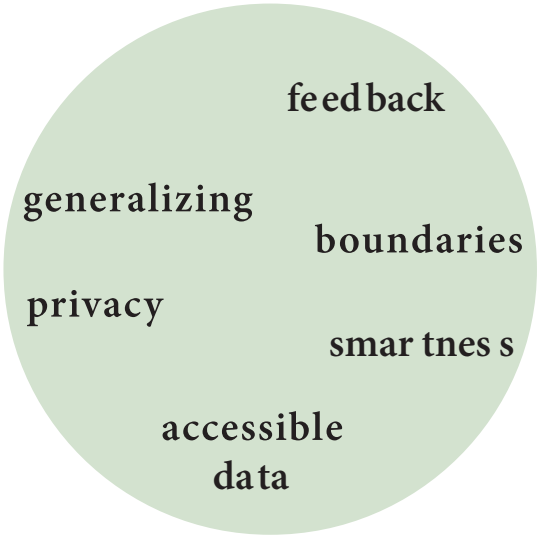
These qualities are the first step to start conceptualizing and later designing for transitional prosumerism in Oosterwold. The question of which attributes contribute to transition and inclusion of more inhabitants will be answered by the upcoming research and design activities as well as decisions.



Subtle Advice Giver



Hackable Hood



Comprehensive Planner

6.2 Transitional Prosumerism for Oosterwold

6.2.1 Brainstorming Workshop

By proposing three different concepts (6.1), the project offers different ways of knowledge sharing in an abstract manner. In order to go deeper in the proposed concept directions, in other words knowledge sharing ways for Oosterwold; a brainstorming workshop is conducted with designers.

Goal

The goal of this workshop is to convert the abstract knowledge sharing ways into concrete design ideas and also to find out pros and cons of those proposed ways by taking different prosumer perspectives into account. Through these, the workshop aims to test and strengthen the proposed concepts. By letting participants think and create together as if they are prosumers from Oosterwold, the workshop aims to reveal the possible design ideas and characteristics with the lenses of the proposed design concepts.

As a personal goal, conducting a workshop with different minds motivates and inspires me since it opens up new perspectives that wouldn't be possible to see with one mind. In other words, the workshop can be seen as an iteration to both test and go deeper in the existing ideas but also further generate new aspects of knowledge sharing for prosumerism in Oosterwold.

Method

A generative design research approach is adopted while designing and conducting the workshop. Similar to what it is described by Sanders and Stappers, the method follows the act of making as a creative act which involves construction and transformation of meaning by giving people the ability to make things that describe future objects and opportunities (2014). First, sensitizing the participants with persona cards and letting them brainstorm and ideate about the proposed design concepts enabled them to imagine and conceptualize their ideas. After, physically building their concept ideas and presenting these provide views on future experiences and future ways of living in Oosterwold.

Set-up

In total 2 sessions are conducted with 6 designers in each session. In order to represent prosumers with different meanings, 6 different personas are created of which 2 of them with strong individualistic and the rest with collective concerns (for concerns that constitute motivations of prosumers see sections 4.1.2 and 4.2). Persona cards are distributed randomly before the beginning of the session and they compose the seats of participants as shown in image 22.

Image 22. While participants are waiting for workshop to start

Participants are asked to work in pairs, therefore for each session 3 groups are made. Each group focused on one concept direction with the materials provided for them (for details see appendix A3). The materials of the session were:

A. Persona cards for each participant

B. A narrative manifesto for each concept, with specific design guidelines focusing on knowledge and meanings

C. Ideation cards to stir imagination

D. Service design maps for sketching

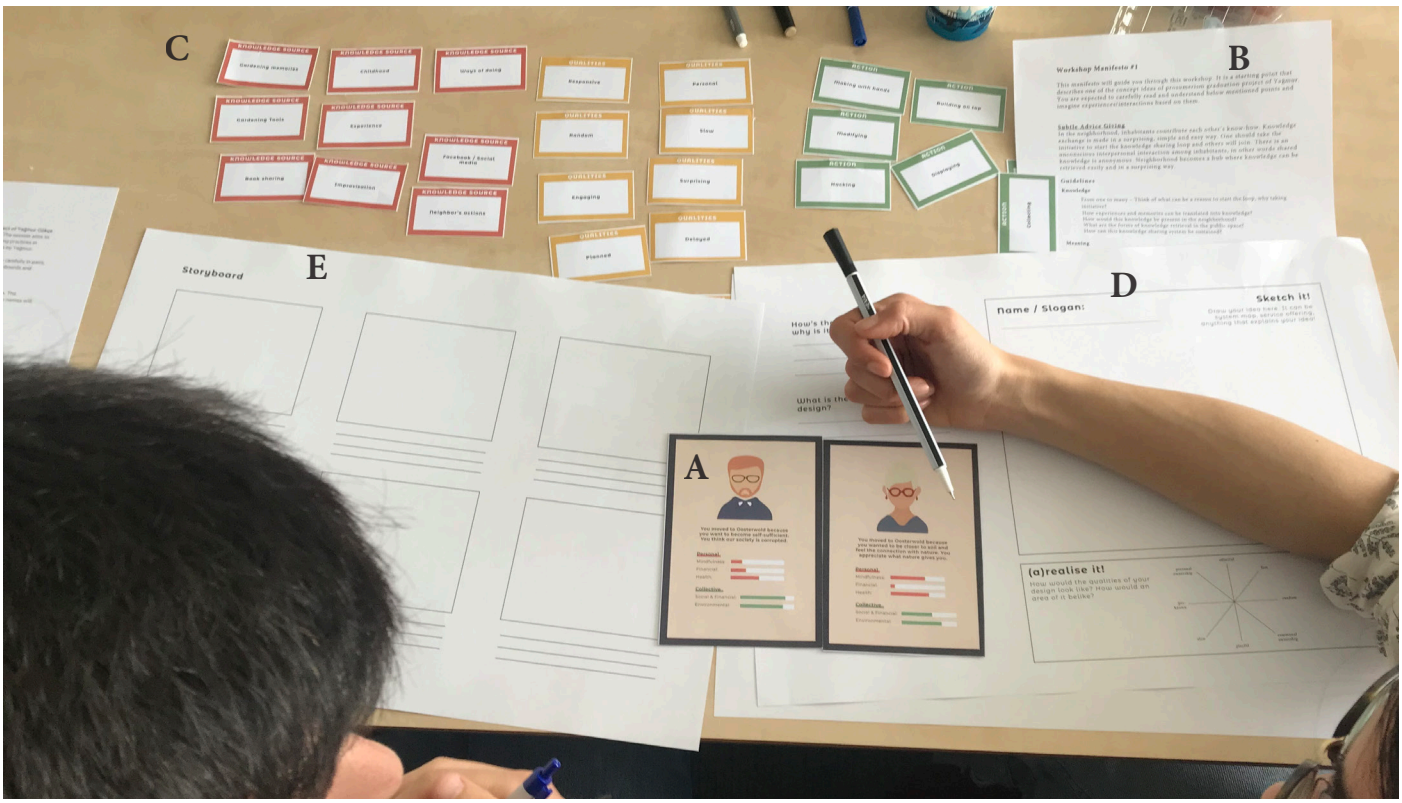
E. Storyboard templates for showing intended interactions

F. Wood sticks and clay to build the concepts

Procedure

1. Introduction

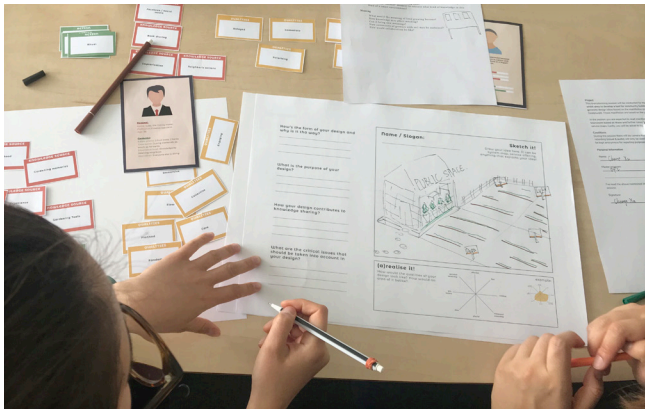
Once all the participants arrived to the session, they were asked to read the consent forms in which the session aim and procedure are described. Once they all signed the forms, a 2 minutes introduction presentation is made regarding the project's background and aim. After that they were told to have look at their persona cards and requested to think and act from the persona's shoes throughout the session. They were also told at this stage that they will work as pairs with the one sitting next to them. As an ice-breaker activity, each participant introduced themselves as their persona together with their favorite food to grow. Finally, the flow of the session is introduced orally by me to kick-off the session.



Overview of the set-up elements

2. Mind-mapping

3 different manifestos are distributed, which are like the design briefs for each pair during the session. The manifestos' structure is explained to them as *"..on the upper part there's a narrative of an ideal world in Oosterwold. Below, there are questions which can help you to think about while you are brainstorming. You can think of them as your design guidelines. Now you can read them."* Once they read it carefully, participants are asked to do a mind-map of the proposed concept direction. Ideation cards are also introduced at this stage to arouse imagination. They had 10 minutes for this part.



Concept ideation of a pair

3. Service Concept Ideation

Once mind-mapping is over, service design map and storyboard templates are distributed to each pair. Based on their mind-maps, they were asked to create one service-system concept and sketch it to the templates. They were given 15 minutes for this phase.

Making process of participants

4. Building the Concept

To decide but also finalize the form of their designs, wood sticks and clays are also given to the participants. They were asked to physically build their concept ideas of which they will present afterwards. To avoid perfectionism, they were told that they are free to build as much as they want, any part of their design etc. They had 12 minutes for building their concepts.

While one of the pairs is presenting

5. Presenting

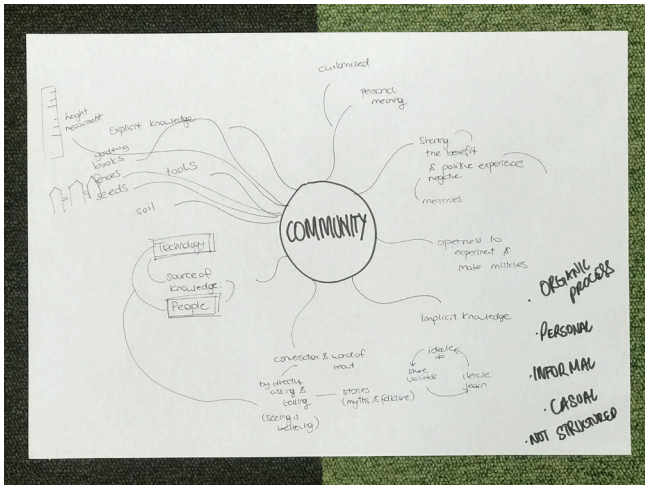
Once the whole creating and making process is over, they were asked to present their final system-service design in 3 minutes through their model and service maps/storyboards.

Overview of the session

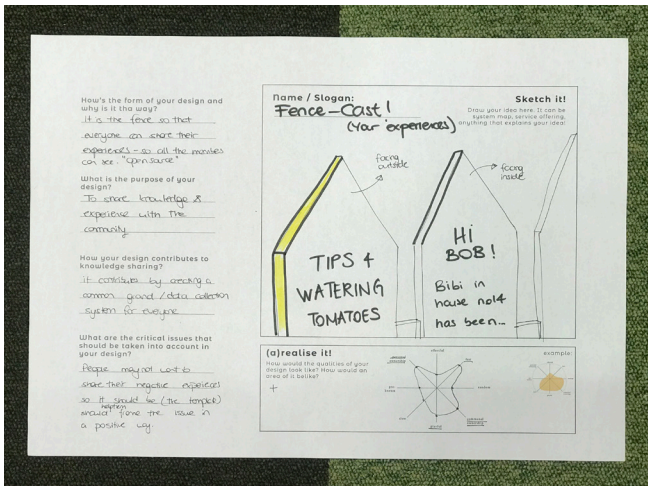
Data Analysis

At the end of the session, 6 mind-maps are generated together with 6 system service design ideas that are presented both with ideation sheets and physical models which can be found in appendix A4. For the convenience of further analysis, components of mind-maps are clustered and at the end 3 mind-maps are created for each concept direction. Furthermore, 6 final designs that are created at the end of the session are analyzed by looking at characteristics, insights sketched in ideation sheets and physical attributes presented models.

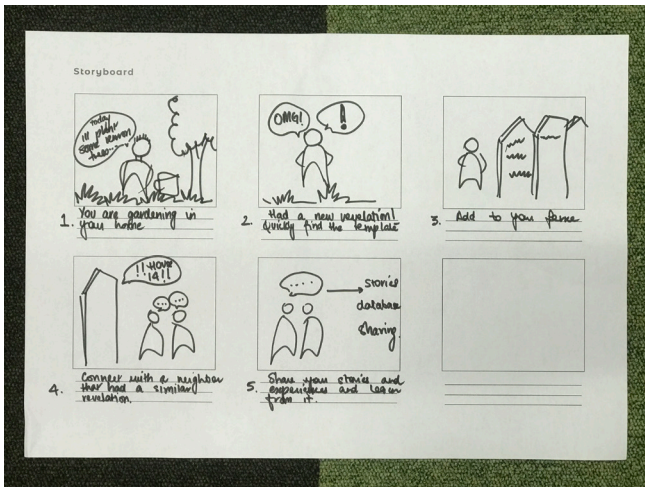
These qualitative analysis will comprise the second layer of the initial concept directions that were presented in section 6.1 of this report. They together will form the core of the concepts; which are two of the four pillars of the overall concept analysis.



One of the mind-maps generated during the session



An example of the service design map



One of the storyboards' created during the session

Subtle Advice Giver

Aligned with what subtle advice giver offers, during the session participants imagined and designed a knowledge sharing that is easy and surprising by focusing on the initiation of the sharing loop. Mind-maps that participants generated focused on figuring out different **sources of knowledge, gardening things** and **responsive initiation** as shown in Image 23.

As their final design, one of the pairs created **Fence-cast!**, that is an **open-source** fence for inhabitants to share their experiences. The fence of their own house, becomes a **common ground** for every individual in the community to share their **stories about gardening.**

To **include as much inhabitants as possible**, the design underlines the fact that the fence **template should guide** the expression way in a **neutral** way, if not **positive way**.

The other pair designed a **Communal Training Gardens** which are a physical spaces located around Oosterwold that aim to **facilitate knowledge sharing** and thus **increase interaction among prosumers.** In this design, to ensure **responsible initiation,** there are **different roles** that one may have like beginner in planning, expert in tomatoes etc. Depending on prosumers' **experience level** and **willingness to participate** they can pick and act upon that role for a month. These roles can be traced through a physical dashboard.

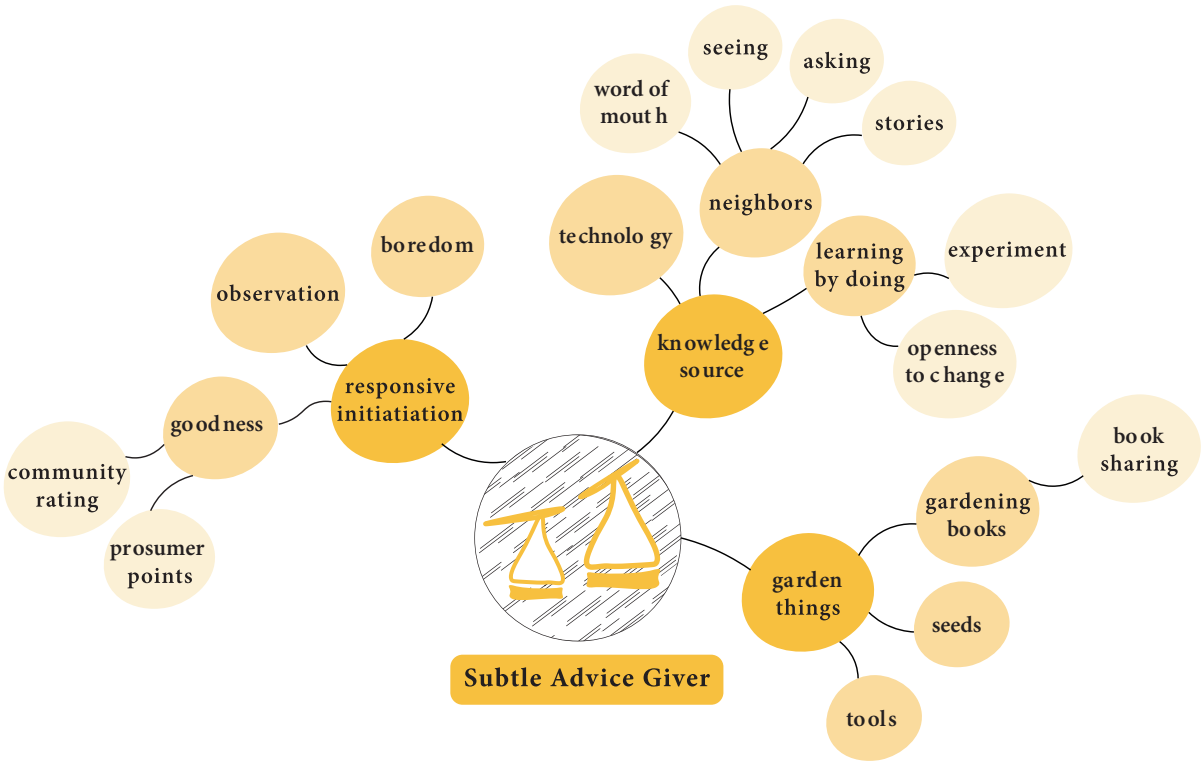
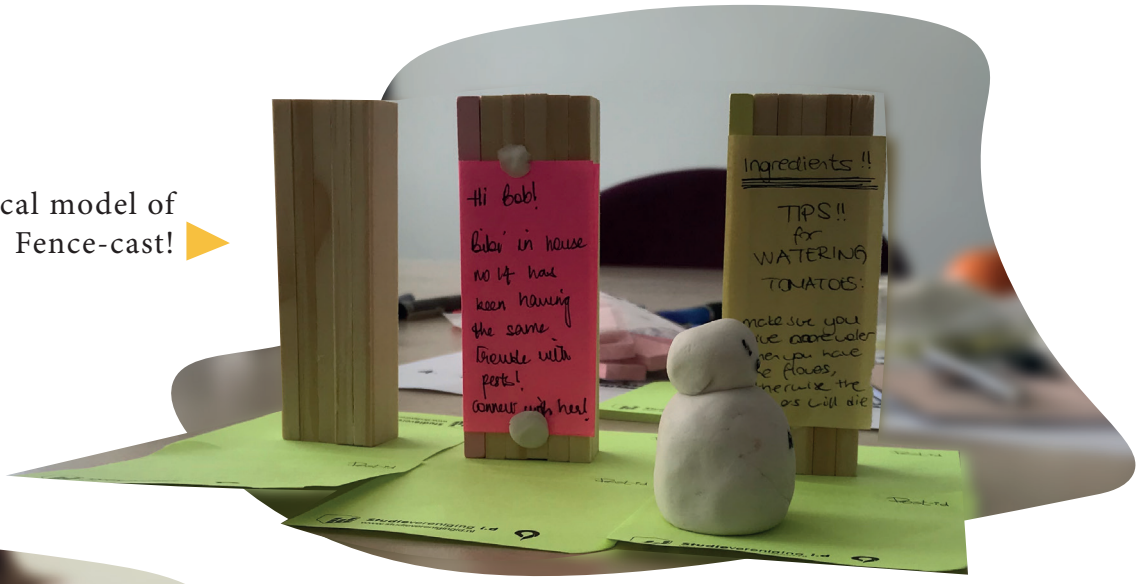


Image 23. Mind-map of Subtle Advice Giver

Physical model of
Fence-cast!



Physical model of
Communal Training Garden

Looking at the physical characteristics of both designs, it can be argued that subtle advice giver should be **accessible and visible in outdoors** and **for everyone.** Even though the ownership of the two designs may differ at first sight, with time both of them will become stronger in **communal ownership**.

Also, the designs display a **voluntary** and **equal** way of **engaging**. In Fence-cast! supposedly everyone will have a fence display and in Communal Training Garden, based on the number of requests, a workshop will be conducted or a role will be given to someone.

Hackable Hood

The manifesto given to the participants which will let them brainstorm about hackable hoods, puts emphasis on the **maker approach**. In other words, it draws an image of hacked, created and transformed neighborhood by its inhabitants. While imagining this kind of an environment, mind-maps of participants focused on the **ways to create knowledge** and explored the ways of keeping it **open-source** as shown in Image 24.

