Internship Report

By Kyara Fasen

Company Coach:
Anja Köppchen

Teacher Coach:
Matthias Rauterberg

Assessors:
Emilia Barakova and Erik van der Spek

CUBE
DESIGN MUSEUM

February eight 2019
Kerkrade

Summary

I have conducted my B3.1 internship at the Cube Design labs, which is part of the Cube Design Museum in Kerkrade. This is an interesting workplace as it gives me the possibility to involve users in all stages of the design process.
Here I work on a design project in a team with other interns from different educational backgrounds. My project is about smart packaging. We are searching for new packaging features or possibilities in the food industry, taking into account questions of form, materials, sustainability, reducing food waste or communication with the costumer.
Next to my main project I get to organize workshops and user tests in the museum related to my project and talk to visitors or ask them for feedback on my ideas every day.

Project summary

The project topic I worked on during my time in the Cube labs is ‘Smart Packaging’. We got the assignment to design for human needs. We translated this in identifying the largest problems in the world of food packaging with an eye on the current developments and food trends. This to also recognize future problems. After doing research into the topic ‘food packaging’ we learned that one of the major problems is that fact that for many people packaging still equals garbage. “Milieu centraal” (n.d.) writes that a Dutch individual opens on average of 7 packages a day. This creates a lot of waste: 20 percent of our waste consists of packaging.
This became the goal of our design project: Reduce the amount of packaging waste. With this goal in mind we conducted interviews with professionals in the packaging chain and supermarket customers. One returning aspect of these interviews stayed with us in particular, namely the growing trend of online grocery shopping. Once all the selling happens online, we predict a radical shift in the world of packaging design. Emphasis will come to lay on factors like improving the shelf life of a product instead of visual stimuli to convince the customer to buy.
On this notion we designed the **Smart Shelf**, a system that works together with reusable **Foodboxes**. In this future world food is no longer packaged in portions but kept in large bulk containers. Once a customer places an order, a generic box is filled in the distribution center with the exact amount the customer ordered. This box is delivered at home. The costumer can put the box on the smart shelf. The shelf will recognize the box and show the user information about the product (expiration date, weight). Next to that the self cools the box to the specific temperature that is recommended for preserving that specific type of food. Preserving a food product at the right temperature can gain days on its expiration date.

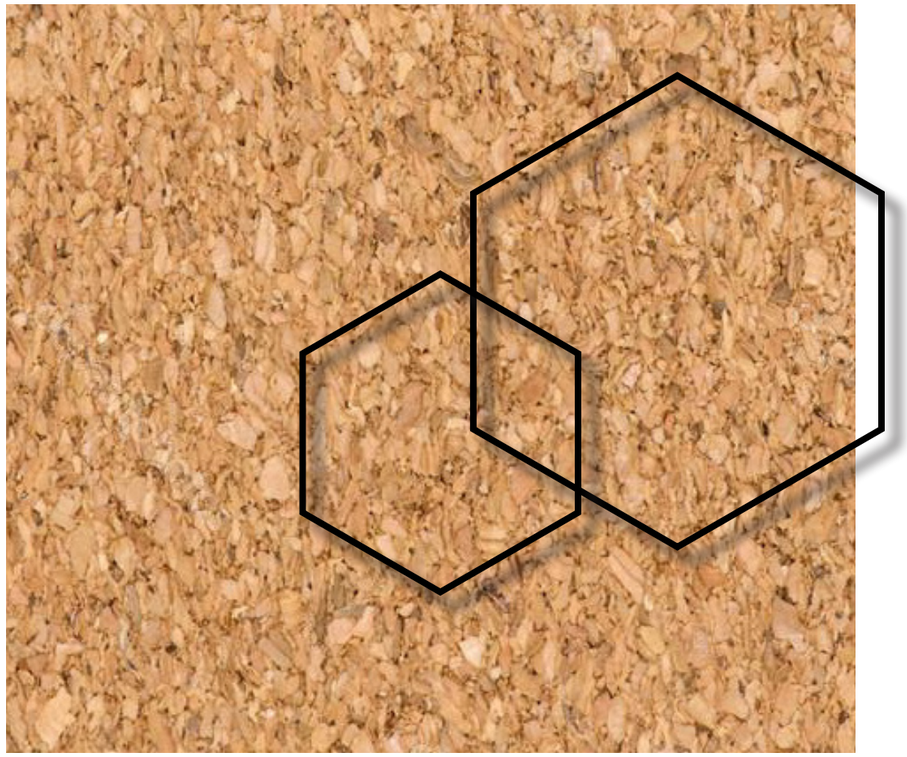
FOREWORD

In the first semester of my third Bachelor year at Industrial Design I wanted to do an internship. I choose for an internship instead of an exchange, minor or electives because I felt like an internship is the place where could grow the most. I'm very comfortable and familiar at a university/in school where I have teachers, classmates and subjects. And although I can follow different courses and learn new things while staying at a university, I want to challenge myself further out of my comfort zone. I think that the biggest challenge for me, after I graduate, will be the different setting. From school to the workplace. I always speculate about how I will function in a company and how I can prepare myself. With an internship I can answer these speculations.

Next to this I also want to improve my professional network. Working in a company, meeting their business partners and joining them at events seems a perfect way to do this.

I found this internship at Cube design museum in Kerkrade. This museum has a residence program which functions as an multidisciplinary laboratory where visitors can join interns and designers working on innovative product design. Cube design museum offers young designers, students and alumni the possibility to work in these Cube design labs. Form the different interns there are multidisciplinary teams formed which are made up of students from different disciplines, faculties and nationalities, of experts from relevant disciplines and of end-users. Each team will get to work on their own design project. The results will be permanently showed in the Cube museum collection, physically or digitally.

CONTENTS



VISION

We live in a society full of individualism and labels. Separating us from each other by putting ourselves and others into boxes. And yes it is true, every person is unique. But in other ways we are really all the same.
Like Maslow illustrated in his famous pyramid (1), we all have the same hierarchy of needs. But not every individual has the **same opportunities** to fulfill these needs. Whether it's through illness, disability or inability to express themselves.
I believe everyone in our society deserves the same opportunities since we all have something unique to contribute to this world.

I believe design should focus on creating equality and **empowerment**. Especially for Individuals with special needs. Design has the wonderful ability to support **independence** and **self-worth** within people. It can enhance a person's quality of life and help them to live healthier and more fulfilled lives by enriching everyday experiences.