One of the designs that was created at the end of the session is Share-me. Share-me composes of **multiple public storage furnitures**, like a library, racks and shelves. They offer **space for exchange** of any gardening product to some kind of a knowledge. The question of the prosumer as well as her house number will be written below part of the thing that one wants to exchange (garden tools, plant seeds, produces from garden etc). Someone else in return reads the question and if she knows the answer, takes the product and visits the house to have a small chat about the question. In that way, design provides a **slow and not pushing** way of knowledge exchange through **visibly hacking the neighborhood,** by keeping it **open-source.**

The other design for a hackable hood, was Get Dirtier. It enables a comprehensive way to share knowledge among inhabitants through providing **different roles** based on **personal strengths** of inhabitants. There are different roles like **building, finances, environmental impact** etc. and each of these roles has **different corresponding physical blocks**. When an individual performs a role for a defined amount of time, she receives a block of that particular role (pink block for finances for example) and locates it in front of her house. This way, each house becomes **a role indicator hub**. The more you perform one particular role, it's an indication of your experience level about that topic. The idea lays on **mutual trust** of inhabitants.

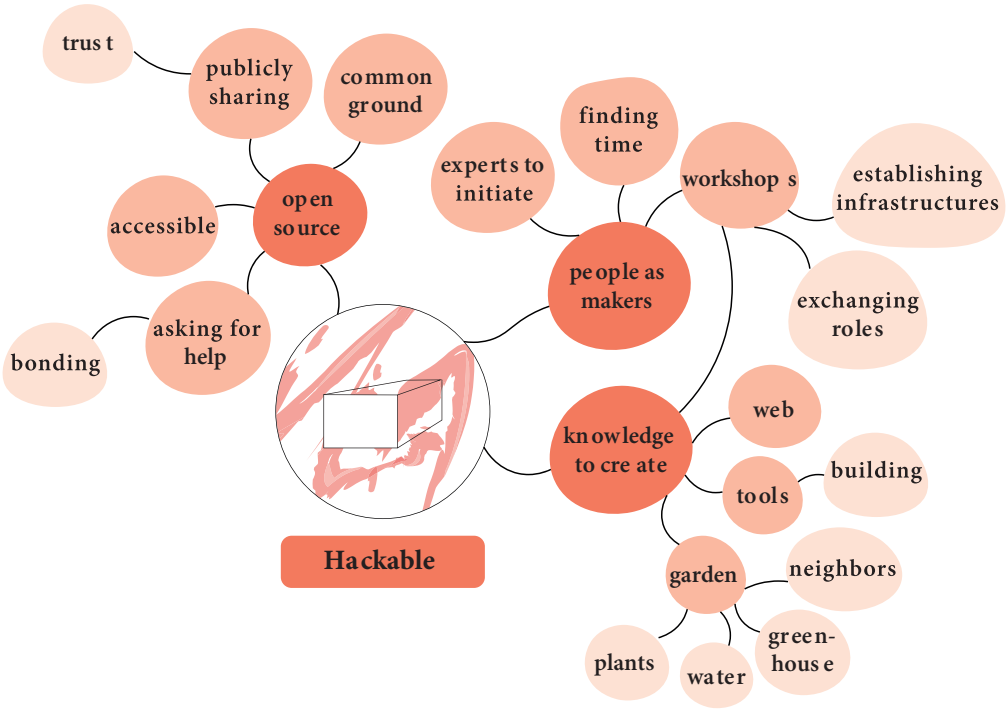
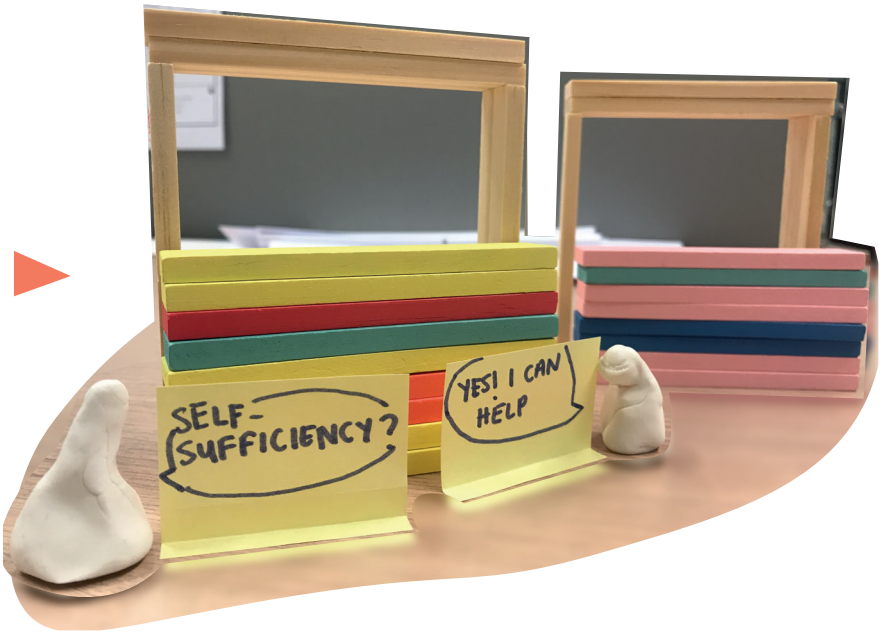


Image 24. Mind-map of Hackable Hood

Built representation of Share-me

Built representation of Get Dirtier



Both of the end designs represent **personal resources** of individuals in an **open and visible** for all manner. However they differ in terms of how they do it. Share-me provides a public space that focuses on **trade-off**; whereas Get Dirtier makes use of the **personal zones** and transform those into some kind of a **knowledge indication dashboard**. Nonetheless, both of them require a guarantee from inhabitants that they will perform the roles of theirs. This guarantee can be in form of a communal agreement, or receiving "dirtier points" / "share-me points". For the initial, security of the shared resources should be maintained; which will again be through taking care of inhabitants. These insights reveal that a hackable Oosterwold would be possible through internalizing the sense of community and common resources.

Comprehensive Planner

Aligned with the manifesto given to the participants, they mind mapped the possible **data types** that might be available and necessary for prosumers. It automatically brought the issue of how to **take control** over the data, followed with an additional use case of data that is **communal entertainment**. The focus of the mind-maps was how to make data meaningful and fit with prosumer's daily routines, in an environment where almost everything is accessible like shown in Image 25.

Building on top of that, one of the groups created **PlatFarm**, a physical and virtual communal space for prosumers to t**race and track** their own and each others' actions. The **virtual** part of the platform provides **basic knowledge** in forms of video tutorials about **seasonal information** and **procedural know-how** of plants. The virtual platform also includes **shared experience** and **entertainment sections**; which are linked to the physical environment. In the shared experience section, people can give tips and tricks to their neighbors from their own gardens, may organize harvesting together. Those events will take place in prosumers' gardens (twice in every month, hosting the event will rotate). There will also be sensors located within the gardens to ensure **safety** of the plants. The community will be informed if an unexpected movement is recorded in the gardens. As the third function of the PlatFarm, entertainment such as tours of farms around Europe, and workshops with cooking professionals will be organized.

Second design of the comprehensive planner is Share & Grow, which is a community garden. Inhabitants may rent slots and plant anything they want. The name of the plants and owners will be visible to enhance sharing experience.

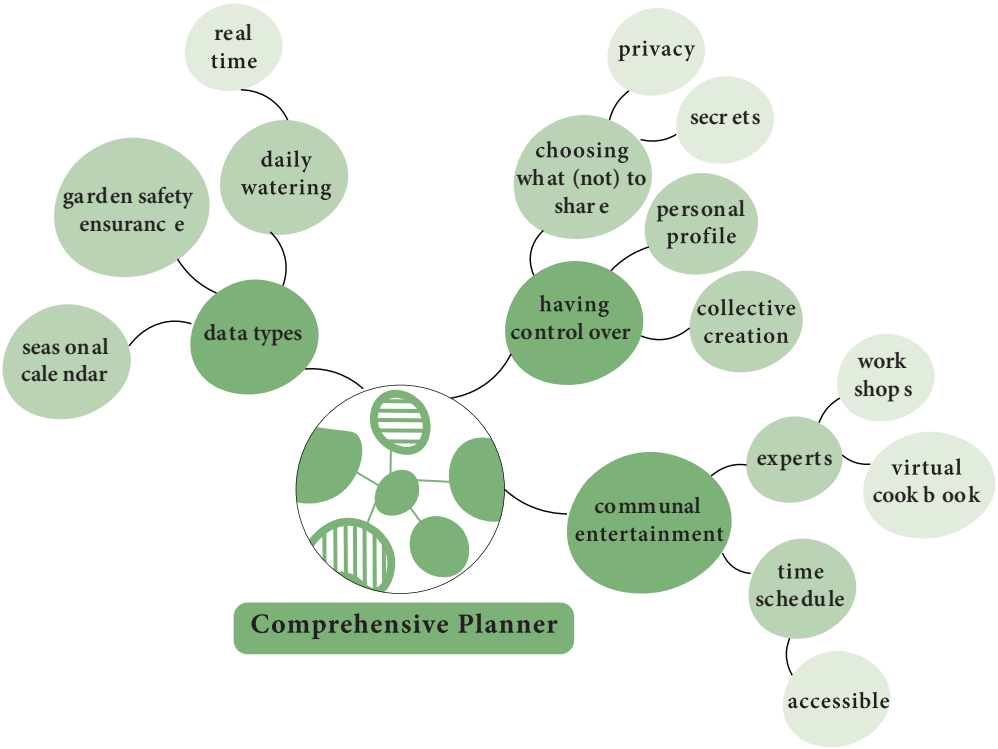
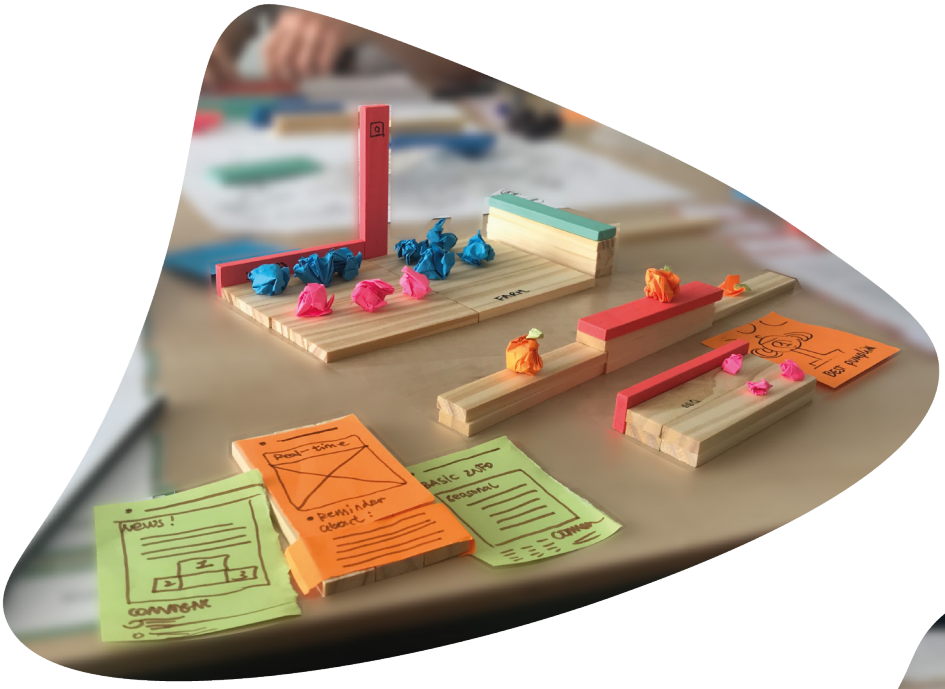


Image 25. Mind-map of Comprehensive Planner



Representation of PlatFarm

Representation of Share & Grow

The end designs share a similar characteristic by having a physical garden component in it. However, Share & Grow proposed only a communal garden which wouldn't be very practical for prosumers of Oosterwold since they already grow their own food in their own slots. That's why Share & Grow carries a potential to be implemented in the future where Oosterwold becomes fully settled and people require more space other than their houses.

PlatFarm on the other hand focuses on knowledge sharing and gaining through socialization. By combining a virtual platform with physical gardens of prosumers, it gives power to prosumer for initiating, continuing the knowledge transfer cycle. Here, by organizing events like competitions, the best pumpkin award, the design aims to increase involvement of prosumers with different knowledge-level.

Conclusions

The design outcomes of the session, provide insights regarding three different concept directions that are discussed in 6.1. Those insights are added on the initial design qualities of concepts which form the core of each concept like shown in this page.

It is important to repeat here that the concepts are not independent from each other but instead they stand out with some different characteristics while also sharing common attributes.

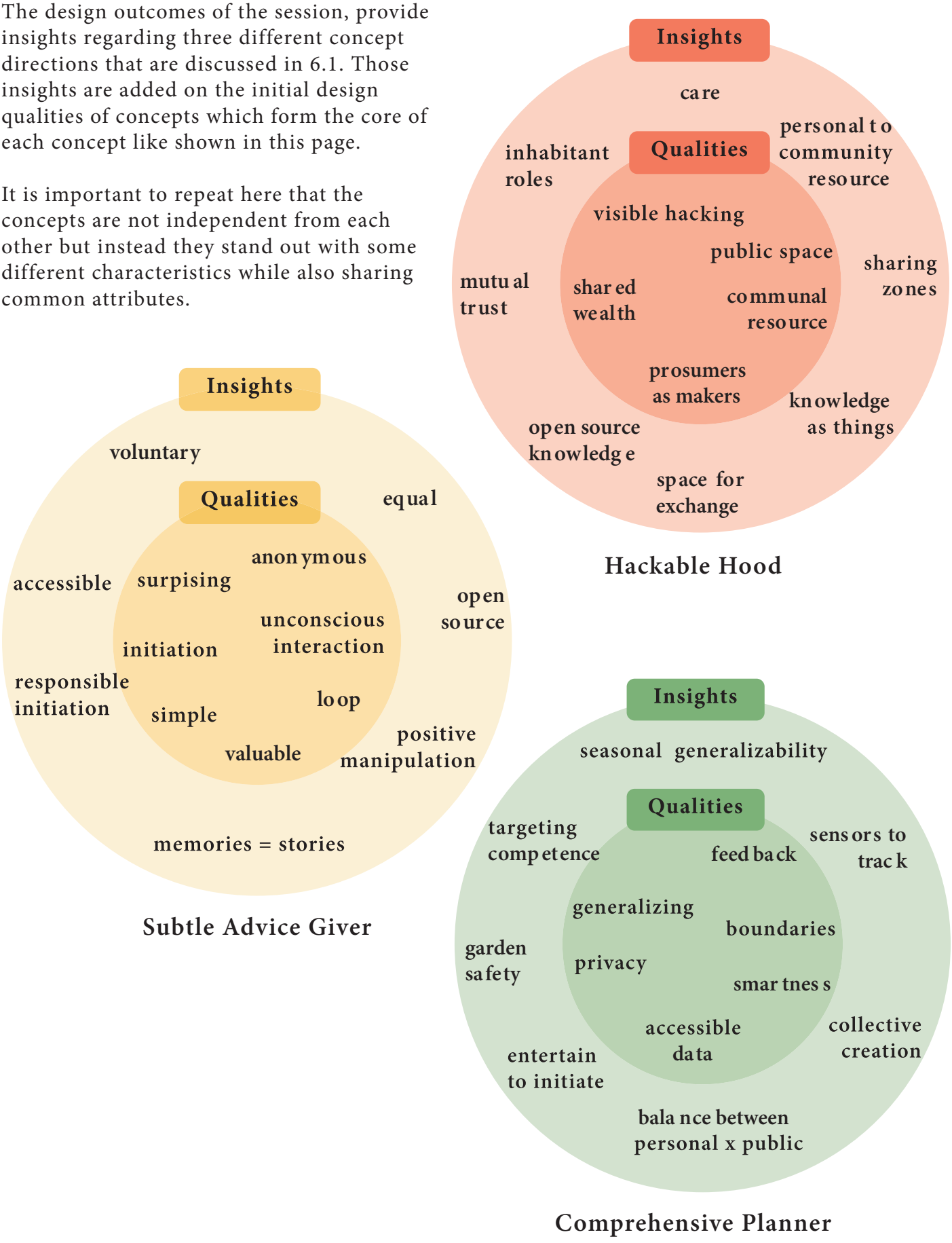


Image 26. Design cores of three concepts

6.2.2 Synthesis: Facilitating Transition

To build on top of the core of each concept, that is made of qualities and insights, fit with Oosterwold and expected impact on other practices are also considered. The initial is chosen to receive feedback from the prosumers who joined to the research phase of this project and from the mentors of prosumerism research project (WUR) to facilitate fit with Oosterwold. This was to see to what extend each concept aligns with prosumers as well as Oosterwold's mission and vision.

After this, a final design proposal (chapter 7) will be created by combining the elements from proposed concepts. Once the design is prototyped and tested (section 7.2), as a final layer, to foresee the impact of the final design on other practices, three elements of practice theory will be brought back and discussed (chapter 8) how the final design facilitates transition through the practice of prosumerism.

Image 27. Synthesis method of the project

6.2.3 Fit with Oosterwold

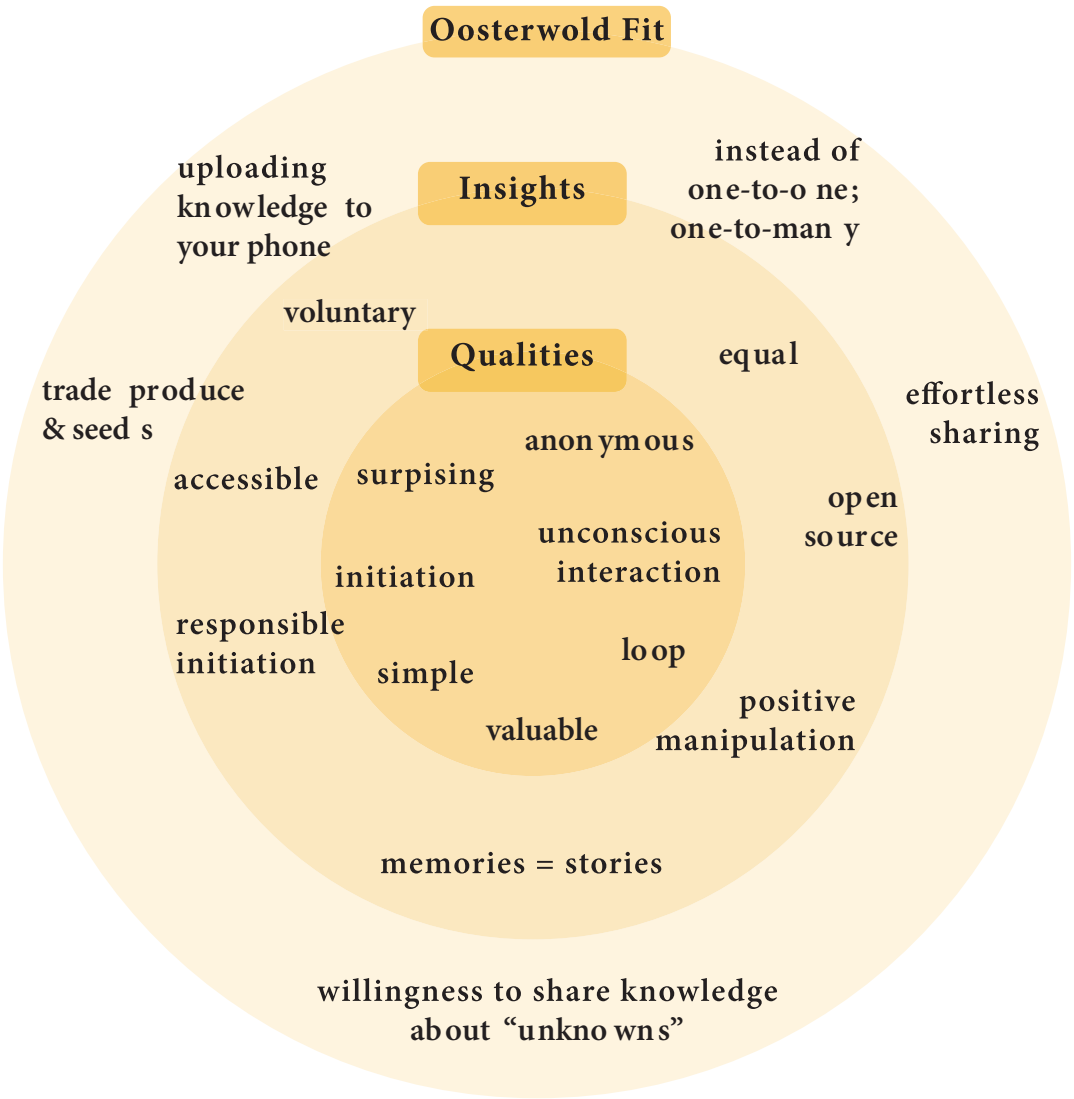
In order to consider fit of three different design cores with Oosterwold, first feedback calls with previous prosumers are made. These calls were based on a small report that presents 3 core concepts which can be found on appendix B1. The outcomes of these calls enabled to evaluate the concepts from users' perspective. Secondly, the concept directions are also discussed with Esther Veen and Jan Eelco Jansma to ensure alignment with Oosterwold's vision and mission, similar to the points discussed in sections 2.1 and 2.1.4.