With my designs I find it important to pay attention to user-product interaction and value the physical aspect of design. I will design for human needs and show the impact an empowering design solution can have.

PROFESSIONAL IDENTITY

I am an empathic designer who values user centered design approaches and is aiming for **equality** and **empowerment**. I want to help people by improving their self-worth and allowing individuals with special needs to have equal opportunities in our society.

In my past projects I noticed how interested I am in **social design**. Finding solutions for un tackled problems rather than innovating existing technology.
I am drawn to people and their personal stories. If my designs can do as much as improve the life of one child, elder or anyone in-between it would be wonderful. With my designs I want to enhance a person's **quality of life** and help them to life healthier and more fulfilled lives by enriching everyday experiences.

In the design process my strengths lay in **ideation**. I like to work in an iterative process, switching between new ideas/improvements and user validation.
As a little child I was never able to finish my school tasks in time, not only because I was a perfectionist from a young age, but also and mostly because I am a **dreamer**. With every word I read I would get lost in a sea of thoughts and ideas.
When I receive user feedback on my work, it still has the same effect.

As a designer I **design for human needs**. I look for the core of a problem or issue people face and show the impact an empowering design solution can have.

1. (Maslow, 1943)

Company Description

2

The company vision

Cube design museum is the first museum in the Netherlands that is entirely dedicated to the design process. Cube finds it important to exhibit design with content; design that has an impact on the world. The goal of Cube is to provide visitors with insight into the process behind design and to inspire and stimulate active thinking about how the world around us is designed.
They define their vision as such:
For centuries, humanity has been shaping the world, developing objects, applications, and services that keep us dry, nourished, healthy, safe, and satisfied. Innovation - driven by large and small needs and the desire to control life as much as possible - is constantly producing new products, services, and applications. According to Cube, it is precisely these products, which have been developed on the basis of a human need, a desire, and an urge, that make the difference in the world. (“Cube design museum”, n.d.)

2. (De Wit, 2016)

3

The company organization

As part of Museumplein Limburg, Cube wants to contribute to the social self-confidence, economic self-reliance, and cultural awareness of its public and their environment . The museum wants to do this by focussing on designing for Human Needs.
The Cube design museum is a museum about design and development. Cube is aimed at an international public from the Meuse–Rhine Euroregion that is interested in the process of design and design for human ambitions, large and small needs, and new insights. At the same time, Cube serves as a permanent laboratory where students and designers co-create with the public. In this position it focuses on education, business, and the world of designers. These so called ‘Cube labs’ are also the workplace where I worked during my internship period.
During my time in the Cube labs there were three teams working on the following topics; ‘Smart Packaging’, ‘Luxury in the future - Preventing burnouts’ and ‘Luxury in the future - Work-life balance’. While we were able to assist in all the projects, the main project I worked on is ‘Smart Packaging’. I did this together in a team with other interns with different educational backgrounds of all levels. The first 10 weeks with Chajen Debije (Industrieel product ontwerpen, Fontys Venlo) and Cas de Mönnink (Engineering, Design & Innovation, HZ University of Applied Sciences). The last 10 weeks Cas de Mönnink left the project team and Rick van Doorn joined (Industrieel product ontwerpen, Techniek College ZL).

During my time here our project was coached by several designers. One of which was packaging designer Rob Vermeulen. He has been working as designer and design strategist for forty years: either solo, or as leader of a bureau or as advisor for profit and non-profit organizations in the Netherlands and Europe (Vermeulen, n.d.). Besides coaching Rob also helps the museum with network expansion and organizing conferences.
Our second project coach was Nina Simons. She is the owner of the design studio ‘Studio Kernland’ and does part time coaching.
Our last coach, and also my company coach is Anja Köppchen. She works for the Cube Design museum as coordinator and student coach and contributes to meaningful and educational ways of exhibiting the design process within the context of a museum.

3. (De Wit, 2016)

Goals

The reason I was drawn to this company is because my vision seems to perfectly align with the vision of the Cube design museum. Both of us state that the quality of life is one of the most important aspects to design for. And also human needs play a big role in both Cube's and my vision.The Cube design museum sees it as their mission to contribute to the social self-confidence, economic self-reliance, and cultural awareness of its public and their environment through its focus on design for human needs. I find it important to design for human needs and show the impact an empowering design solution can have.
Additionally, their user centered way of working fits my professional identity. It assures me that the Cube labs will be the place where I can accomplish the goals I set for myself. During my internship I mainly want to further develop my User & Society expertise area. I always want to involve users in my design process and at the Cube labs I am going to learn how to do that. I will learn the best ways to communicate with the end users and involve them in all stages of the design process.

Image 1, Showing museum visitors what my team and I are working on

Overshadowing goal

My main overshadowing learning goal this semester is going to be communication. In all its aspects. As I reckon that this important area, which allows me to inlove users from my target audience like I want to, is the area where I still need to grow a lot.
One of the things I currently struggle with is that I often have a vision in my head, but not the skills to share it to others. I want to learn how I can communicate my ideas better within my project team, to a client and to my user group. These skills will be very valuable in my final bachelor project.

Specific goals

User & Society

I find user involvement very important when designing. Most of the times I can only look a design challenge from my own outsider perspective. But what I think I would want in that situation isn't always what the target audience really needs. I want to prevent this from happening by improving my interviewing techniques and user tests. I will reach this goal by setting up at least ten different user tests during my time here. I will find out ways to let my user tests appeal to visitors, so I will receive high levels of participation and feedback/data for my project. After every test I will reflect on it and make notes on what aspects I can improve so my next test will be more successful. In every iteration I will grow!
By organizing all these different user tests I also want to learn with what kind of tests I can get the most useful information or data for my project.

Math, Data & Computing

I want to work with the various data analyzation methods for qualitative and quantitative user research data which I learned in previous courses at the university. Afterwards I want to communicate important aspects of my findings by using data representations or models. If I'm able to visualize the data in a clear way it will be easier to discuss the results within the team and communicate them towards our audience. I will achieve this goal by visualizing the data from at least three user interactions (tests, workshops, interviews) and presenting them to my company coach.