Accordingly, fit of the three different concepts are discussed in this section.

Subtle Advice Giver

Subtle Advice Giver is perceived as a simple but limited way of knowledge sharing by prosumers since it focuses on one-to-one sharing. Instead one-to-many approach is suggested, so everyone may access what is available. Prosumers said that they look for easy access to that knowledge, so they wanted to upload the advices to their phones. When it comes to what exactly will be shared, a prosumer suggested that sharing "new discovered", "unknown" plants can be an option.

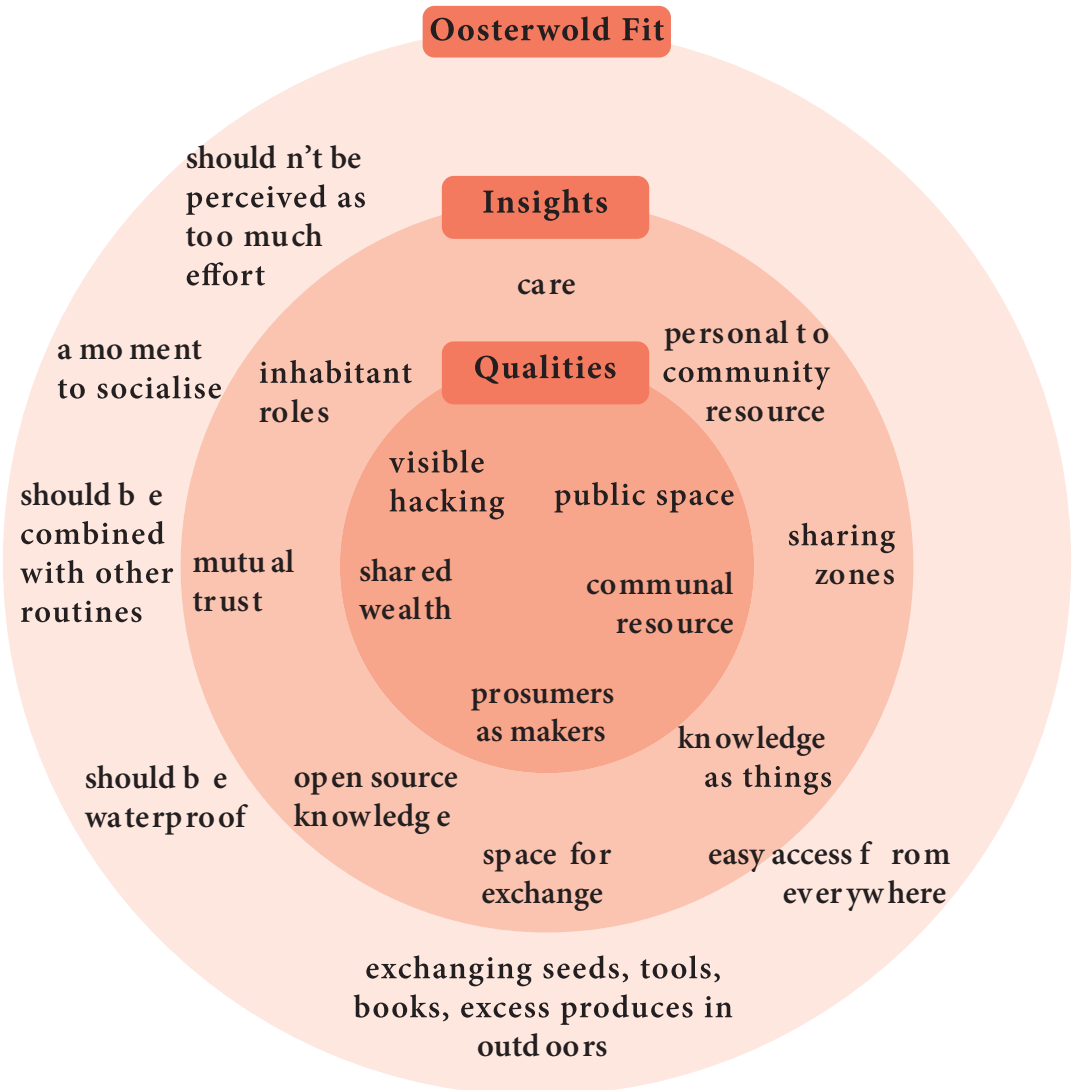
Even though Subtle Advice Giver offers a simple way of knowledge retrieval, accessibility of the concept and the reason to start sharing are found to be developed further.



Hackable Hood

As a concept where prosumers become more than growers, hackable hood made prosumers feel excited. They declared that coming together to "hack" can be a moment to socialize. It was also underlined that the process of hacking shouldn't be perceived as too much effort. As suggested by one prosumer, one way of dealing with it may be integrating the hacking moment into other routines. Easy access to the "hacked hood" was also one of the concerns that prosumers underlined.

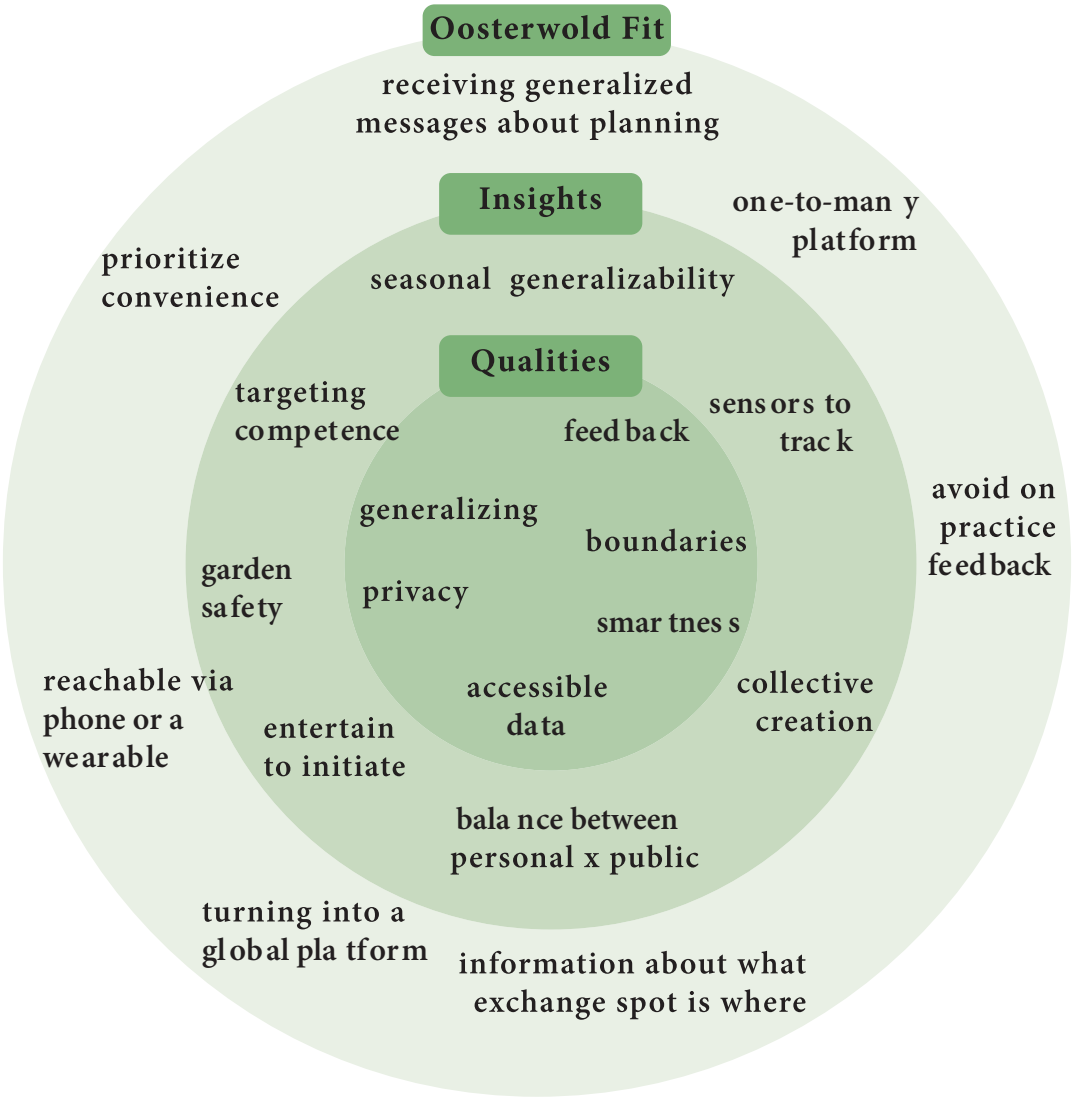
During the feedback session with Jansma, he underlined the fact that Oosterwold is a DIY neighborhood, so this idea of hacking has a good potential with Oosterwold fit.



Comprehensive Planner

Comprehensive Planner was perceived as the most realistic and "this era's" concept among the three, the main reason behind this was the potential of the concept in aspects of accessibility and being a one-to-many platform. One of the prosumers also added that she might feel annoyed with the constant feedback while she's taking care of her garden.

Jansma brought out the issue of convenience, that is valuable for most of the inhabitants of Oosterwold. The concept being reached via phone or a wearable; and may be edited by many made him like the Comprehensive Planner.



Conclusion: Final Design Proposal

Once three design cores are studied together with their fit to Oosterwold, it became apparent that there are overlapping design qualities and interactions. Thus, those reoccurring attributes offer a view on how the final design should be like. Below, it's explained from which design concept, a particular final design attribute is derived and contribute to a part of the final design.

As it can be seen, the final design proposed to be a mix of the three concept, instead of only focusing on one. Chosen attributes constitute the base of the final design and aim to ensure knowledge sharing through community building in Oosterwold.

Trade produce & seeds

Space for exchange
Exchanging seeds, tools, books, excess produces outdoors

Information about what exchange spot is where

Exchanging Sharing

Instead of one-to-one; one-to-many

Generalizable
One-to-many platform

From one to many

Personal to community resource

Balance of personal and public

Personal to public

Uploading knowledge to your phone

Easy access from everywhere
Shouldn't be perceived as too much effort

Prioritize convenience
Reachable via phone or a wearable

Accessibility Convenience

7. Final Design

This chapter presents the final design concept of the project: DIY Exchange Hubs. Specifically designed for Oosterwold through exchanging elements like gardening tools, books, seeds and excess produce; hubs are presented and further tested in a community event, Oosterwold Ontkiemt. The results of the event are explained in here; which turned out to have a good potential for further implementation for Oosterwolders.

7.1 DIY Exchange Hubs

DIY HUBS
Oosterwold

DIY Exchange Hubs are cube-like boxes for Oosterwolders to **exchange** gardening things like **tools, books, seeds and excess produce**. The hubs can be built by Oosterwolders with the help of the **building manual** which includes **drawings** of the pieces, **instructions** about how to put them together and **extended features** section that includes tips about **coloring** and **functional differentiation** of the hubs. Further, the hubs can be **traced and tracked** with the mobile application. Through the app, Oosterwolders may see the **current status of the hubs**, how to **make use of the things** that are in the hubs and further make a hub **building request**.

DIY Exchange Hubs

Building Manual

Mobile Application

7.1.1 Design Elements of DIY Exchange Hubs

Physical Exchange Hubs

Hanging Tools

Inspired by the results of thing-ethnography; roles of gardening tools in the practice are deconstructed. Tools are presented to Oosterwolders in a neutral form, while they are hanging from the ceiling. This creates an unbiased first interaction with the tools.

Free Wall

Made from chalkboard paint, free wall provides space for hub users to express anything they want through the surfaces of hubs. Oosterwolders may ask each other questions, leave comments, express their thoughts not only about gardening but also about other things that may concern the neighborhood.

This kind of a free space is integrated into the design since it's an opportunity for Oosterwolders to express meanings they associated with food growing and the practice of prosumerism. This kind of collective expression may open new ways of thinking among Oosterwolders and even strengthen shared opinion.

Illustrations

One side of each box is designated to an illustration which represents the content of the box. This way it becomes easier to identify what is inside of which box. Also, illustrations enable hubs to be perceived from a distance.

Exchange of Things

Hubs act like a base to actualize the practice of exchanging. This kind of a centralized spot is designed on purposely instead of doing it through solely an online platform to ensure that practice of exchanging is visible in the community.

Visible Community Building

By making hubs from pieces and then putting it to the desired communal spaces, Oosterwolders create a visible community building. This unhidden way of neighborhood creation, enhances notions like ownership, relatedness towards the space people live in.

Standing Look

Boxes standing on top of each other; compose a hub. If considered individually, they are cubes for storage but once they are put on top of each other, they occupy space like humans do; stand still and claim presence. This is where they become exchange hubs.

Building Manual

Building manual of DIY Exchange Hubs is a guide for Oosterwolders to be able to make the hubs on their own. The hubs can be made with family, neighbors or alone depending on preference. When it comes to distribution of the manuals, it is expected that the building manual, together with the laser cut file will be available online from a domain that is easily reachable to Oosterwolders. Distribution and accessibility of the manual will be discussed in the following implementation chapter.

By introducing do-it-yourself way of building, DIY Exchange Hubs aim to be aligned with Oosterwold's vision and mission about giving the power to inhabitants to make the city.

The manual of DIY Exchange Hubs composes of two main parts; basic model and extended features. Basic model shows materials needed and building guidelines to build the hubs. Extended features include tips about coloring and visibility of the hubs as well as shape and functional differentiation. Below image 28 and 29 summarizes the building manual by displaying some important pages. Complete version of building manual can be found in appendix B2.1.

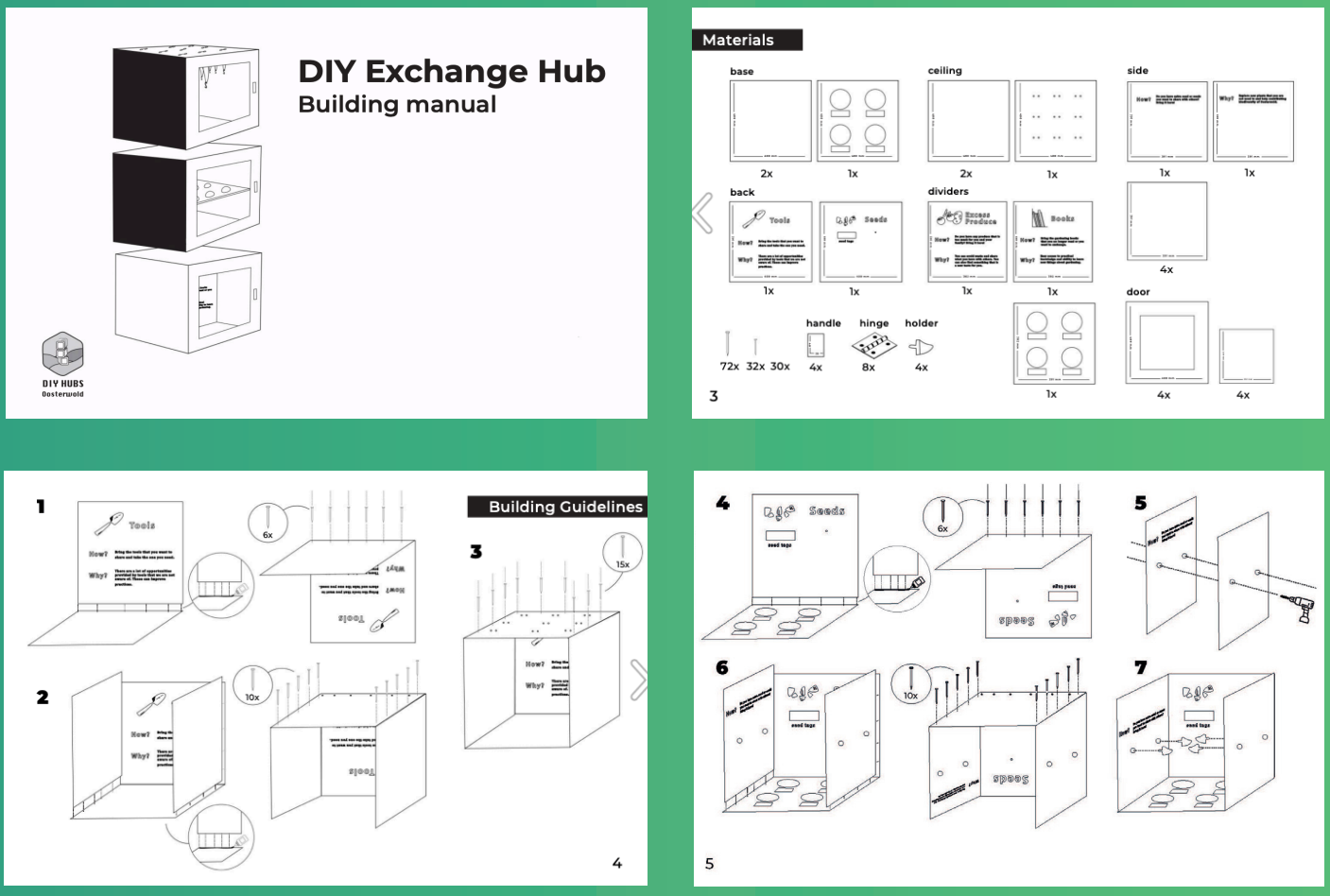


Image 28. Materials and first two pages of building guidelines

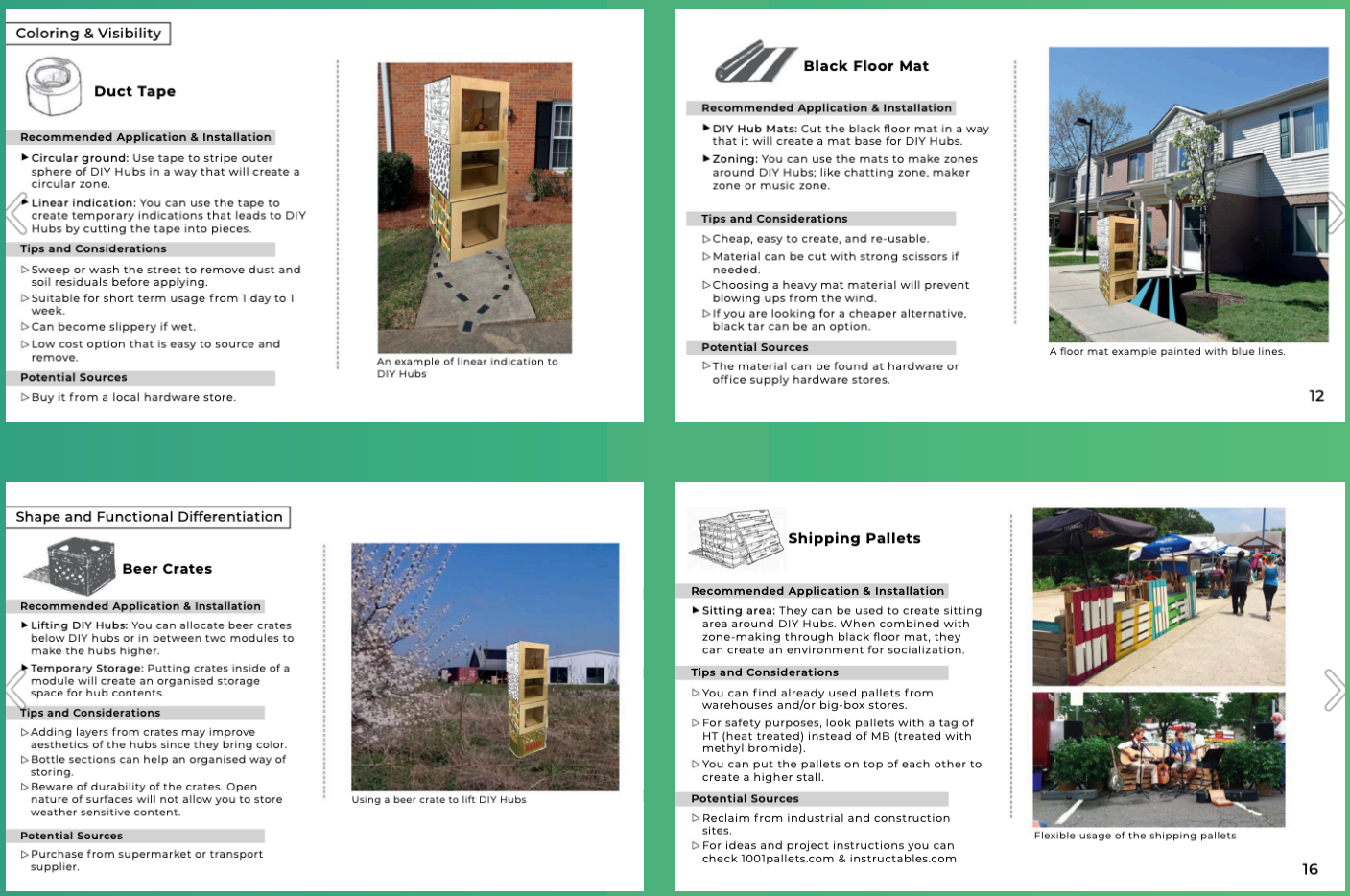


Image 29. Some example pages to extended features

Autonomy & Ownership

Building manual enables Oosterwolders to become makers of the hubs. This gives them autonomy; by being able to construct hubs on their own, as well as ownership of the hubs; since they put effort in it. These two qualities are expected to trigger prosumers who already grow a lot but also grab attention of the ones who are willing to start out new things.