Technology & Realization

Another way to work on my communication is to improve my prototyping skills. To improve my ability to use a 3D printer, to be able to use a laser cutter, to be able to do basic programming with Arduino and my ability to make clear visuals. I will develop these physical prototyping skills by making at least five low fidelity prototypes to display in the museum and use for brainstorming, I will use both the 3D printer and the laser cutter at least once during my project. While doing this I can get help and tips from fellow interns and coworkers studying or graduated from 'engineering, design and innovation' and 'Industrial product design' on various levels of education. At last I will practice coding and use Arduino Uno at least once in my project.

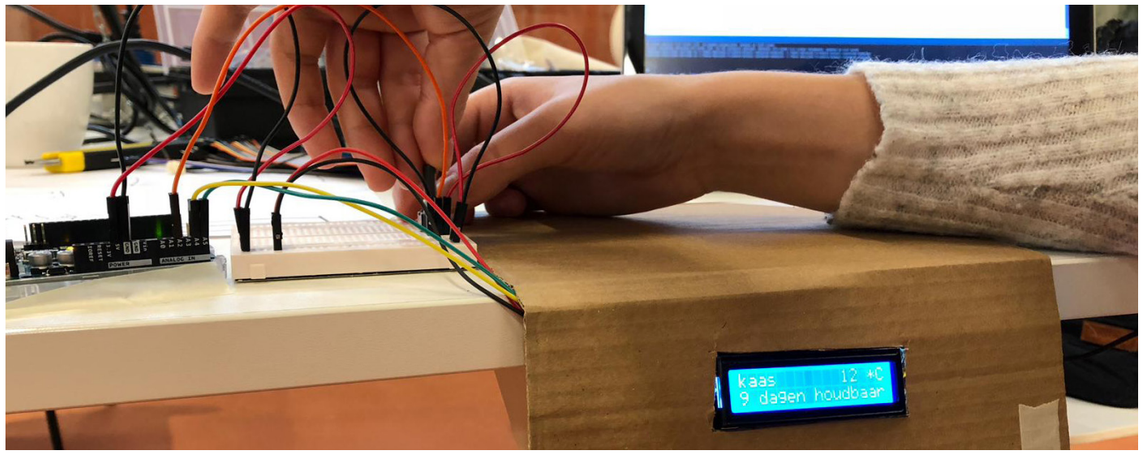


Image 2, Building a first prototype of our design 'Smart Shelf'

Creativity & Aesthetics
I want to be able to present my design process and project clearly to visitors of the Cube design museum, which is a challenge since every day I will be in a different stage in the process.
I will test my communication progress by asking the visitors if they understand my visuals or if my story was clear. I will do the same after every visual I make. I will ask colleagues or visitors at the museum what they think about the visual and if they understand them.
I will develop my digital design skills by making at least five posters to display in the museum, creating visuals for the project and use the 3D printer. While doing this I can get help and tips from fellow interns and coworkers studying or graduated from 'Multimedia Design, Trend research & concept creation in lifestyle' and 'Media Culture'.
I will also watch YouTube tutorials about how to use these programs and do exercises out of the books 'Adobe Illustrator CC Classroom in a book De officiële training van Adobe by Pearson Benelux B.V.', 'Adobe InDesign CC Classroom in a book - De officiële training van Adobe by Pearson Benelux B.V.' and 'Adobe Photoshop CC Classroom in a book - De officiële training van Adobe by Pearson Benelux B.V.'
During the course of my project I will also make at least five professional sketches to present to the visitors and ask for constructive feedback.

Business & Entrepreneurship
During my internship I want get a better insight in basic business principles concerning entrepreneurship and business ethics. I want to gain a better understanding of organizations and how they manage processes involving multiple stakeholders. I will reach this goal by observing the processes in the company and talking with employees of the design labs and the museum. I will also involve myself where possible in these processes and assist. I will attend at least two company meetings about topics that aren't related to my project.

Professional Skills
During my internship I want to expand my professional network and get more familiar with design companies and design activities. In particular in the south of the Netherlands and the Meuse–Rhine Euroregion.
One of the ways I will do this, is by putting myself professionally more forward on social media. I will keep my LinkedIn profile up to date and make sure to add all the professionals I meet during my internship period. I will also start an Instagram profile in which I show my projects and professional development.
I want to use these new connections for company involvement in my project. I am going to involve experts from at least 2 different companies beside the Cube Design museum.
At last I want to work on improving my own confidence in my skills by placing myself in an organising position looking over other team members and creating structure for them.

Image 3, Assisting in company events

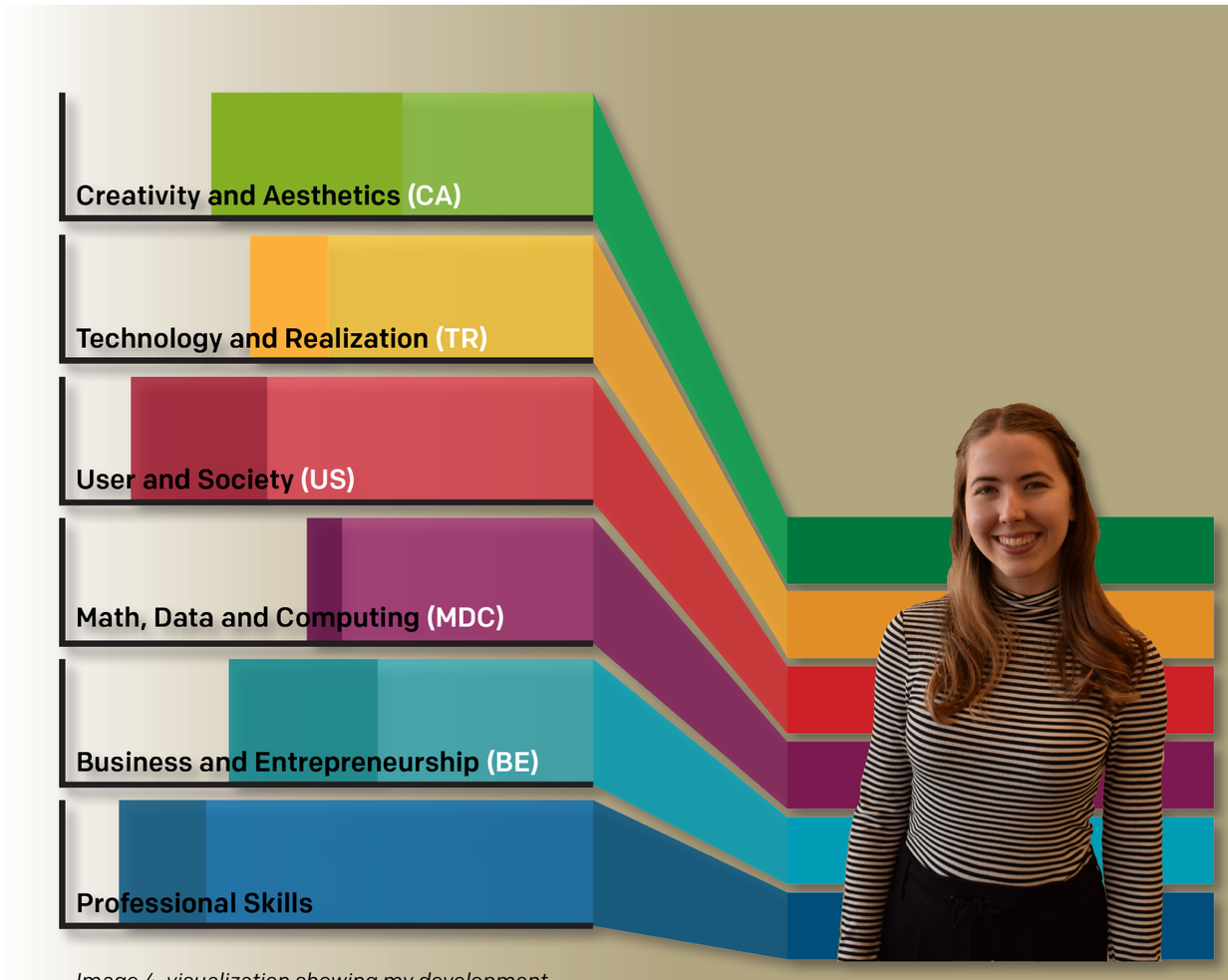


Image 4, visualization showing my development

This visualization shows how I developed myself during this internship and where I currently stand. The black line reveals to what extent I want to develop myself in each expertise area during my studies. The darkened colour represents how much I developed myself in a certain expertise area during my internship.

Activities/Project

Main Project: Zinin

Introduction to the Cube call "Packaging"

Rob Vermeulen, one of my coaches, has as a packaging designer a large worldwide network in this field. Because of his involvement in the Cube labs and previous designs the Cube labs have brought out, the Cube design museum was invited to participate in the Touch Point packaging fair in Düsseldorf June 2020 and showcase one of their designs here.
Because of the relevance of this topic in our current society the Cube design museum accepted the invitation and opened a so called 'Cube call'. Interested designers and interns can respond to this call and are offert a place to work in the Cube labs. All the Cube calls the museum offers are related to what is happening in our current society, as their vision is to design for human needs. The board of the museum recognized innovation in the world of packaging, especially looking at sustainability and health, as a human need.
I was drawn to this Cube call even though it is unlike previous projects of mine, which were about dementia patients or visually impaired children. The relation of the topic to my vision and professional identity isn't obvious at a first glance, but I realized the reason I was interested in it was because of the possibilities it held for me to work my vision into it. It held the opportunity for me show my skills and turn such a global topic into something very personal. I wanted to empower an individual by looking at the core of the problem and finding out their true needs. Then translate this into a new way of packaging food.

Process

In the Cube labs I learned to work on projects in three phases: Ask phase, Imagine phase, and Create phase.
In the **Ask phase** I worked on defining the 'human need' in the packaging call. Followed by brainstorms about this need. This was not only done within the project team but also in co-creation with museum visitors. This allowed me to get a clear view on the problem. It is easy for designers to get stuck in their own view of the problem but this co-creation allowed me receive feedback from many other perspectives besides my own. It also allowed me to discover if the need my team and I identified is truly viewed as the core need people face.
Once the design challenge was clear we entered the **Imagine phase**. Here I worked on designing and working out multiple ideas. Also here I involved the target audience in the design process by discussing the different designs with them and taking their feedback with me while designing new iterations.
Then, on the basis of correct substantiation, one of the ideas is chosen to work out into a final concept in the **Create phase**. Here prototypes are build, user tests are conducted in an iterative process. Program requirements are formulated, material research is done and branding is finalized.

During the whole process it was important to showcase what I currently working on. I did this through workshops, visualizations and presentations.

Activities

ASK

As mentioned earlier, we start the process with the ASK phase. This phase consists of analysis and empathising.

Secondary research

While working in a multidisciplinary team with designers from all levels of education, we were all able to showcase the different strengths we took from our education. I as a university student took it upon me to be responsible for the scientific foundation of design decisions. While undertaking desk research I involved the other interns in the task and guided them in tactics to read through scientific papers and quote along the APA format guidelines.
To get a better view on problems and design challenges in the world of packaging I started with looking at 'bad' packaging. I defined 'bad' as a way of packaging food that is unsustainable. The most important reason for looking in this direction is learning what makes a packaging unsustainable. Amy Wu (2014) explains that in general, the smaller a package and the greater its mix of materials, the less recyclable it is. However this doesn't make larger packages the solution as this causes new sustainability issues like transport costs and food waste (Wu, 2014). Food waste is a recurring topic for companies behind the reasoning for choosing a certain way of packaging. So explained the Dutch dairy company Campina to Meldpunt Verpakkingen, after they received backlash for giving their cartridges a plastic cap, that caps on the cartridges have a number of advantages. Although it leads to higher use of plastic compared to the 'old' cartridges, the cartridges are easier to reclose. As a result, this ensures better hygiene. Products have a longer shelf life and the risk of food waste decreases (Meldpunt Verpakkingen, 2014).
Also biodegradable and compostable materials were a promising topic for the project.
I was very interested in the material research as I had no previous experience with it. I compared different compostable materials and their qualities from literary studies and did some tests in the museum with a compostable BoPLA and PVA bags, especially the latter was very interesting as it dissolved in water.
I think it is important for me as a designer to be aware of the life cycle of my products, this includes where the used materials come from and what happens to them at the end of the products life.