Extended Features to Foster Competences

Extended features section provides ways of differentiating hubs in terms of visibility and functioning through small interventions that can be achieved by using everyday materials such as duck tape, corn starch etc. This way, it is expected that Oosterwolders improve their abilities and creative skills by practicing various possibilities of making that are presented with the name extended features.

DIY Exchange Hubs Application

Mobile application of the hubs is designed in order to keep track of the exchangeable things that are available in the hubs of Oosterwold. It aims to make the hubs as convenient and accessible as possible through letting its users have control over the hub.

The application has 4 main functions that allow users to perform (1) sharing, (2) checking hubs' existing status, (3) seeing their own profile and (4) requesting to build a hub; as shown in image 30.

Once an Oosterwolder wants to share a tool for instance, she has to indicate some basic information about the tool for the other Oosterwolder who is going to pick it up in the future. The information that is asked from the initial owner are the name of the tool, step-by-step information about how to use it, any special instances to use the tool and a photo of it so that the other person will know how to use it. For the other person who wants to check out the hubs and what they contain, she is first asked to choose a hub as shown in image 31. Once the selection is made, then the app displays overall status level of the hub. At that moment, user decides what she wants to take and she can see detailed information about that particular thing that she is about to take as shown in image 32. This allows Oosterwolders to reach relevant practical information about seeds, tools, excess produce or books that are available to them through their mobile phones. The flow of the app is represented in image 33 partially. (see appendix B2.2 for the complete flow)

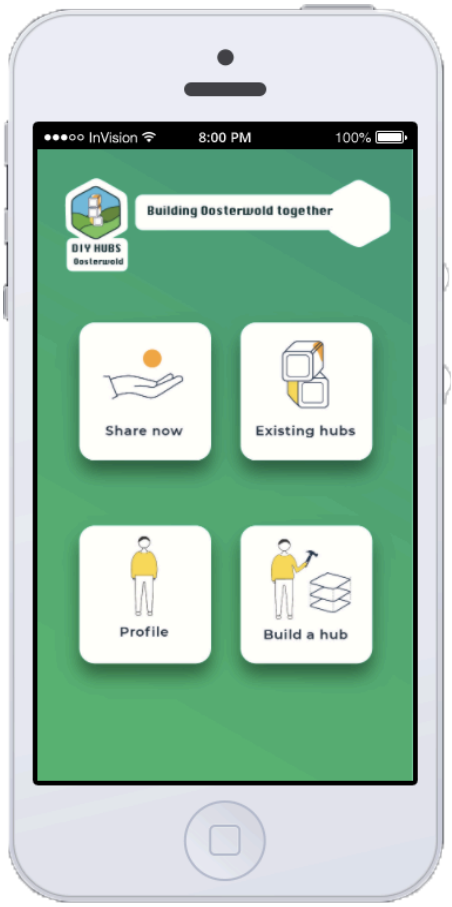


Image 30. Home page

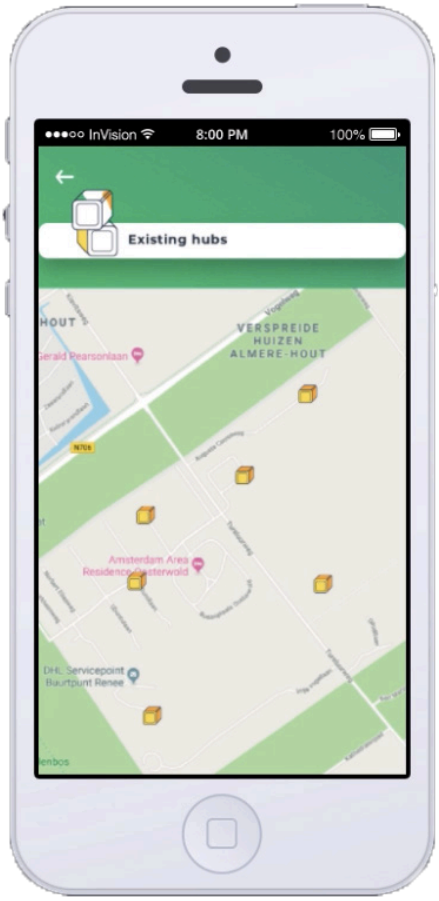


Image 31. Display page for the existing hubs

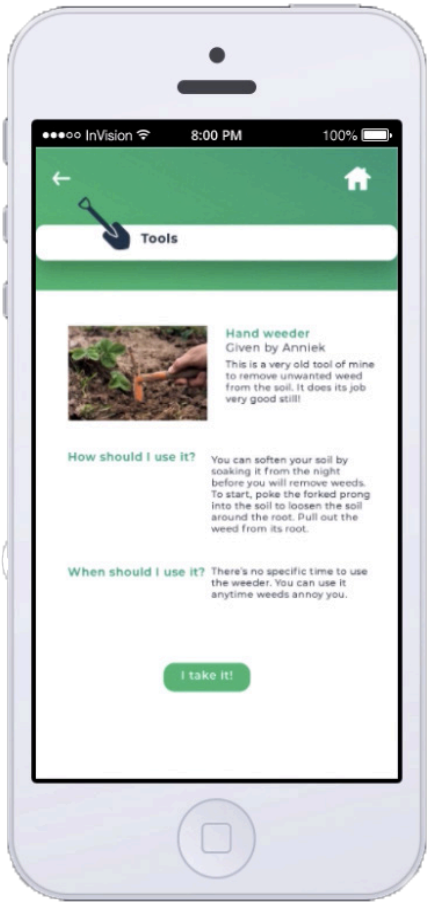


Image 32. Detailed info page about hand weeder

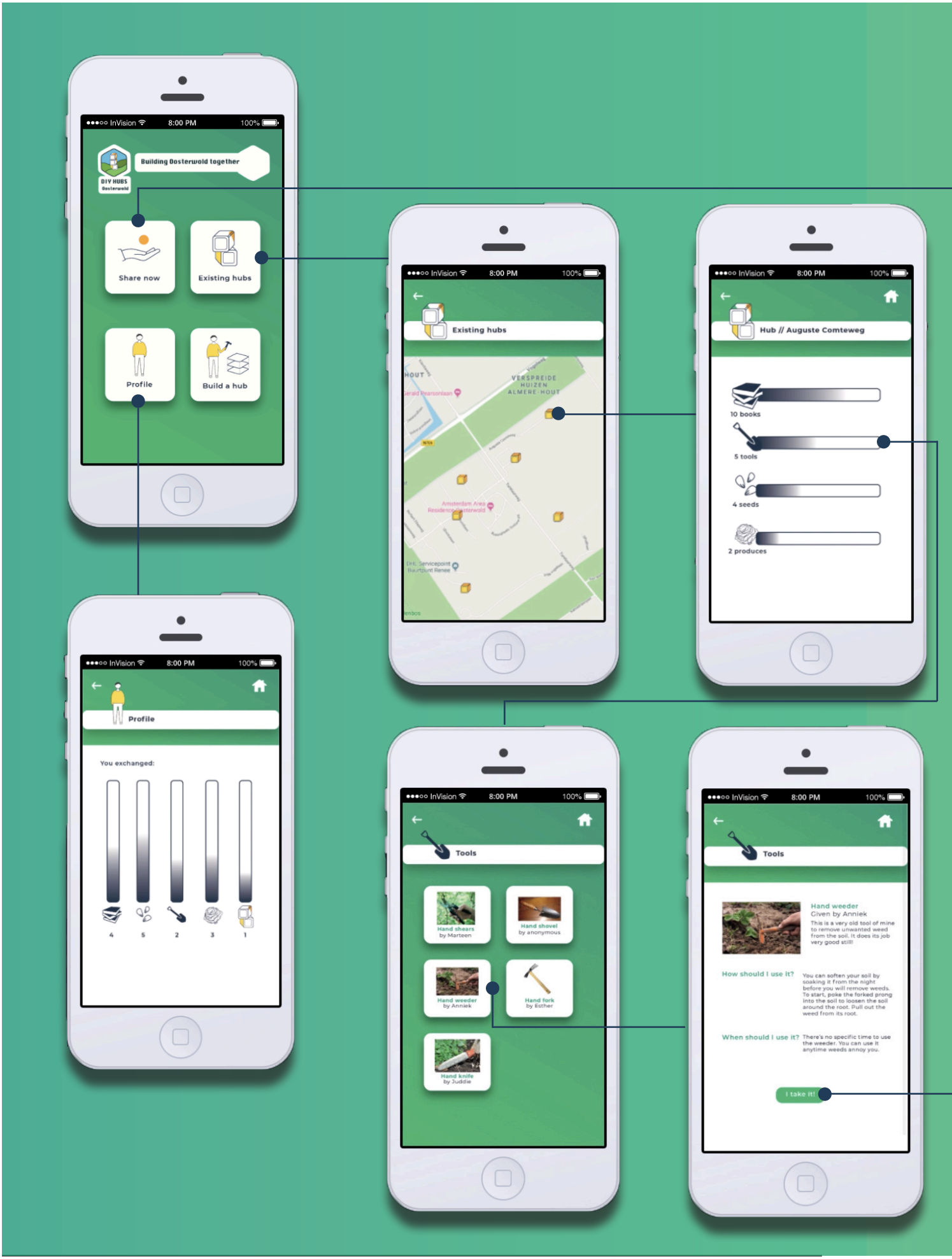
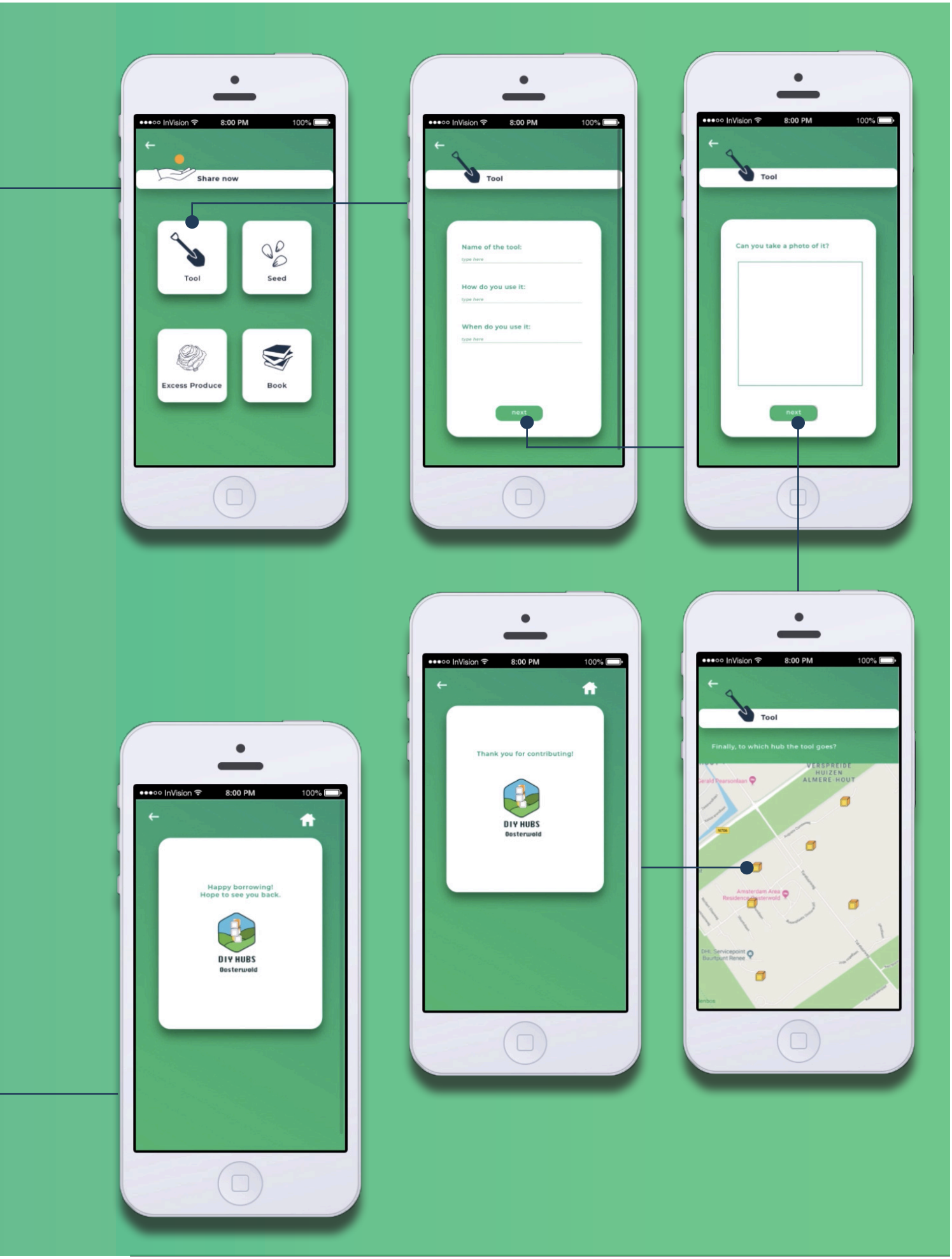


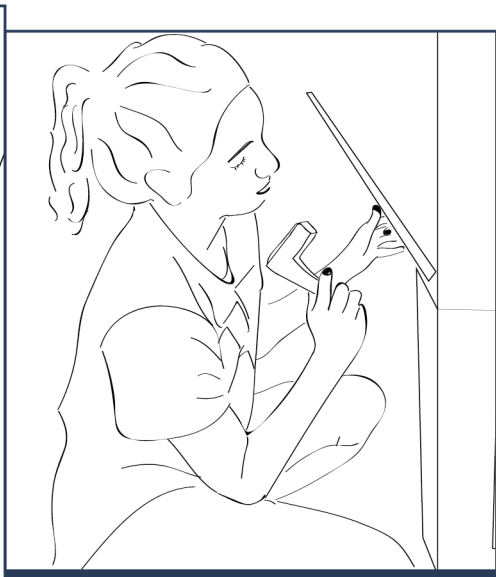
Image 33. Partial use flow of the screens


InVision 8:00 PM 100%
Share now
Tool
Seed
Excess Produce
Book
Tool
Name of the tool:
type here
How do you use it:
type here
When do you use it:
type here
next
Tool
Can you take a photo of it?
next
Tool
Finally, to which hub the tool goes?
VERSPREIDE HUIZEN ALMERE-HOUT
Thank you for contributing!
DIY HUBS
Oosterwold
Happy borrowing!
Hope to see you back.
DIY HUBS
Oosterwold

7.1.2 User Scenario

An Oosterwolder receives pieces of DIY Hubs.

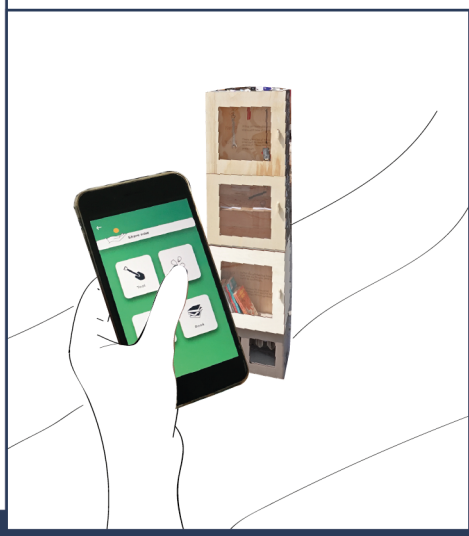
She checks the building manual which arrived together with the pieces.



After that, she starts building it like it shows in the building manual.

At the same time, another Oosterwolder cuts an avocado where he bought from an organic store.

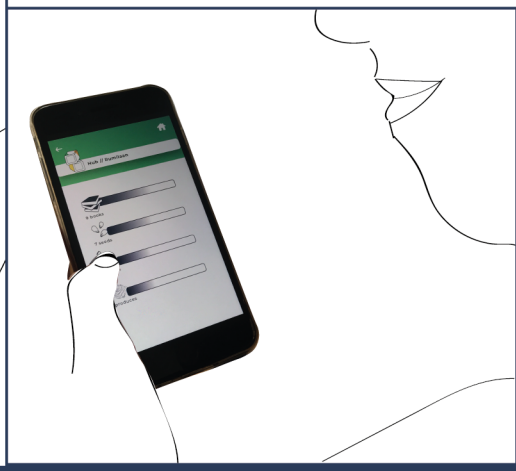
He thinks other Oosterwolders may also like it; so he shares the seed via the closest hub to his house.



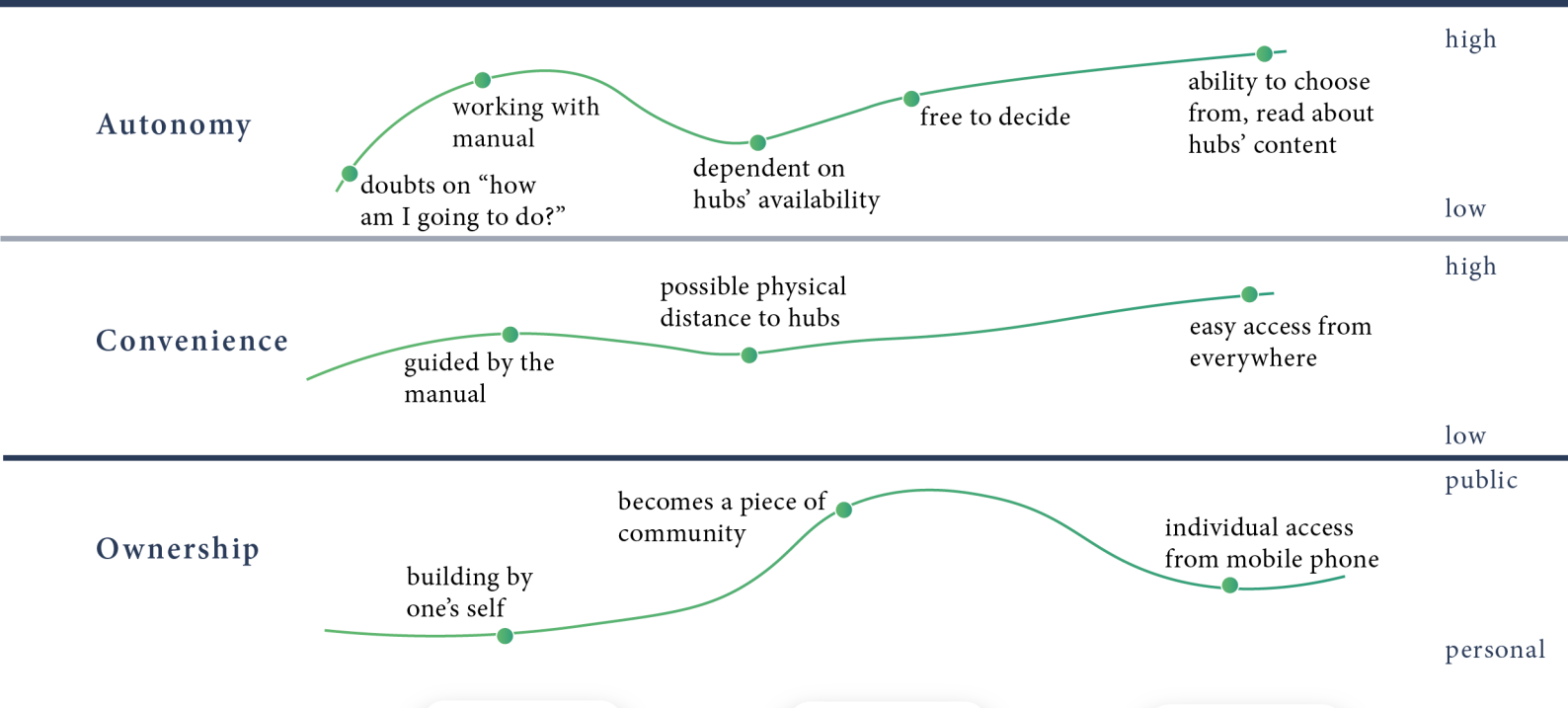
Then, he uses the app. to add the avocado seed to the system.