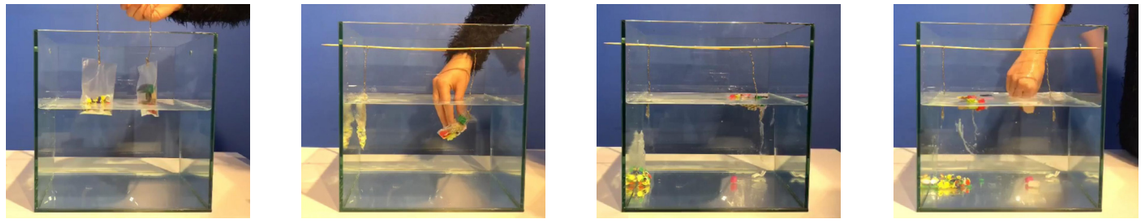


image 5, testing PVA in the museum

Brainstorm sessions about the problem

Leaded by me
My project team consisted of industrial product design interns from three different levels of education. This was a really interesting combination, since we all learned different aspects of product design and other ways to approach our design challenges. I had my doubts about this at first but our collaboration went surprisingly easy and our skills turned out to be very complimentary. As a university student I was used more to the freedom within a large project whereas my teammates were more used to a more direct problem when provided with a design challenge and less freedom. Even though I was the youngest of the group I took the role of organizer upon me to create this structure for my teammates. Among other things this meant I formulated and distributed the tasks, after discussing them with the team, and leaded the brainstorm sessions.
Our way of collaboration felt very natural for me and, thanks to multiple reflection moments upon the teamwork, I know everyone felt like a valued member of the team.

Image 6, various brainstorms in the ASK phase about possible project directions (defining the problem)

Opinions of the public

I not did not only lead brainstorms within my team during my time in the Cube labs. Because of the interesting place it is I also leaded brainstorms with our target group and other designers who worked in the space.

This co-creation with the museum visitors is an important aspect of a design project done in the Cube labs. My company coach Anja Köppchen defines co-creation as followed: ''two or more individuals with complementary skills come together to make something that none of them could have thought of on their own''. This co-creation expresses itself mostly in joined brainstorms, workshops and user tests. Over the course of the project I organized 16 different tests to gain more insight in how the end-users view the problem and to test various aspects of our designs.

These test had varying levels of user involvement. From minimal (participant can choose between multiple options by voting), to mediocre (short experiment), to large user involvement (workshops).

I designed all of the minimal involvement user tests to work even without my explanation or supervision. In these cases the poster or test setup itself should be able to do all the explaining on its own, this was quite a challenge for me. As I've stated before, visualizing and thus communicating my ideas is still a struggle for me. So it was no surprise when, especially at first, some the of the user test failed.

If I was observing the stand with a minimal or mediocre user test and I noticed people looked at it, but didn't interact with it, I stepped towards the visitors we sometimes had hour long conversations about the topic. Indicating that it was not their lack of interest in the topic but something about my test that withheld them from participating. Beside talking about the topic I would also ask them what they thought of the user test and why they did not want to participate. I wrote this feedback down, reflected on it, and took it with me when designing my next user test.

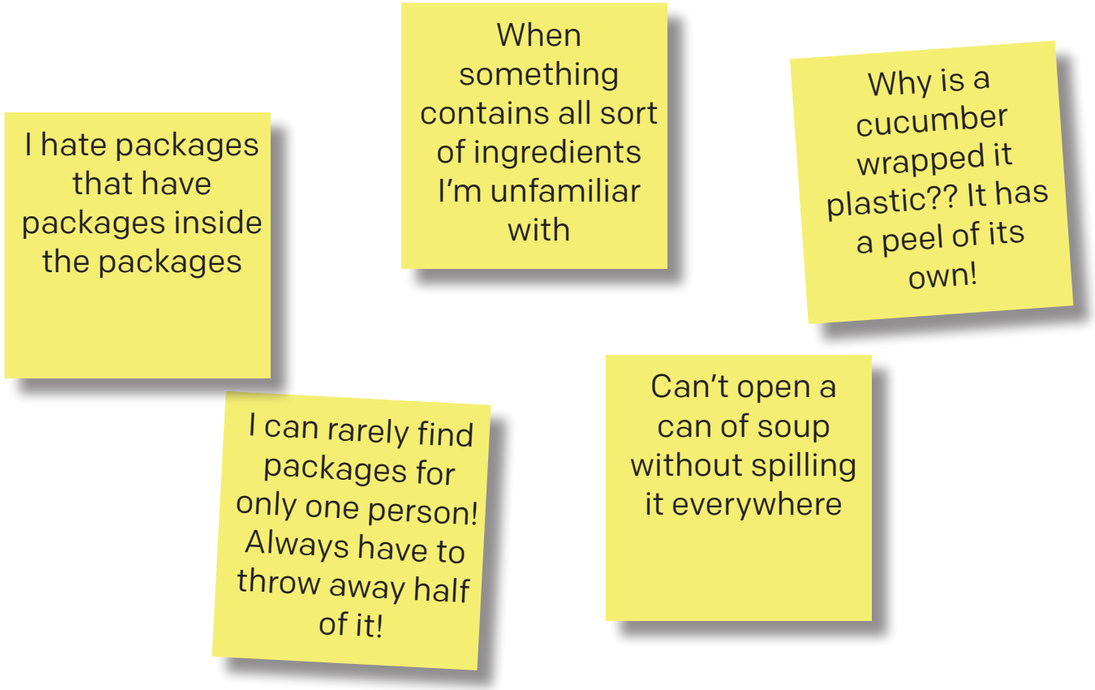


Image 7, enlarged post-it responses of museum visitors

Image 8, example of minimal user involvement test

Image 8 is an example of a minimal user involvement test. Here I used a simple question to get a better view of what problems people see or experience with packaging.

Noticeable was the amount of notes about the not being able to open a certain type of packaging and the amount of notes with disbelieve over the amount of plastic used for food packaging.

From this particular test I learned that post-its are an easy way to quickly get a lot of information. Not every visitor is interested in a conversation with you but almost everyone seemed to have an opinion about an annoying package that they wanted to leave behind in this quick and easy way. I also noticed how museum visitors like to see participation results from other visitors, it stimulates them to participate as well. In this example it means that people liked to read the answers from other visitors, eventually leaving an answer themselves as well.