Once she brings the hub outside, she feels proud of herself.

Couple of hours later, another Oosterwolder arrives and he takes a tape measure

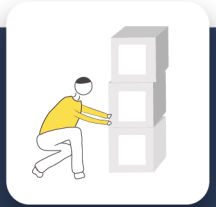


Following, he marks it on the app where he also sees how to use the tool.

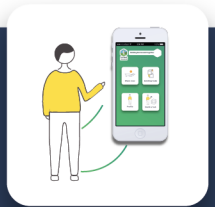


Phases of interacting with DIY Hubs

Building



Exchanging



Using the app

7.2 Testing: Oosterwold Ontkiemt

For the past two years, an open market for Oosterwolders is organized with contributions of WUR, Rabobank, municipaly of Almere and Zeewolde. It is called Stadsbouwplein Oosterwold Ontkiemt which means *meeting place for urban agriculture* if literally translated. Initiatives and organizations that work for Oosterwold take place in this open market to present themselves to Oosterwolders and also to other initiatives. This year, DIY Exchange Hubs had a chance to attend to Oosterwold Ontkiemt where the design is presented to and tested with Oosterwolders.

Goal

The goal of this testing is to see to what extend Oosterwolders like and further embrace DIY Exchange Hubs. With this broader goal in mind, sub goals of the testing are (1) to see what type of prosumer embraces which component of the design and why, (2) overall evaluation of DIY Hubs based on likeliness to use, convenience, accessibility, guidance and empowering to create, (3) to see how DIY Hubs affect elements of prosumerism practice and further other everyday practices of Oosterwolders, (4) whether DIY Hubs will increase number of active prosumers in Oosterwold.

Besides the project's test goals, I believe being able to test DIY Exchange Hubs in an event that is open to all and where it is all about Oosterwold; is a good fit with the design itself.

Method

Since the test environment is not fully controllable; evidencing and task completion are followed with a survey. This kind of a method is used in order to immerse participants with DIY Exchange Hubs as much as possible. Evidencing is used through introducing physical DIY Hubs followed with the building manual. This kind of a method is preferred since it offers tangible evidence of the future (Moggridge, 2007). Then, imaginary scenarios are used to let participants interact with the app. In all these steps, participants are asked to think aloud. Lastly, visitors who are willing, completed a survey about their overall experience. This kind of an evaluation method is chosen since it is appropriate in a crowded uncontrollable testing context.

Set-up

DIY Exchange Hubs are presented to visitors from a stall as shown in image 34. The author and a friend of her, Pelin, were presenters of the stall and they conducted the testing. Visitors who arrived to the stall became participants of the test.

Image 34. DIY Exchange Hubs' stall

Set-up Elements

A physical DIY Hub is located next to the stand aiming to attract visitors' attention. Next to it, on the stand, 40 copies of building manuals, a computer, a phone and map of Oosterwold are located. The scenery looked like image 35 with elements of:

A: Physical prototype of DIY Exchange Hub

B: Building manuals

C: Computer to test mobile application

D: Phone's place - it was taking a photo at that moment

E: Map of Oosterwold

Procedure

Testing happened in an open environment, where each visitor of the stand became participants as mentioned before. Since this is the case, the following procedure represents an overall understanding of how the test was conducted. In some instances, deviations happened due to lack of interest, limited time etc. Detailed procedure can be found in appendix B3.1.

1. Explanation of DIY Exchange Hubs

Once visitors showed interest to the stand and tried to interact with the hub, the project's background and the design is explained to them through walking them through the physical prototype and its components. Comments and questions of visitors are listened and answered.

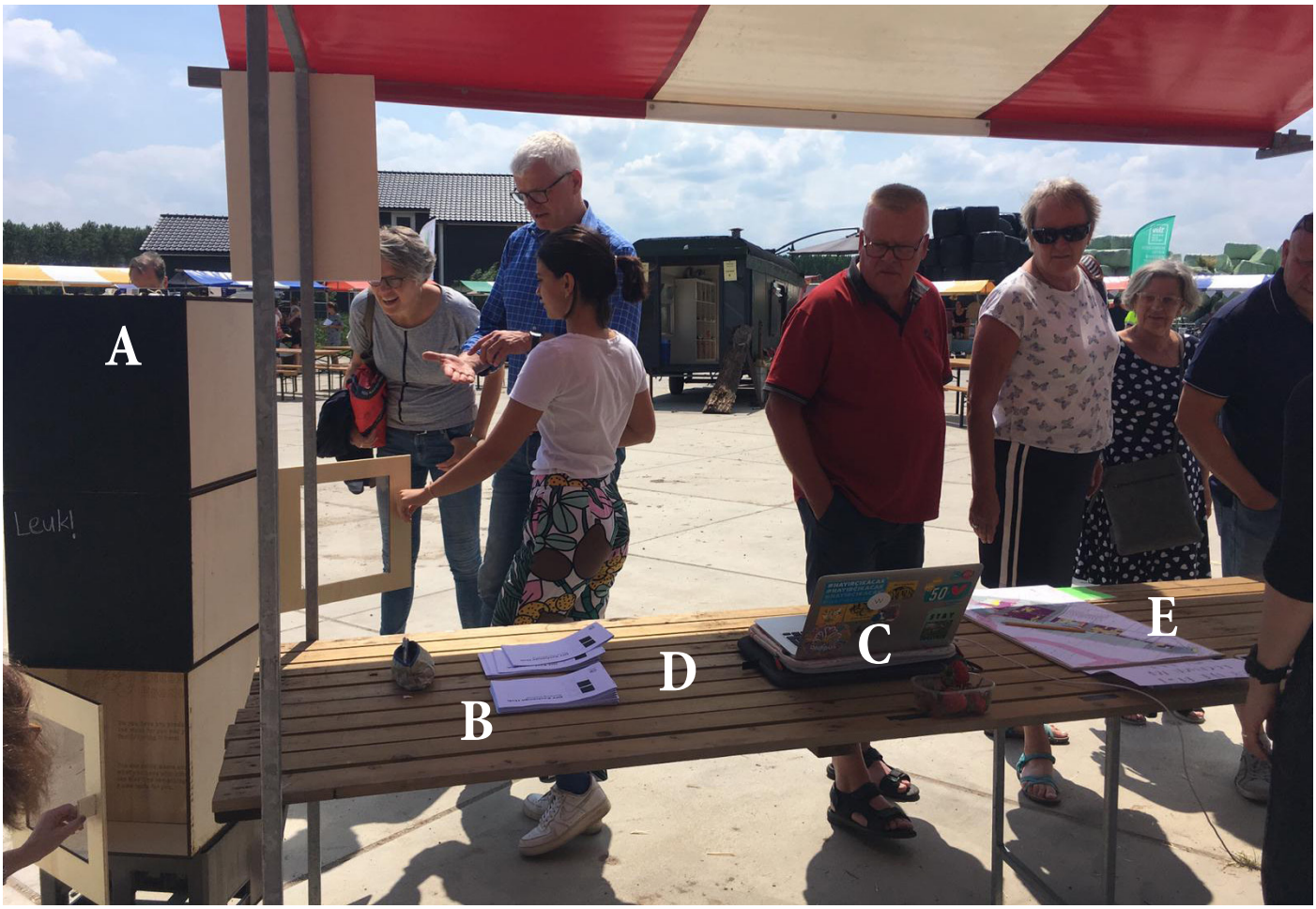


Image 35. Overview of set-up elements

2. Experiencing Building Manual
A smooth transition from the physical prototype to building manual is ensured by guiding visitors as *".. this is how you would be able to build the hubs on your own."* Participants are given some time to go over the building manual; for the ones who are reluctant, building manual is displayed and explained by me by showing them the pages and what the manual contains. Once the interaction is over or interest level started to decrease, participants are guided to try mobile application.


While visitors are going over the manual

3. Experiencing DIY Hubs Application
Depending on availability, visitors are guided either to the computer or phone to test mobile application of DIY Hubs. They were given a task such as *"..let's imagine you need a hand weeder and you're going to check hubs if there's any available"* or "*you want to give away some chilly pepper seeds for your neighbors"*. After that, they are asked to complete the task through using the application and thinking aloud. Once they're done, a brief discussion is held about their overall experience.


One visitor is about to try DIY Hubs app.

4. Completing Survey
Visitors are asked to complete a survey in order to give feedback about the design. The ones who were willing, are guided to the computer to submit the form which contains questions about their overall experience and specific questions about each design component. The complete survey can be found in appendix B3.2.

A visitor interacts with the hub

5. Marking Desired Hub Spot
Through the map of Oosterwold, visitors are asked to put a sticker on their desired location for the hubs. This was done either at the end or in the middle of the testing depending on the conversation's flow with that particular visitor.

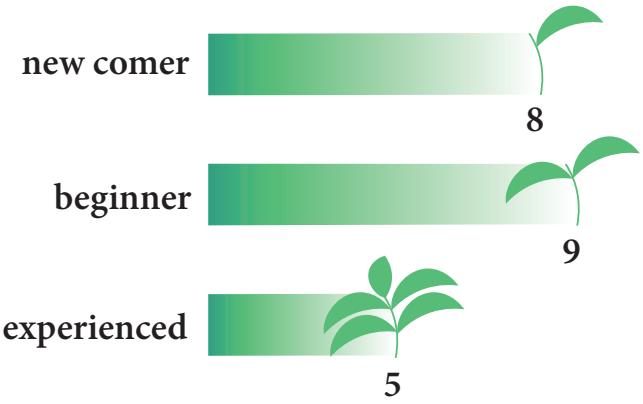

While visitors are filling out the survey

Data Analysis

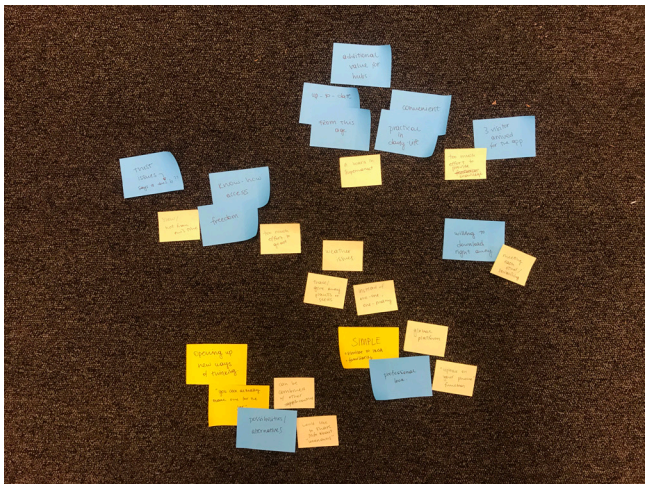
In total 52 batches of people visited the stall. Since some arrived alone, some with family, some with friends, and some while passing by stopped for couple of minutes and went; exact number of people whom shared their opinion regarding hubs couldn't be counted. In total 22 visitors completely filled out the survey (raw results can be found in appendix B3.3) and all of the visitors provided oral feedback while interacting with DIY Hubs. Visitors who completed the survey are categorized based on their experience level with prosumerism. The ones who don't grow any edibles are named as new comer, whereas the ones who grow up to 15 fruits or vegetables are referred as beginners and the ones who grow more than 15 edibles are called experienced prosumers. This kind of a categorization is made in order to see whether DIY Hubs reach to all types of prosumers; whether the design is appealing to all types of prosumers and in which ways. When it comes to oral feedback of visitors, the exact number of comments can not be specified. Instead, the analysis of oral feedback rely on the categorization of the dump session* that is done by the test conductors at the night of the test day.

In order to utilize any type of data, oral feedback (discussions with visitors, comments during the testing) and survey results are analyzed separately. For the convenience of further analysis, outcomes of the testing are brought back together and is reported as follows: (1) physical hub, (2) building manual, (3) application and (4) overall experience.

These qualitative analysis provides insights whether DIY Exchange Hubs managed to meet the design goal and sub-goals (presented in section 5.2 and 1.2 respectively) and further opens up new opportunities for actual implementation in Oosterwold.



Recorded visitors distribution regarding experience level with prosumerism



A scenery from dump session categorization

**: Working with post-its and pens; test conductors write down every detail that they can recall about the testing session. Later, the post-its are categorized and form outcomes of oral feedback.*

1. Physical DIY Exchange Hub

One of the most dominant comments made to the hub is **"..it is some kind of a dream that we have been talking about"** by many visitors with different words. Visitors told that they usually exchange with the neighbors that they already know or with family members who live close by. They expressed interest to the hubs by telling **"this makes sharing central"** or **"..we now have a space for only sharing"**. 6 visitors wrote their names and email addresses to order one pack of DIY Exchange Hub for their own streets; which wasn't expected at the beginning of the testing but shows success of the design.

Besides these positive reactions, it is understood that **durability** of the hubs turned out to be the only concern that may negatively affect usage of the hubs in the future. **Weather** related issues like heavy wind, rain and snow; **security** issues when it comes to theft and **food maintenance** rose as three main concerns regarding durability. As a solution to tackle with bad weather, **occasional hub responsibles** are suggested by couple of visitors, so that they can take the hubs in and out depending on external conditions. Current implementation status of the hubs will be further discussed in the implementation section of DIY Exchange Hubs (see chapter 7.3).

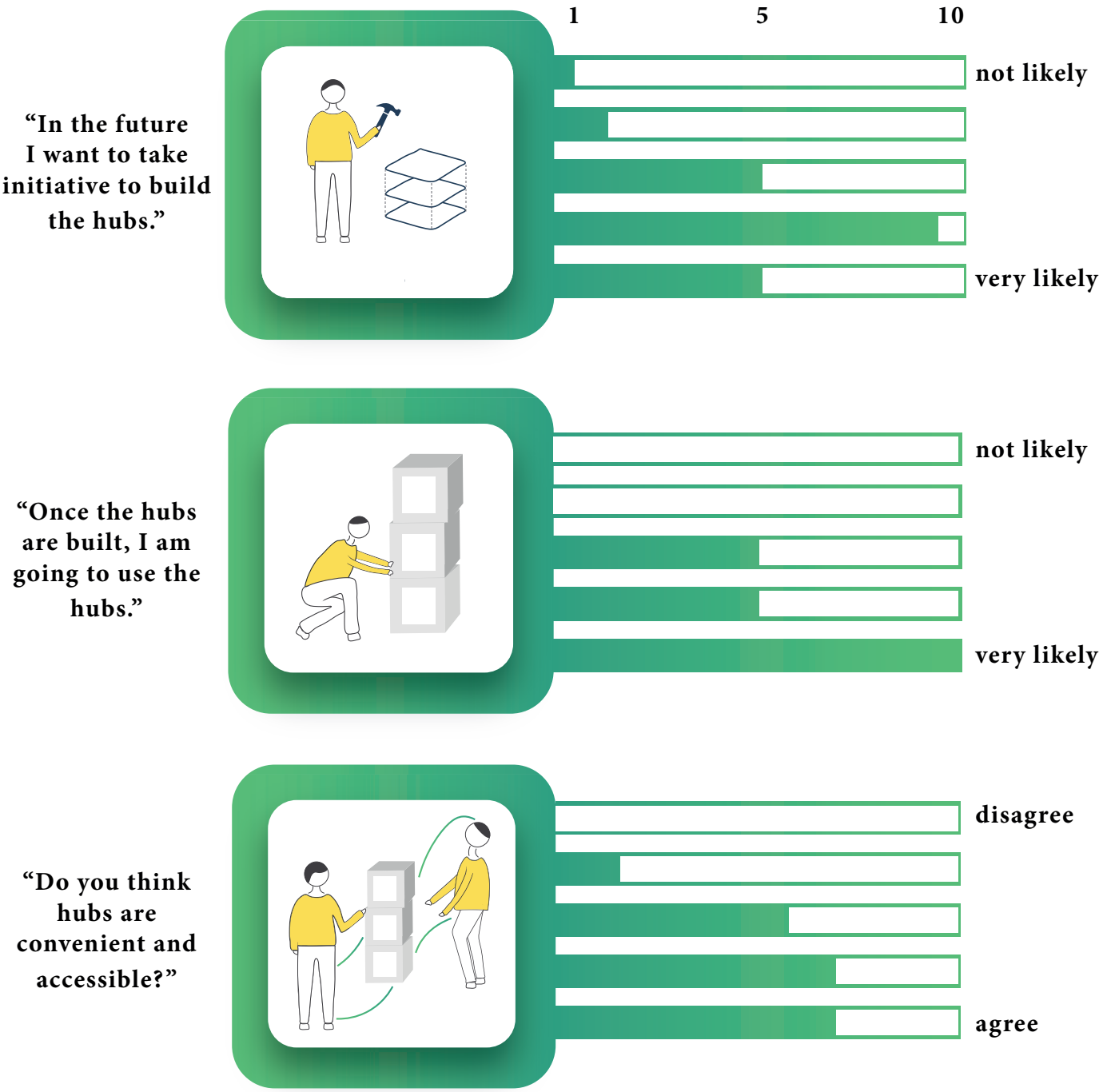
Additionally, the hubs are found to be similar with Peer-by app and public neighborhood libraries. Visitors who thought that the design is similar to Peer-by added that visibility of the hubs **encourages** and further makes **exchanging** more **transparent**. The ones who mentioned public neighborhood libraries indicated that there's a newly developing public library initiative in Oosterwold. Based on this information, DIY Hubs will contact to the library initiative (see chapter 7.3 for more details). When it comes to allocation of the hubs, 15 visitors marked in front of their houses for desired location whereas 12 visitors marked their own street like shown in image 36.

Lastly, **free wall** grabbed the attention of **children** the most. They drew and wrote on it as shown in image 37. None of the prosumers actively interacted with the wall besides **reading** it. However, they indicated that they would use the wall to **ask questions** about the things that can be shared. One visitor said **"maybe I need a garden scissors, then I can write here and hope someone sees"** Another group of visitor told that they would like to announce community related activities through the wall, like celebrating birthdays, newly married couples or announcing workshops etc.

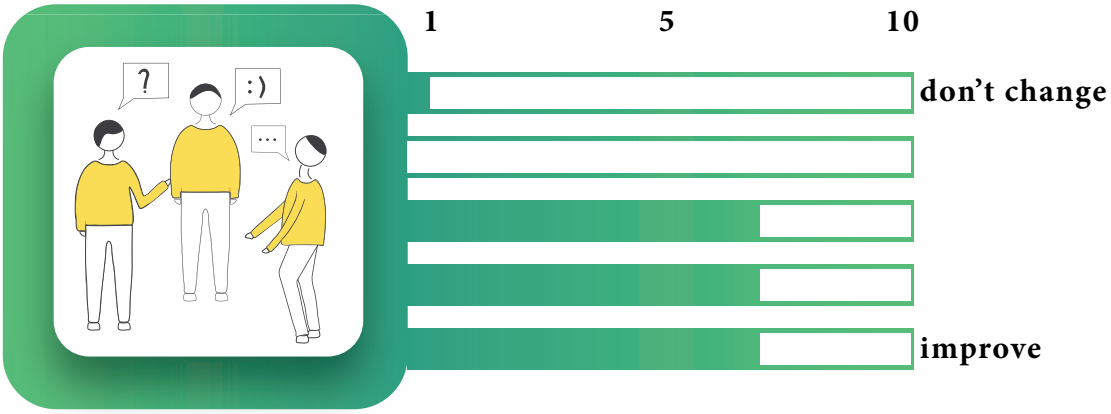
Image 36. Marked map of Oosterwold

Image 37. Kids of Oosterwold with DIY Exchange Hub

When it comes to the survey results of physical prototype of DIY Exchange Hubs, visitors are asked to rank (1) their likeliness to take initiative to build a hub, (2) likeliness to use the hubs, (3) convenience and accessibility of the hubs, and (4) to what extend the hubs will affect their relationship with their neighbors. The outcomes are illustrated as follows:



“Do you hubs will affect the relationship between you and your neighbors?”



The results suggest that Oosterwolders are more willing to use the hubs than building them. Even though the number of inhabitants who are willing to take initiative to build and to use are similar, the latter is stronger in terms of willingness. Interestingly, experienced prosumers are more likely to be willing to initiate hub building compared to beginners and new comers. Also, the number of beginners who are willing to initiate building is higher and stronger than the number of new comers. All of the experienced visitors declared that it is very likely for them to use the hubs in the future with half of the beginner visitors. The rest of the beginners and new comers still think that they will use the hubs but not as strong as experienced ones.

These results suggest that, experienced prosumers are more likely to start and promote DIY Exchange Hubs in Oosterwold. This further propose that getting in touch with active initiatives may bring the project one step closer to actual implementation of the hubs.

Additionally more than half of the visitors think that the hubs are accessible and convenient. Among those visitors; the ones who slightly disagree with this statement are both experienced ones. The reason for this might be distance of the hubs to their gardens. Since they spend most of their time in the garden; literally going to the hubs may be perceived as not so convenient or accessible. Nonetheless, more than half of the visitors, regardless of their experience level, think that the hubs are accessible and convenient. Similarly, more than half of the visitors think that, hubs will improve the relationship between them and their neighbors. This holds for more than half of each prosumer type; so both for experienced, beginners and new comers.

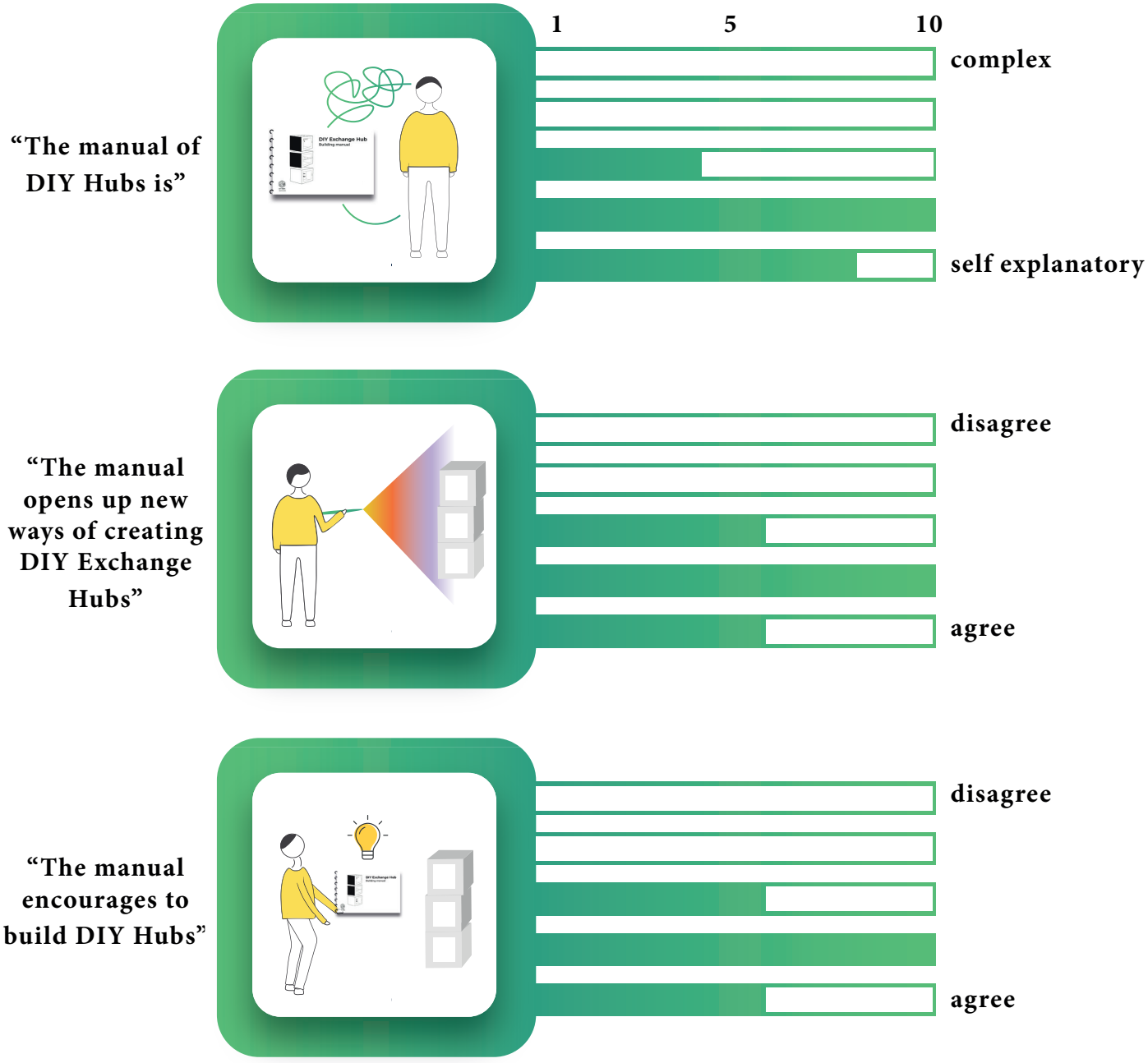
The results provide insights about there’s still room for improvement for the accessibility and convenience of the hubs.

2. Building Manual

Overall look of the building manual received comments as **"..has professional look"** and **"..makes me feel familiar with the hubs"**. When it comes to practicality of it, visitors found it easy to follow and also perform by saying **"..easy because it guides you step-by-step"**. Additional features section of the manual grabbed visitors' attention the most compared to the first section. They stated that they've been thinking about making their surroundings better looking with the materials they have at home but never actually knew how. One of the visitors said **"you can also make use of plastic bottles to surround the hubs and put plants in those".**

Another visitor made the comment of "then maybe **you're not restricted to 4 types of exchanging but you can also make a box for exchanging jams** for example" after going over the building manual.

This suggests that building manual opens up **new ways of thinking** about the **possibilities** and **alternative ways** that Oosterwolders may realize. This effect will further discussed in the upcoming section about how DIY Hubs propose an impact on practices of Oosterwolders. In general, all of the visitors were impressed by the building manual and they all took a copy of it.



3. Mobile Application

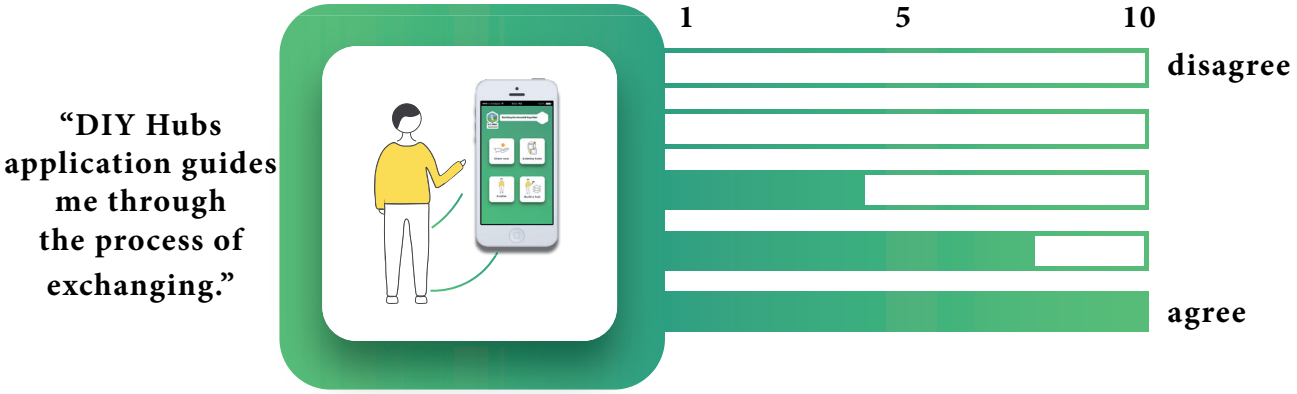
One of the most strong points of the application is that it is perceived as an **added value** for the whole design of DIY Hubs. Most of the visitors indicated that the app is a component which **belongs to this age** and **up-to-date.** Visitors also indicated that the application is **convenient** and **practical** to use in daily life. This suggests that the application was appreciated due to reasons of **easy accessibility**, **knowledge enhancement** and **realism**.

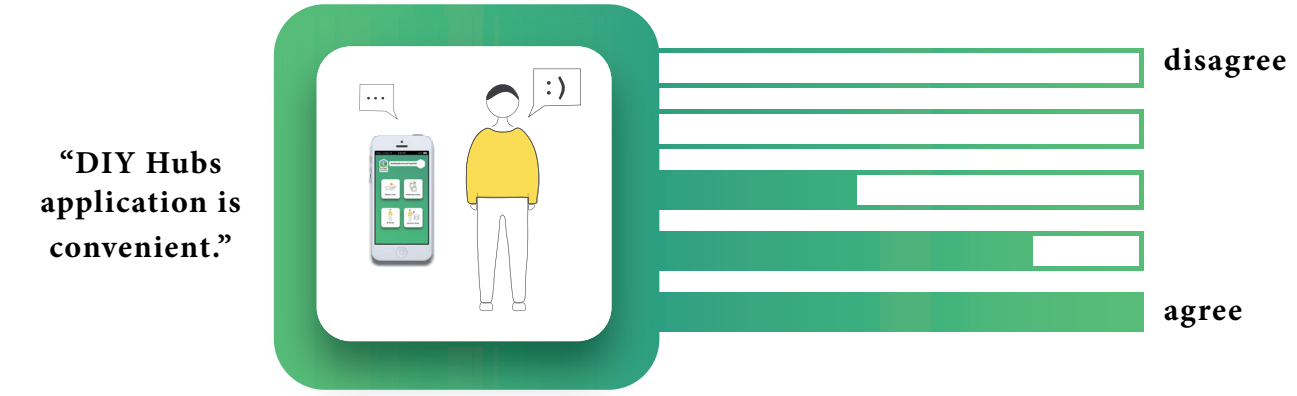
The visitors who spent more time on interacting with the application indicated that the app offers different types of information about the things that can be exchanged; **"..this is also about practical knowledge"** as one of the visitors stated. After trying out the application, most of the visitors **wanted to download** it to their phones**.**

Some visitors arrived to DIY Hubs' stand from the word of mouth of their friends and neighbors specifically about the application.

Only concern about the application and the way it works turned out to be **trust related issues** such as if someone doesn't use the application and takes an exchangeable without informing the system. This suggests that the **connection** between the application and the physical hubs **should be stronger,** which will be discussed in implementation section.

When it comes to survey results, there was no significant difference among visitors' perceptions toward the app. Thus, regardless of their experience level, visitors thought that the application **guided them through the process** of exchanging and found the app **convenient**.



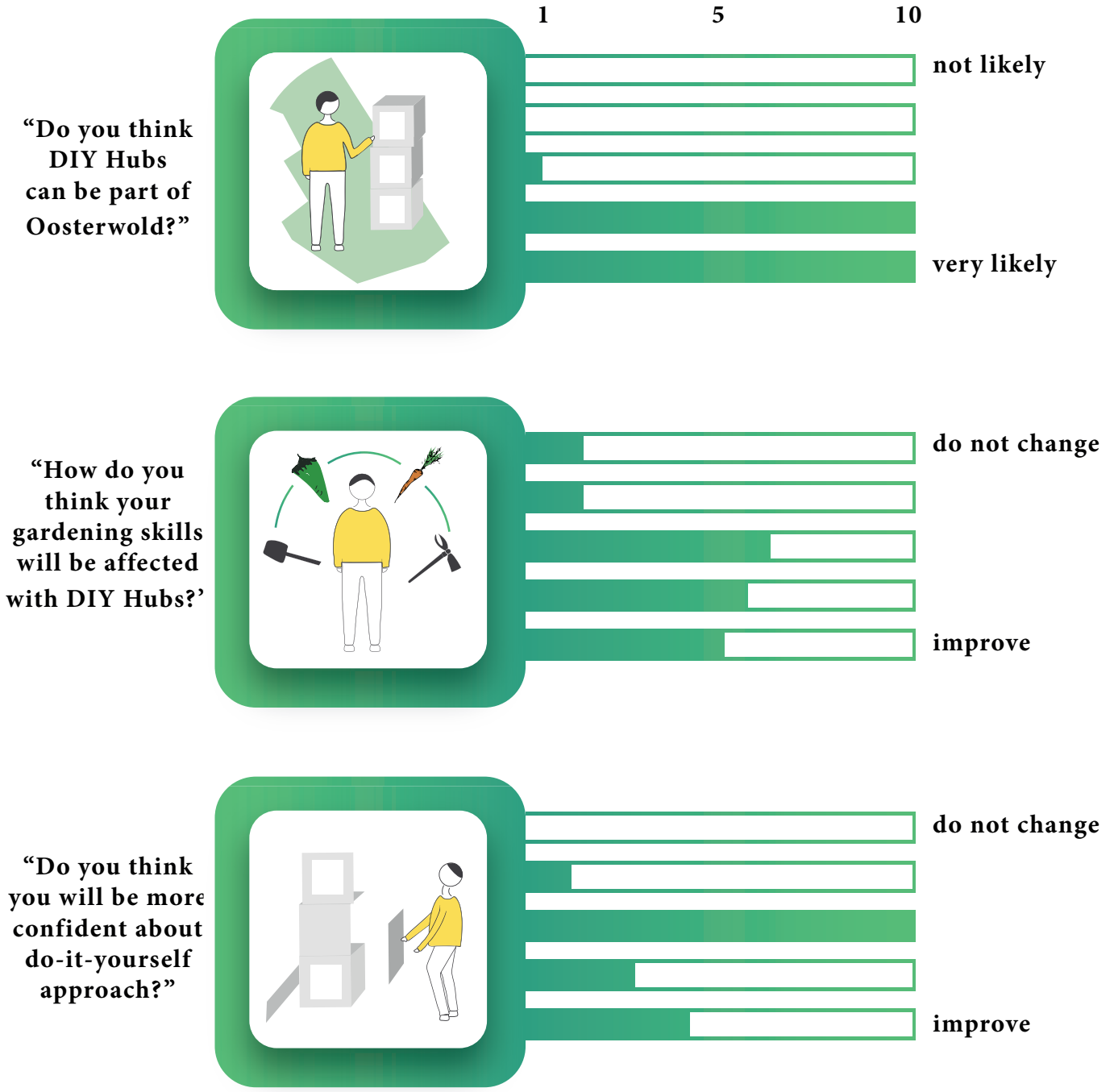


4. Overall Experience

Almost all of the visitors thought that DIY Hubs can be part of Oosterwold as shown below. This suggests that overall the design fits with Oosterwold in the eyes of inhabitants. When it comes to whether DIY Hubs will improve gardening skills; more than half of the visitors thought so. However, the strength of this one wasn't as strong as the initial. Interesting enough, the ones who thought that hubs wouldn't change their gardening skills are all beginners; and all of the experienced visitors declared that it will definitely improve gardening skills.

Lastly, visitors didn't hold a strong opinion about likelihood of hubs to increase confidence about do-it-yourself approach. However, more than half of the experienced prosumers together with a beginner thought that hubs may let them more confident about DIY approach.

These outcomes, together with the previous ones, suggest that there is a strong opportunity for DIY Exchange Hubs to become part of Oosterwold. Next section of the thesis explains the ways in which DIY Hubs can -will- be real in Oosterwold.



7.3 Implementation: Future of DIY Exchange Hubs

During the event of Oosterwold Ontkiemt, it was understood that DIY Exchange Hubs has a potential to become real in Oosterwold. That is why during the event, some further steps are also taken in order to realize the design in Oosterwold.

Availability Online
One of the important points that should be addressed was the accessibility of the building manual together with the cutting templates of the hubs' pieces to Oosterwolders. Those should be available through platform where inhabitants may easily access. After talking to initiatives and communications manager of the Oosterwold development area, Yolanda Sikking, we agreed on publishing the materials online via a central web page of Oosterwold, which is currently being developed and will be launched by the end of year 2019. Through the official web page of Oosterwold, DIY Exchange Hubs' template and building manual will be accessible and downloadable to Oosterwolders.

Access to Hubs' Pieces
Another essential point was the ability of Oosterwolders to have easy access to materials that are necessary to build the hubs. To make the production and delivery as self-sufficient as possible within Oosterwold, some kind of an agreement with local carpenters or wood manufacturers was needed. During Oosterwold Ontkiemt, I had chance to talk to one of the local wood artists Jos Bregman. After explaining DIY Hubs, he agreed on being the one who will cut the pieces of hubs and make them ready for Oosterwolders to pick up. However, since he uses another type of wood material, we are currently in the phase of building an example hub to see whether building process will be different than the existing. If that's the case, then I am going to make adjustments in building manual and then DIY Exchange Hubs will be ready to be build by Oosterwolders. The communication document with step by step plan can be found in appendix B3.4.

Including Initiatives
As discussed in the previous chapters, Oogsterwold and FlevoVelt are two of the initiatives in Oosterwold that organize events, workshop about urban agriculture. Serendipitously, they were also in the event and were willing to buy a hub as an initiative which will be build after summer, once most of their volunteers are back in Oosterwold. Furthermore, the library initiator has been contacted and she showed willingness to cooperate once the hubs are built. Introducing the hubs to the parties which currently operate with similar mindset as DIY Exchange Hubs in Oosterwold was particularly important since it is one of the effective ways to collaborate and increase recognition.

These three points of implementation are the ones that found an opportunity to be addressed. Besides these, there are other points of consideration which are beyond the scope of this graduation project to implement. However, they still are valuable to mention for the ones who might be willing to implement a project with similar aim. Image 38. summarize current and ideal implementation plan of DIY Exchange Hubs.

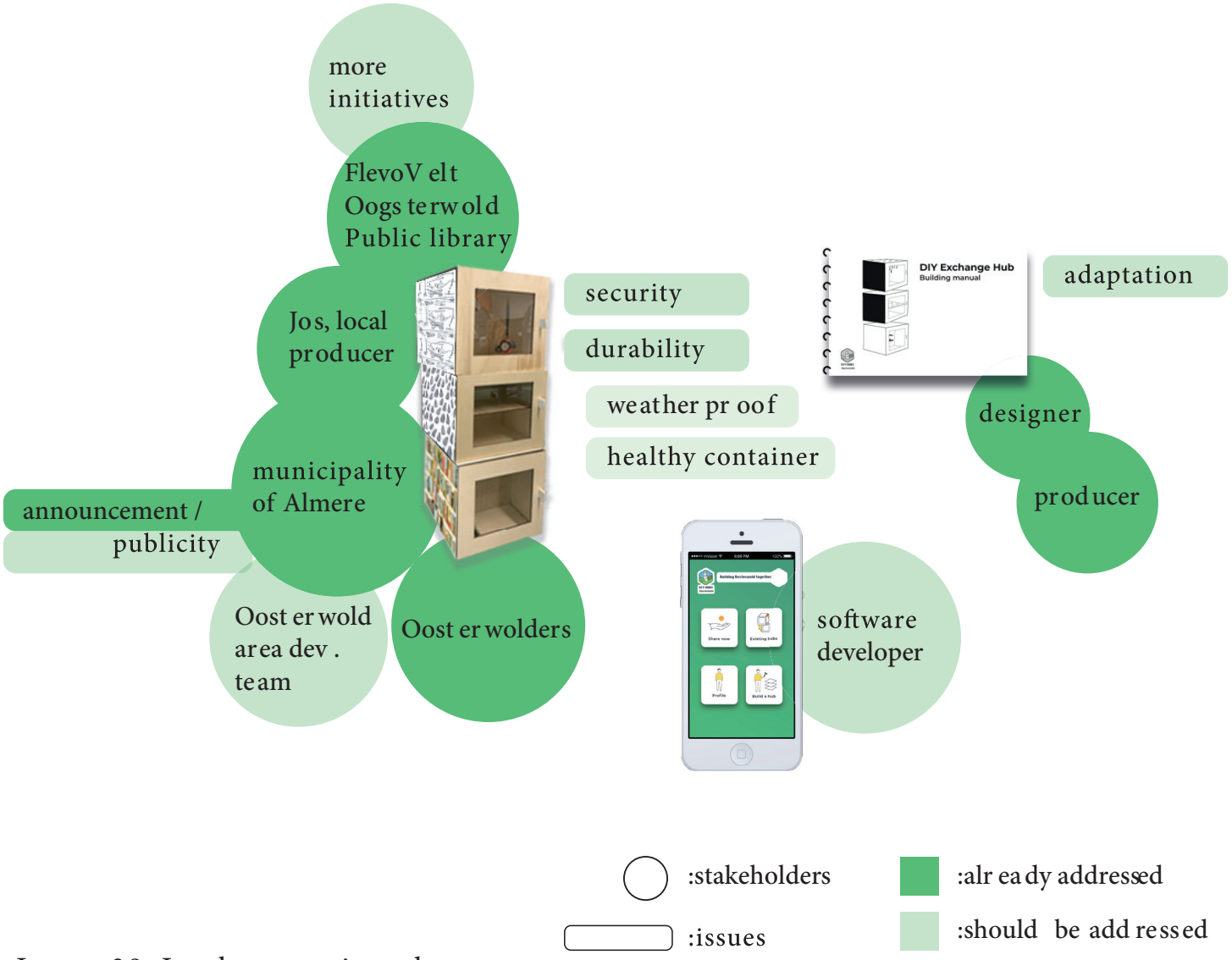


Image 38. Implementation plan

In addition to the already implemented points discussed, it is essential to collaborate with more initiatives that already operate in Oosterwold. This would strengthen existence of DIY Hubs. Once governmental bodies who are responsible from Oosterwold like Oosterwold area development team, municipality of Almere and Zeewolde are also informed about the hubs; they could be beneficial to spread hubs into the neighborhood. In the future, they may take initiation to distribute the pieces of the hubs and further make manual and templates available in their web page for their citizens.