Image 9, museum visitor reading the post-its left by other visitors

Workshops

One of the main goals of Cube is to provide visitors with insight into the process behind design while letting visitors contribute to the projects going on in the labs. One of the ways I could help with that is by hosting workshops for larger groups of visitors of all ages. I designed three workshops related to both packaging and the design process, learning how to find a balance between getting useful, mainly quantitative, input for our project and learning the visitors about design (appendix page 14).
Afterwards I analyzed the data out of the workshops and made them presentable. The results were shown to my supervisors and put up in the museum.
While doing the workshops I was both really surprised by the creativity of the participants and stunned by how held back a lot of people were with their ideas. Almost everybody needed some time to warm up to the idea that there really are no wrong ideas when brainstorming. It was really fun to guide children in the design process, but giving the workshop was often also out of my comfort zone, for example when working with adults and elders. I'm not used to teaching people, especially teaching participants a lot older than me. But after a few workshops I learned that the age of the participant truly doesn't matter. No matter what age, everyone who joined my workshop was excited to learn, and that's what it is all about.
It was amazing to see how people were surprised of their own ideation capabilities during my workshops. It made me feel like my work was really appreciated and it also proved my point that involving your users in your design process is always a good idea. Because even if you think they won't understand what you are doing, since they know nothing about design, their abilities and insights can always surprise you.

Image 10, example of workshop I conducted in the Ask phase with groups of visiting high school students

	Vraag	Ja	Nee	Totaal
"Heb je wel eens afval op de grond gegooid?"	Vraag 1	43	2	45
"Eet je (ten minste) eens per week chips?"	Vraag 2	47	1	48
"Kom je wel eens een verpakking tegen die je vervelend vindt?"	Vraag 3	46	15	61
"Let je in de supermarkt op de ingrediënten als je iets koopt?"	Vraag 4	22	35	57
"Denk je dat je goed kan recyclen?"	Vraag 5	27	33	60
"Gooi je thuis (ten minste) eens per week eten weg?"	Vraag 6	26	27	53

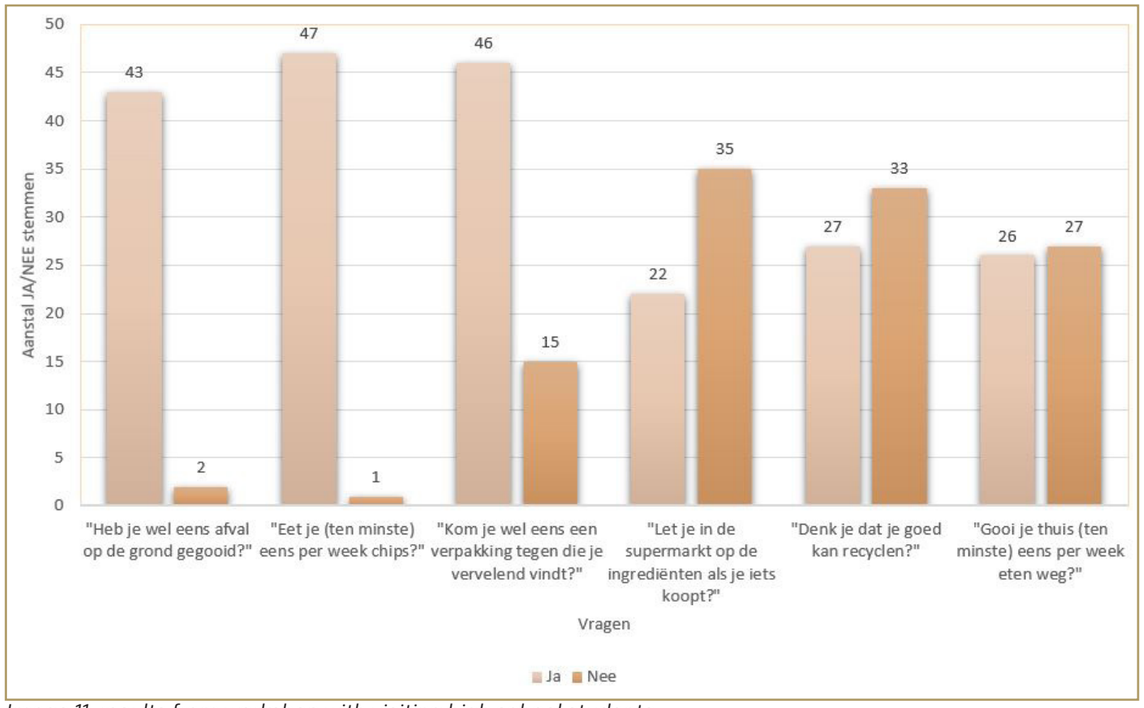
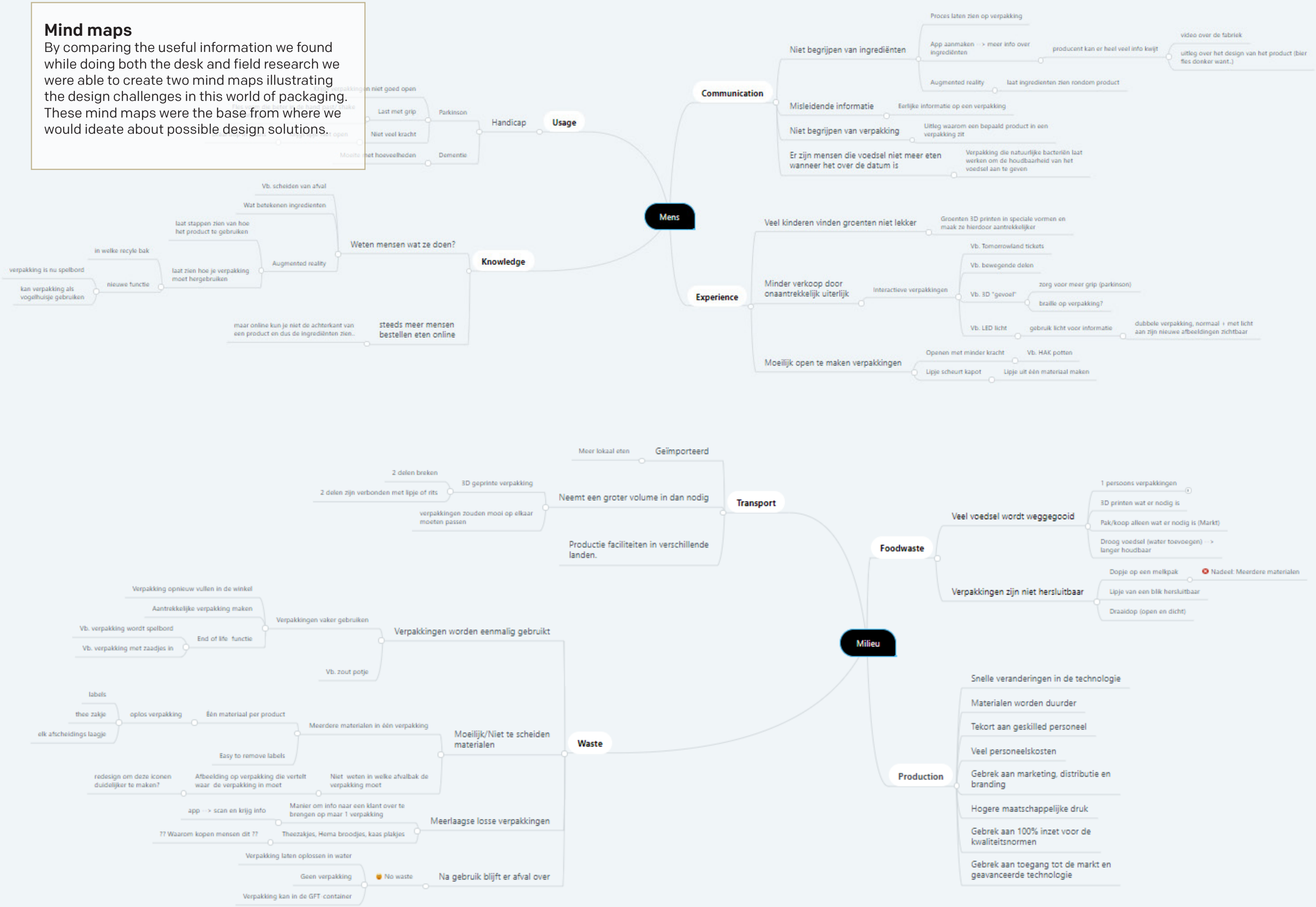