For the hubs to become durable 4 season, proper coating and even material differentiation should be considered. Furthermore, excess produce box should be ensured to protect fruits and vegetables. Even though, it is not expected; in order to avoid theft or any kind of misuse of the hubs; security of the hubs should be assured. This can be possible through letting DIY Hubs application communicate with the hubs. To make the application real, a software developer, possibly from the community, should become part of the system. Lastly, in case there's a difference in building conditions of the hubs due to material change; this should be communicated with the designer so that the manual should be adopted accordingly.

8. Conclusion & Discussion

This final chapter makes the closure of DIY Exchange Hubs by explaining how hubs are expected to facilitate prosumerism practice in Oosterwold. Furthermore, it discusses the preference of combining thing-centered and human-centered design research methods to design for transitional practices. At the end, with personal reflection, the author sums up her journey with the project.

8.1 Practice of Prosumerism with DIY Exchange Hubs

DIY Exchange Hubs is the resulted design for a transitional practice of prosumerism in Oosterwold. In order to understand to what extend the project succeeded its goal, this section is going to answer the design and research questions of the project (see section 1.1.2 and 1.2.1). In that sense, this section provides an overview of how the hubs affected existing elements of practice, the mechanisms behind these and further the value of the design for Oosterwold.

To address the first two design and research question of **how the elements of food growing practice are experienced by prosumers of Oosterwold,** and **how these elements effect each other**; it is essential to break down and analyze practice elements one by one. To recall from the previous chapters, elements that compose a practice are meanings, materials and competences. Image 39 presents an overview of how elements of prosumerism are with the existence of DIY Exchange Hubs.

Meanings of Prosumerism for Prosumers

1.Conveying different meanings of prosumerism through design elements:

As explained in the research phase (see chapter 4 for more detail) the meanings that prosumers associated with food growing are dependent on the concerns they have. For inhabitants of Oosterwold, these concerns vary from individual to collective. As Tromp suggests, conflicts among these are inherent to living in groups (2013). Concerns like monetary, spiritual, health stay on individual level whereas environmental, social-financial systemic are on the collective level. As research revealed, the meaning of food growing may be different for different concerns owners. How to find a common ground for prosumers with different concerns or meanings? In other words, how to tackle the conflicting concerns through a common design? The way that DIY Exchange Hubs tackles this issue is through including a design element which would speak for a meaning owner. For instance, mobile application of DIY Hubs enables access to practical knowledge about gardening tools, books, seeds and excess produce. Even though the app will be used by all types of prosumers, it provides and easy and convenient way of reaching information about the content of the hubs. Similarly, for an inhabitant with strong monetary concerns, having access to “free” gardening tools or seeds may be very attractive. Same attribute -exchange of gardening things- can be perceived very promising for another prosumer with environmental concerns since through exchanging she would stop buying new tools, or books which would minimize her overall consumption. For another prosumer with strong spiritual meanings, free wall may be a good space to express herself and invite others to join this expression. It may also be the case that, another prosumer without a particular concern, expresses her interest through the wall. As such, designing elements which would target different meanings, helped DIY Hubs to be perceived as everyone’s hub. It is also important here to state that like described above, even though a particular element is designed for a particular meaning; the boundaries are flexible and one design element may work for multiple meaning owners. Another way of targeting meanings can be done through addressing a commonly occurring meaning. As one of the findings of contextmapping research for Oosterwolders, the feeling of autonomy that gardens provide was one of the important aspects (see section 4.1.2). By giving them the power of building the hubs on their own through building manual and online available templates; a feeling of autonomy is created.

2.Introducing an already existing meaning through temporal change of use:
There is another meaning embedded to DIY Hubs which is appealing to prosumers regardless of their concern types or existing meanings: feeling of ownership. This can be perceived as a quality of the design goal. To ensure community building, a feeling of ownership towards the hubs was necessary. The journey of an Oosterwolder with DIY Hubs starts with building the hub. By letting them build on their own, the hubs aim to give a sense of personal ownership. This followed by taking the hubs outside, alters ownership of the hubs to communal; meaning that now everyone is responsible from the hubs. This transformation from personal to communal occurs as a result of natural life-span (temporal change) of the hubs; which is one of the enablers of community building.

<u>Materials of Prosumerism</u>
1. Shift from owning to looping:
Initially, prosumers used to work with materials that belong to them. Here, the project approaches to materials as tools, or things that are being used to let prosumerism practice happen. With DIY Exchange Hubs, tools of gardening, seeds, books and even excess produce are being shared which creates an environment for re-usage. This constant loop is a way to reduce consumption and a step towards sustainability. This notion fits not only with Oosterwold's sustainability goals (see section 2.1.4) but also with prosumers with the aim of self-sufficiency or money saving.

Furthermore, being able to use and experiment with new materials of prosumerism, like a new tomato seed from Spain or a multi-functional hand shovel may open up new ways of prosumerism which would indeed let prosumers have new competences. In that way, changing the ways in which materials are obtained in a practice, may contribute having novel

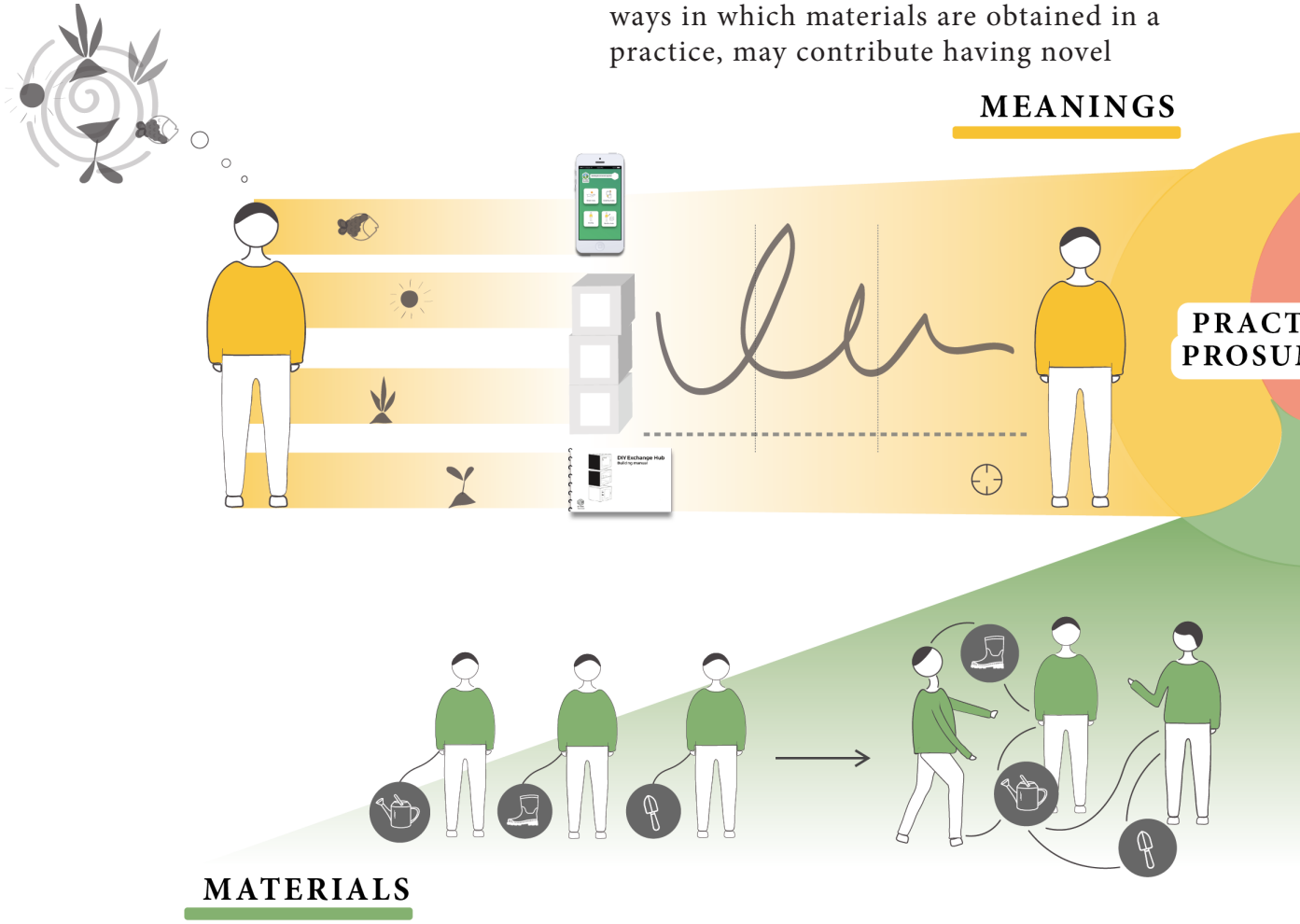


Image 39. Overview of how elements of prosumerism practice are targeted with the design

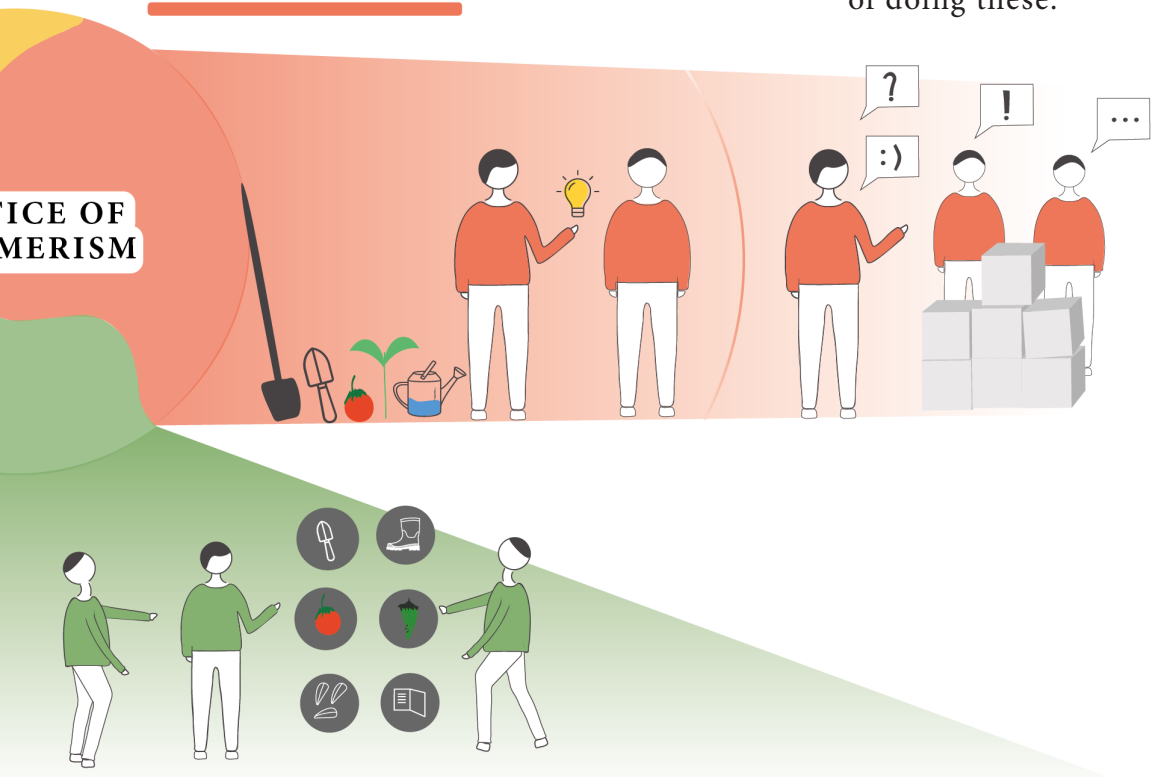
competences while supporting the meanings of prosumerism.

2. Making it accessible for all:
DIY Exchange Hubs are inspired by the open source model where intentions are based on collaboration and sharing. By providing building manual and cutting template for hubs' pieces in a platform that is free and accessible; the design aims to ensure that every Oosterwolder reaches to the knowledge of how to build the hubs. This way, materials of practice enables Oosterwolders to get new competences such as being able to build an exchange hub, or learning different ways of hacking the neighborhood through the hubs.

Competences of Practice
The way that prosumers of Oosterwold used to get engaged with their garden was based on their own knowledge or simply though experimenting. DIY Exchange Hubs offers not only new ways of gardening but also new ways of thinking and doing other daily practices.

1. Gaining new gardening skills from each other:
With the tools, seeds and books that are being shared, Oosterwolders are expected to explore new ways of getting engaged with gardening which would enrich their prosumerism practice. Through the mobile application, prosumers will be able to access each other's way of doing gardening. This enables prosumers and eventually Oosterwold to become a living space that constantly grows in terms of gardening.

2. Moving from gardening to everyday practices by learning the approach:
DIY Exchange Hubs don't stay limited to only offering new ways of gardening. Through the building manual, the design offers an opportunity for prosumers to get closer to do-it-yourself approach. By giving the power to build on their own and further differentiate the existing, DIY Hubs approaches prosumers as creators and makers of their own community. In this way, prosumers become aware of the fact that possibilities are limitless when it comes to making and exchanging and they are capable of doing these.



When it comes to the third design and research question **which investigates ways of including more inhabitants who actively performs the practice of prosumerism,** DIY Hubs revealed that targeting meanings is the starting point for such kind of an aim. Similar to what was explained in the previous page, designing for the meanings that people already have bond with -either for prosumerism or a repeated meaning in daily life- enabled DIY Hubs to be appreciated by Oosterwolders regardless of their experience or engagement level with prosumerism. Image 39. illustrates how different meanings can be addressed in a process to increase active participation.

To answer the final design and research question of **how design enables transition through food growing,** DIY Exchange Hubs show that targeting elements of practice (see pages 107-109) and embedding desired mechanisms into them is one of the ways to do so. As discussed in materials of prosumerism for example, by looping the elements of gardening (tools, books, excess produce and seeds) among Oosterwolders, DIY Exchange Hubs influence people's consumption habits. It is expected that prosumers of Oosterwold will become more sustainable through exchanging gardening elements like tools, seeds, produce and books. Once Oosterwolders realize that they are stronger, when they share together; such kind of interaction with the world, will become a new way of living which is based on collaboration. Here, new way of living is defined as a system that is open, accessible, based on trust and exchange. This can be seen as one of the steps towards new modes of thinking and living; which is a good example that can be adopted while designing for transitional contexts such as Oosterwold.

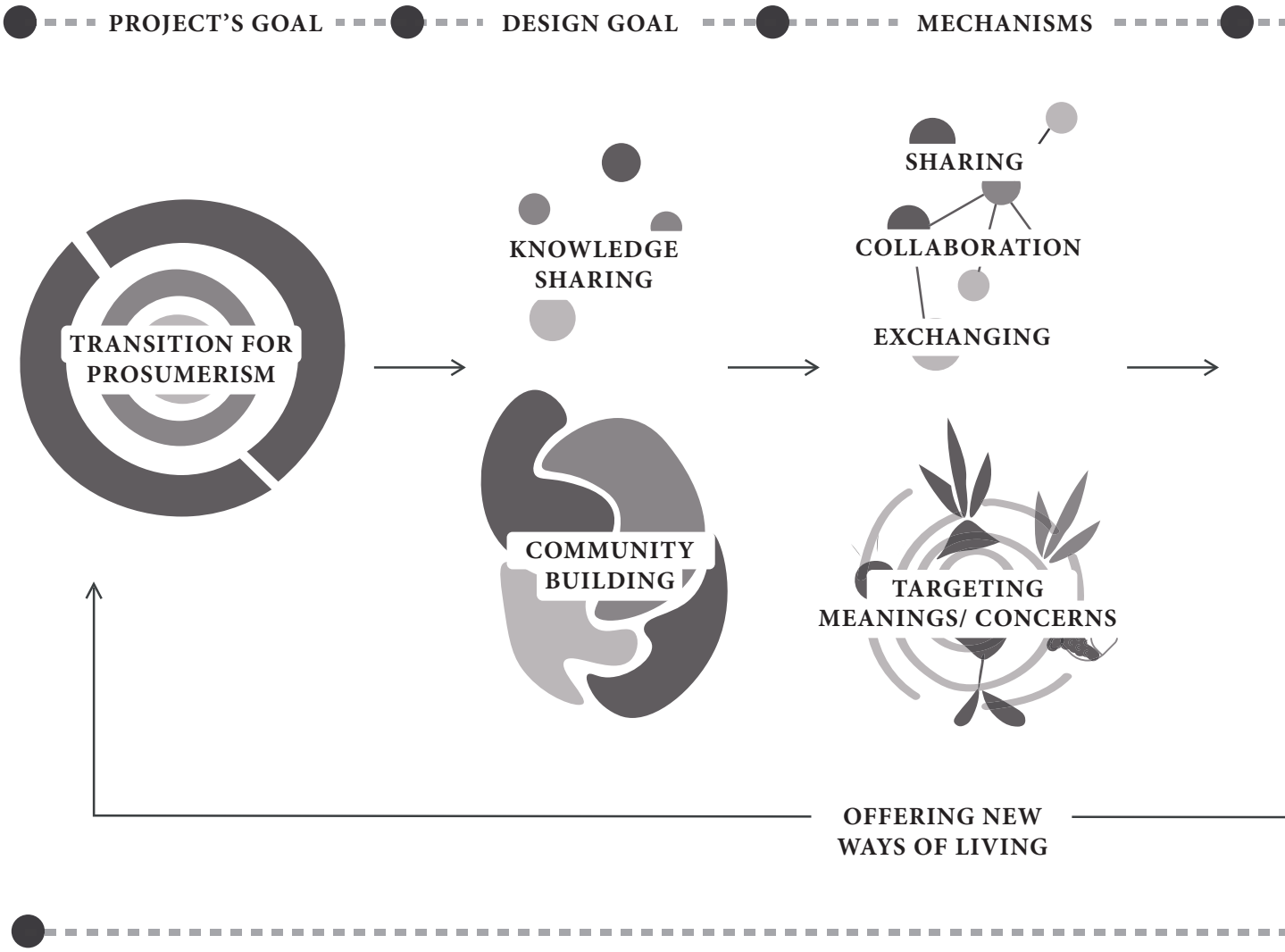


Image 40. A process model to design for transitional practices

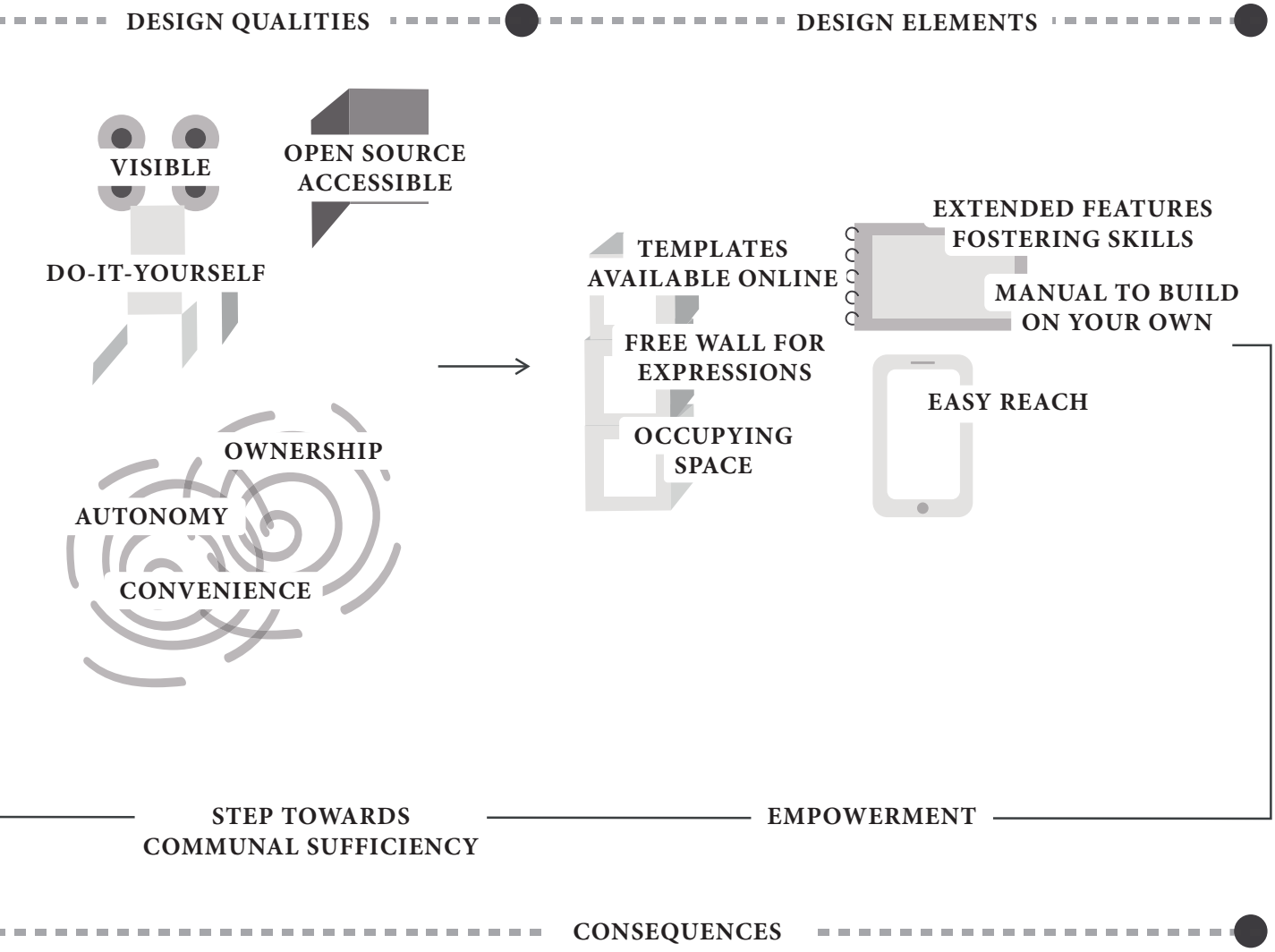
But how these kinds of mechanisms -like collaboration and exchange- are determined during a design process? How can one decide, what kind of mechanism to target and how does she translates them into design qualities and further tangible design elements? What is the rationale behind these decisions and how do they relate to transitional practices?

At this point, it will be valuable to examine the process of DIY Exchange Hubs since it provides examples to above mentioned mechanisms and how they came into being with design elements.

Steps to Design for Transitional Practices

The project investigated prosumerism practice as an entry point, which has great potential to contribute to the transitional goals of Oosterwold. As a practice performed by inhabitants on a regular daily basis, prosumerism carries great potential to facilitate transition of Oosterwold towards sustainability goals of the neighborhood. The reason to choose this kind of a bottom-up approach while designing for transitions, was (1) limited and even non-existing involvement of governmental bodies in Oosterwold, (2) high engagement of inhabitants in creation of Oosterwold and (3) prosumerism as the key practice of the neighborhood.

The results of every design and research activity conducted during the project, offered points of concentration, in other words mechanisms, that the final design should contain. These mechanisms enabled DIY Exchange Hubs came into being which contributes to transitional goals of Oosterwold. Image 40 illustrates the mechanisms, design qualities and elements of DIY Exchange Hubs and how they are linked.



Project goal of designing for the transition in Oosterwold altered itself to the design goal of how to enable community building of prosumers through supporting meanings of food growing where knowledge sharing was chosen as a target point. This goal was formulated as a result of design research activities conducted during the project specifically contextmapping and thing-ethnography. In order to meet the design goal mechanisms such as collaboration, exchanging, sharing and targeting meanings/ concerns are set. These mechanisms tell us what the project has to establish in Oosterwold for the above mentioned design goal. Translating these mechanisms into design, starts with setting design qualities before going into hands-on designing. Design qualities inform us about "should be"s of the final design. For instance, the mechanisms of sharing, collaboration and exchanging should be visible, open source, accessible and with do-it-yourself approach. Whereas the general targeted meanings should be ownership, autonomy and convenience. It is valuable to mention also that the qualities formed themselves during concept development phase of the project, so while exploring ways of designing mechanisms.

In order to make design qualities real, they are transferred to design elements which overall compose the design itself. In other words design elements ensure that design qualities are met. For example, designing a building manual that becomes a step-by-step guide to build the hubs, which ensures that Oosterwolders become autonomous and further foster ownership towards the hubs. By making use of do-it-yourself approach and putting the manual as well as cutting template online where everyone can reach them, qualities like accessibility and convenience are targeted. Once the design is complete with all of its elements, the effect is interpreted to see what overall design achieved for the project goal. For DIY Hubs, giving people power to build on their own and further offering alternative ways of differentiating hubs with extended features of the building manual, created empowerment while suggesting new ways of living. Here, new ways of living is meant to realize the possibility of forming relations based on collaboration and exchange without constantly buying new things; which would be a step towards communal sufficiency.

This process model suggests that while designing for a transitional practices or contexts, setting mechanisms such as sharing, collaboration, exchanging together with targeting meanings help to explore appropriate design qualities and elements. Furthermore the model points out that consequences, which are the effect of the final design, can be used to reassure whether project meets its goal. Making use of this kind of a stepped process model -starting from the project goal to consequences- would help designers to have control over what they are designing and why.

8.2 A Methodology for Transitional Practices

As transition design advocates, for societal transitions towards more sustainable futures, it is essential to acknowledge the connectedness of living and non-living systems while designing for everyday life practices (Irwin, 2015). This project approached prosumerism as transitional practice that is happening in Oosterwold; since the neighborhood was already practicing this unique way of food growing which also contributes to the sustainability goals of the region.

In order to understand the connection among living and non-living agencies of the prosumerism practice, this project made use of thing-centered and human-centered design research methods. Thing-ethnography was chosen to understand the role of tools, their relationship with its owners and how they facilitate the practice of prosumerism in Oosterwold. Here, it is important to underline that gardening tools are taken as one of the important materials of prosumerism practice. Together with thing-ethnography; contextmapping, as one of the human-centered design research methods, was conducted to deeply grasp the ways in which inhabitants of Oosterwold perform prosumerism; the meanings they associate prosumerism with, the motives to become prosumers, their existing way of doing gardening, needs and desires about the way that prosumerism operates in Oosterwold. This kind of a method enabled us to distill meanings and competences of prosumerism from the eyes of prosumers.

When applied together, thing-ethnography and contextmapping allow to understand and further design for practices that are complex and more-than-human. Thus, the fourth design and research question of this project, **how design may enable transition through food growing**, may again be answered with this combinational methodology.

In a more specific way, applying thing-ethnography informed the project about the different roles that gardening tools have during the practice of prosumerism. Furthermore, it revealed the other members of prosumerism practice. As described by Giaccardi, conducting thing-ethnography with tools of prosumerism enabled us to access worlds we never accessed before and call attention to what we thought it was marginal or irrelevant (2019). Using this kind of a method acted as a source of inspiration for the **form** DIY Exchange Hubs. In other words, **thing-ethnography** helped to reveal **how** the design would look like. Contextmapping on the other hand, demonstrated the context of prosumerism practice from the perspective of prosumers. As mentioned before, it revealed meanings and concerns that prosumers hold for the practice and also their needs which composed the design goal of the project with its mechanisms; knowledge sharing and community building through collaboration, exchanging, sharing and targeting meanings. In that sense, **contextmapping** informed us about **what** the final design would be about.

For instance, in DIY Hubs members of prosumerism practice like gardening tools, seeds, books and excess produces are exchanged. The act of exchanging is done through the agency of ecosystem members, which were revealed at the end of thing-ethnography. Furthermore, by collecting them into one place and creating hubs out of these; the members take active role in the practice of exchanging.

Again, as revealed by thing-ethnography; tools may have different roles depending on the relationship between them and their owners ranging from a connector to watcher (for more details see 4.1.3). With DIY Exchange Hubs these roles are transformed into a neutral state by letting prosumers hang the tools. Prosumers become the ones who neutralize the tools through the hubs. This unconscious way of putting away of the existing roles, that were assigned to tools as a result of the interaction with their owners, enables balancing the power relations among them. To speculate the roles of humans and tools for the practice of prosumerism a little bit more, DIY Hubs are presented in a form that is standing still and occupying a physical space like humans normally does. These together, tacitly questions the existing relationships that we formed with non-human agencies of practice and offers new ways of interacting with the world of more-than-human.

Using thing-ethnography as a source of inspiration to create the form of the final design, helped DIY Hubs to be a transitional design attempt for prosumerism in Oosterwold.

Thus, for the projects where the aim is to design for a transitional practice, applying a combination of thing-centered and human-centered design research methods help to reveal the form and content of the final design respectively.

Some inspirational moments from thing-ethnography

8.3 Reflections after DIY Hubs

8.3.1 Reflections on the Project

This section explains the points that might have done differently during the project in an ideal world where everything is possible.

More prosumers, richer insights: Both for the research phase and collecting feedbacks, it would be ideal to include more prosumers with different concerns. Including prosumers during the research phase with contextmapping and thing-ethnography would enable project to collect richer insights regarding the reasons of engagement with the practice of prosumerism. This would automatically strengthen the foundations of the project. Furthermore, including more prosumers in feedback and testing (also launching for DIY Hubs) processes, would create a stronger word-of-mouth which is assumed to positively affect publicity of the hubs.

Inclusion of regulatory authorities: In order to spread DIY Exchange Hubs to Oosterwold, more active collaboration with governmental bodies is needed. This would assure visibility and even credibility of the hubs. Perceiving DIY Exchange Hubs as design that can be implemented by neighborhood authorities to support community building and knowledge exchange may benefit those authorities since they would be providing a service for one of the core practices of its inhabitants.

Ensure durable hubs: DIY Exchange Hubs should be designed in a way that they are durable both towards weather conditions and robbery. This may be realized by having local collaborators that are experienced with durable production methods.

8.3.2 Personal Reflections

Besides the reflections on the project itself, here I present my personal reflections -learnings- of the whole research and design process of DIY Exchange Hubs.

Talk to your stakeholders, constantly and not too much: One of the important skills that I developed during this project is being able to keep in touch, inform and exchange with stakeholders in the necessary and appropriate moments. During the project, it was essential to keep in touch with the prosumers who participated to my research; since (1) I needed their feedback in the upcoming phases and also (2) letting them know about how their input shaped the project, makes them feel useful and happy. They were also people who believed in the project, and automatically to the impact that DIY Hubs will create. Updating and consulting with my supervisors from WUR, eased the process where it was hard to reach prosumers and further helped organizing the final test. Constant communication with my own supervisors helped me to be on track and helped them to follow my process and way of thinking.

Play with abstraction levels of design concepts when stuck: While passing from research phase to idea generation, it is best to let imagination speak; so sketching the ideas down. This enabled me to get the research insights and design directions out of my system. Then, I detailed those design directions and made concrete product/system service concepts out of those. Afterwards, I realized that there were some overlaps among the occurring concepts and also it was hard to iterate on them since they had a form, and use flow. That is where I

chose to go one step back and think through the core of each concept. In other words I focused on the effect that I want the concepts to create, and desired interaction modes with these concepts. I communicated the concepts with relatively abstract storyboards and via mechanisms and design qualities of them. Bringing the concepts one level back in terms of their concreteness enabled me to move onto the next stage through a brainstorming workshop where I detailed the concepts.

Thinking of an onion for synthesis: In order not to loose any finding/insight from a research activity, it is essential to document these. Even though it doesn't matter how you document them, I believe it is very important to do it in an imbricative way. So, building on top of each other starting from the core to the very outer layer like an onion -this analogy can also be a matryoshka doll, the world or anything that is layered-. What each layer entails is highly dependent on the project. For DIY Exchange Hubs, the onion (see 6.2.2 for details) composed of design qualities, insights, fit with Oosterwold and test findings.

Sometimes it is OK -even good- to do first, interpret after: Considering the limited time of a graduation project, or any project with limited time, it wasn't always possible for me to know the rationale behind every decision of mine. Trusting the process and going on in the light of the knowledge that you already have -either gained through the project or life in general- made things easier in long-term. This has couple of reasons: (1) it is not always possible to see something new, if you have been looking on the same direction/way for too long, (2) digesting is an important process of designing, (3) already existing literature, theories from different disciplines may help you to interpret what you did.

Bibliography

Almere. (2008). In Feddes, F.(ed). *The Almere Principles; for an Ecologically, Socially and Economically Sustainable Future of Almere 2030. Thoth Publishers, Bussum, NL.*

Almere. (2009). *Summary Draft Structural Vision Almere 2.0*. Almere.

Atzmon, L., & Boradkar, P. (2014). Introduction: A Design Encounter with Thing Theory. *Design and Culture, 6*(2), 141-152. doi:10.2752/1754708 14X14031924626988

Bogost, I. (2012) Alien Phenomenology, or What It's Like to Be a Thing. *Minneapolis: University of Minnesota Press, 2012*.

Borha, J. D., Kuijer, L. & Aprile, W. 2010. Sustainable systems innovations in households' food acquisition activities: a practice oriented approach. *In: R. WEVER, J. Q., A. TUKKER, J. WOUDSTRA, F. BOONS, N. BEUTE (ed.) ERSCP-EMSU Knowledge collaboration & learning for sustainable innovation. Delft, The Netherlands: Faculty of Industrial Design Engineering*.

Capra, F. (1997). *The Web of Life. New York, Anchor.*

Dekking, A. J. (2017). *Stadslandbouw in Almere* (Rep.). Wageningen. doi:https://doi.org/10.18174/432084

DiSalvo, C., Lukens, J. (2011). Nonathropocentrism and the Nonhuman in Design: Possibilities for Designing New Forms of Engagement with and through Technology. *From Social Butterfly to Engaged Citizen: Urban Informatics, Social Media, Ubiquitous Computing, and Mobile Technology to Support Citizen Engagement, Marcus Foth et al., eds. Cambridge, MA: MIT Press*

Dobernig, K., Veen, E. J., & Oosterveer, P. M. (2016). Growing Urban Food as an Emerging Social Practice. *Practice Theory and Research,* 153-178.

Forlano, L. (2016). Decentering the Human in the Design of Collaborative Cities. *Design Issues, 32*(3), 42-54.

Giaccardi, E. and Nicenboim, I. (2019). ID5216 Thing-Centered Design: Course Manual. *Delft, Delft University of Technology, Netherlands*.

Giaccardi, E., Speed, C., Cila, N., & Caldwell, M. L. (2016). Things as Co-ethnographers: Implications of a Thing Perspective for Design and Anthropology. *Design Anthropology Futures, London*.

Giaccardi, E., Speed, C., Cila, N., & Caldwell, M. (2016). Thing Ethnography: Doing Design Research with Non-Humans. *DIS*.

Giddens, A. (1984). *The Constitution of Society: Outline of the Theory of Structuration*, Cambridge, Polity Press.

Hielscher, S., Fisher, T. & Cooper, T. (2007). How often do you wash your hair? Design as disordering: everyday routines, human object theories, probes and sustainability. *7th European Academy of Design Conference (EAD07): Dancing with disorder: design, discourse and disorder. Izmir, Turkey.*

Irwin, T. (2011). Living Systems Principles and Their Relevance to Design. *The Natural World: Living Systems,* 169-185.

Irwin, T. (2015). Transition Design: A Proposal for a New Area of Design Practice, Study, and Research. *Design an Culture, 7*(2), 229-246.

Jansma, J.E, & Dekking, A. (2016, September). Pivotal Position for Large-Scale Urban Agriculture in Bottom-Up Development in Almere. *Urban Agriculture*, (31), 46-48.

Jansma, J.E, & Veen, E. (2012). The Agromere "Arena" : Bridging the boundaries between the urban environment and agriculture in Almere (NL). *Congres: Agriculture in an Urbanising Society, Wageningen, The Netherlands*.

Jansma, J.E, Veen, E. J., Dekking, A., & Visser, A. (n.d.). Urban Agriculture: How to Create a Natural Connection Between the Urban and Rural Environment in Almere Oosterwold. *REAL CORP 2013* (pp. 1373-1382).

Jansma, J.E, & Visser, A. (2011). Agromere: Integrating Urban Agriculture in the Development of the City of Almere. *Urban Agriculture*, *25*, 28-31.

Kaptelinin, V., & Nardi, B. A. (2009). *Acting with technology: Activity theory and interaction design*. Cambridge (Mass.): The MIT Press.

Kuijer, L. (2014). *Implications of Social Practice Theory for Sustainable Design*. Impressed druk en print.

Kuijer, L., & Giaccardi, E. (2018). Co-performance: Conceptualising the Role of Artificial Agency in the Design of Everyday Life. *CHI 2018*.

Kuijer, L., & Jong, A. D. (2011). Practice Theory and Human-Centered Design: A Sustainable Bathing Example. *Nordic Design Research Conference*.

Latour, B. (1992). Where are the missing masses? The sociology of a few mundane artifacts. In: BIJKER, W. E. & LAW, J. (eds.) Shaping Technology/Building Society: Studies in Sociotechnical Change. Cambridge: The MIT Press.

Maas, W., Rijs, J. V., & Vries, N. D. (n.d.). Almere 2030. Retrieved from https://www.mvrdv.nl/projects/357/almere-2030.

Moggridge, B. (2007). *Desining Interactions*. Cambridge, Massachussets: MIT Press.

Portschy, S. (2016). Community Participation in Sustainable Urban Growth Case Study of Almere, the Netherlands. *Pollack Periodica, 11*(1).

Reckwitz, A. (2002). The status of the "material" in theories of culture: From "social structure" to "artefacts". *Journal for the theory of social behaviour, 32, 195-217*.

Reckwitz, A. (2002). Toward a Theory of Social Practices: A Development in Culturalist Theorizing. *European Journal of Social Theory, 5, 243-263*.

Remmers, G. (2011, September). City Resilience: Building Cultural Repertoire for Urban Farming in Almere. *Urban Agriculture*, *25*, 47-50.

Sanders, E. B., & Stappers, P. J. (2014). *Convivial toolbox: Generative research for the front end of design*. Amsterdam: BIS.

Scott, K., Bakker, C., & Quist, J. (2011). Designing Change by Living Change. *Design Studies, 33*, 279-297

Shove, E., Pantzar, M., & Watson, M. (2012). *The Dynamics of Social Practice: Everyday Life and How It Changes*. London: SAGE Publications

Tromp, N. (2013). *Social Design: How products and services can help us act in ways that benefit society* (Phd thesis). Delft University of Technology, NL. doi:https://doi.org/10.4233/uuid:c2e396f0-1f29-4ce1-a827-37d62d0b29f8

Tromp, N. & Vial, S. (in review) The social design grid: a model for framing practice and research, *She Ji: The Journal of Design, Economics, and Innovation*

Van Oost, A.C., and I. de Nood, (2010). *Almere Oosterwold: toonbeeld van duurzame gebiedsontwikkeling. Groen, vakblad voor ruimte in stad en landschap*, *11*: (pp.41-45). (In Dutch)

Vercauteren, C., Quista, J., & Veen, E. (2013). Community Gardens as Learning Spaces for Sustainable Food Practices. *SCOTAI Europe Workshop Proceedings* (pp. 327-342).

Veen, E. J. (2015). *Community Gardens in Urban Areas: A Critical Reflection on the Extent to which They Strengthen Social Cohesion and Provide Alternative Food* (Phd thesis). Wageningen University, NL.

Viljoen, A., ed. (2005). *CPULs Continuous Productive Urban Landscapes: designing urban agriculture for sustainable cities. Architectural Press, Oxford, UK. 280 pp.*

Zhou, J., & Commandeur, S. (2009). Urban Culture in New Town Almere. In *IFoU - The New Urban Question: Urbanism beyond Neo-Liberalism* (pp. 301-310). Amsterdam.