Image 11, results from workshop with visiting high school students

Image 10 shows an example of workshop I conducted in the Ask phase with groups of visiting high school students. This workshop had two rounds, first I let the participants vote on statements by sticking post-its on the question number on either the yes side of the room or on the no side of the room (e.g. Do you throw away food at your home at least once a week? yes/no). I would elaborate on these quantitative votes by asking the participants why they voted on this answer (e.g. What are the reasons you throw away food at your home?).
In the second round I teamed the participants up in groups and let them design a possible solution for the issues discussed in the first round (e.g. food waste).
See image 11 for the outcome of this workshop. See appendix page 14 for elaboration on this workshop and other workshop setups conducted in the Ask phase.

Mind maps

By comparing the useful information we found while doing both the desk and field research we were able to create two mind maps illustrating the design challenges in this world of packaging. These mind maps were the base from where we would ideate about possible design solutions.



Activities

IMAGINE

The imagine phase consists of ideation and validation.

First ideas

The start of the Imagine phase at the Cube labs was all about brainstorming for design solutions. My team and I created over a 100 possible directions for the project to go to, see image 12 till 15. But were able to narrow it down to seven. While brainstorming and selecting ideas we used several methods from Open HPI; Silent brainstorming, hot potato brainstorming, photo brainstorming, plus 5 brainstorming, dot voting, three categories technique, 2x2 matrix, and idea funnel (OpenHPI, 2018). On each of the seven ideas, we chose to continue with, we spend a single day. Working it out further following the framing method explained in the book Design Thinking by Guido Stompff (Stompff, 2018). I noticed that discussing the ideas with coworkers as well as visitors was rather difficult without any visuals. So I made the decision to create for each of these seven ideas a poster and a low fidelity prototype, either from paper or 3D printed. My team and I created a hallway in the museum filled with these posters and prototypes, making it a perfect opportunity for us to discuss these ideas and receive qualitative input for our project (appendix page 7).

When people told me they did not understand a poster or visual I made I would immediately make new poster the next day and talk with visitors again about how they felt about the poster. I'm really proud of my growth in this area. At one point I noticed visitors skipping over the project posters/visuals of other interns and designers but standing still to read some of mine. I received the feedback that I really showed the essence of my ideas and concepts and that that simplicity was able to grab one's attention and sparked the interest of visitors to read more information. Beside posters I also used colored sketches and self-filmed short movies to visualize my ideas and concepts to the visitors.

To also receive feedback on the ideas when none of us where present at the hallway we gave visitors the chance to vote on their favorite design solution and left a question with each frame that would provides with insight into way people would want this design solution or why not. On pages 26 and 27 I will illustrate the three of the seven ideas that my group and I decided to continue with. The other design solutions can be found in the appendix.

Image 12, brainstorm method 'Silent brainstorm'

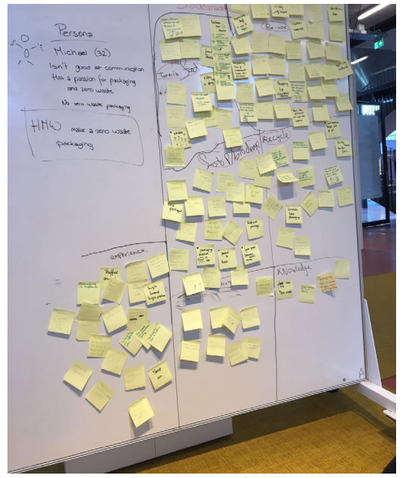


Image 13, selection method 'Dot voting'

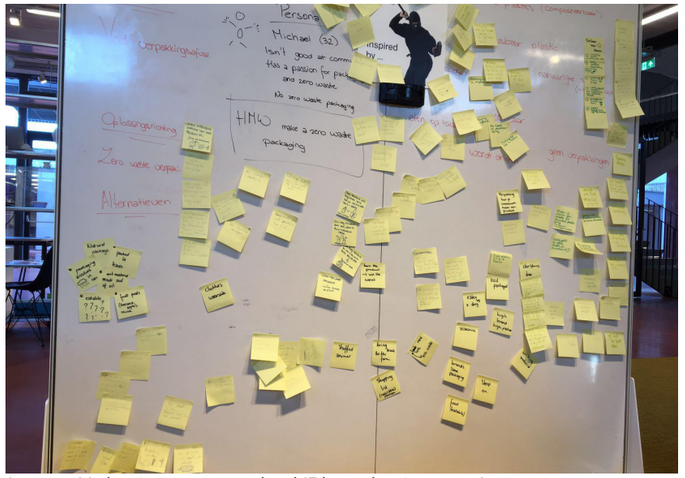


Image 14, brainstorm method 'Photo brainstorm'

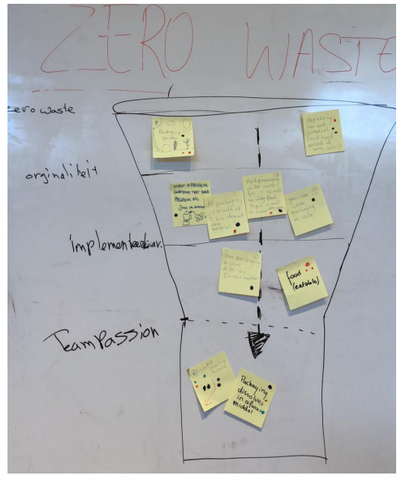


Image 15, selection method 'idea funnel'

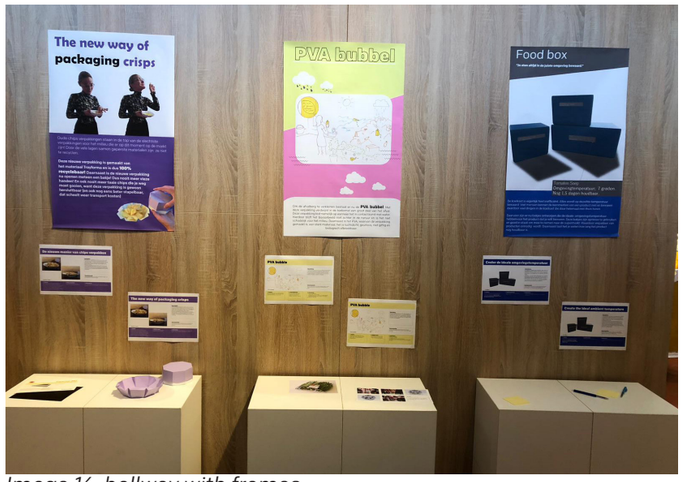


Image 16, hallway with frames

Image 17, hallway with frames

PVA bubbel

Om de afvalberg te verkleinen bestaat er nu de **PVA bubbel**. Met deze verpakking verdwijnt in de toekomst een groot deel van het afval. Deze verpakking lost namelijk op wanneer het in contact komt met water. Hierdoor blijft het bijvoorbeeld niet achter in de natuur en is het niet schadelijk voor het milieu. Daarnaast is het PVA, waarvan de verpakking gemaakt is, een sterk materiaal, het is luchtdicht, geurloos, niet giftig en biologisch afbreekbaar.

Votes

● ● ○ ○ ○
○ ○ ○ ○ ○ 8 out of 56

Q: How do you feel about packaging food in a package that will dissolve in water?

- *"Great!"*
- *"Does that mean it will melt in the rain..?"*
- *"Seems to me it is a good solution! But only when 'no packaging at all' is no option."*
- *"Fantastic! If it really works.. How long will it take to dissolve?"*

Food box

"Je eten altijd in de juiste omgeving bewaard."

Tomaten Soep
Omgevingtemperatuur; 7 graden.
Nog 1,5 dagen houdbaar.

De koelkast is eigenlijk heel inefficiënt. Alles wordt op dezelfde temperatuur bewaard. Veel mensen kennen de kernmerken van een product niet en bewaren daardoor veel dingen in de koelkast die daar helemaal niet thuis horen.

Daarvoor zijn er nu bakjes ontworpen die de ideale omgevingstemperatuur hebbenvoor het product dat je wilt bewaren. Deze bakjes zijn opnieuw te gebruiken en goed in staat om mee te nemen naar de supermarkt. Waardoor verpakken van producten onnodig wordt. Daarnaast laat het je weten hoe lang het product nog houdbaar is.

Votes

● ● ● ○ ○
○ ○ ○ ○ ○ 14 out of 56

Q: Do you throw away food once it reaches its given expiration date, even though it might still be safe to eat?

- *"Not that often. I usually look and smell at the food product."*
- *"Almost always! I'm even more confused when it says it's perishable after opening"*
- *"Never, I can smell and taste for myself"*
- *"I know I should see for myself, but I'm too scared I'll judge wrong and get sick. It's not worth it."*

Een supermarkt zonder verpakkingen

In de supermarkt van de toekomst koop je de exacte hoeveelheid eten die je nodig hebt.

"Voedsel is niet meer verpakt in porties."

Vanaf nu kun je je eten uit bulk-containers nemen en daarmee je eigen potten vullen met de precieze hoeveelheid voedsel die je nodig hebt. Met deze oplossing hoef je nooit meer te veel te kopen, wat ervoor zorgt dat voedsel niet meer over de houdbaarheidsdatum gaat.

Votes

● ● ● ● ○
○ ○ ○ ○ ○ 19 out of 56

Q: Would you be willing to bring your own boxes and bags to the supermarket?

- *"Absolutely, when I was younger I also always had to bring my own paper bag to the greengrocer"*
- *"Never! I really won't have time for that."*
- *"Sure! At the market that's normal!"*
- *"Yes! That is the future! Packaging is ruining our planet, we have to fight the plastic soup!"*

Interviews

Because I want to be a user centered designer I find it important that I am able to empathize with my user and involve them as main stakeholders in my design process. Being able to successfully conduct interviews is important in this because it allows me to switch perspectives and learn from people in their societal context.
Because I don't only want to look at the design challenge from a customer perspective, I also want to know how professionals in the packaging chain feel about current issues they face and speculate about how the packaging chain looks like in the future. We did qualitative research into the chain to gain a better understanding of underlying opinions, motivations and reasons of stakeholders.
We conducted three in-depth face-to-face interviews in the packaging chain.

1. Distribution center — **2. Supermarket** — **3. Delivery service**

1. Interview with Marc Boits CEO bij Heuschen & Schrouff (Importer and distribution center of mainly Asian food products)
How do you see the role of a distribution center in the packaging chain in 30 years?:
''*People will always have to eat. But will they continue to cook for themselves? Consumers want convenience. Convenience, biological, more local. Production companies are slowly coming back from Asia to Europe. Next to that I also expect that rationalization will take place. No longer 40 brands of peanut butter, but back to about 2. Distribution centers will still be here in 30 years. But transporting food to a physical supermarket will no longer happen. We will deliver to specialized home delivery centers.*''

2. Interview with Guus Sturing manager of supermarket PLUS Heerlerbaan
How do you see the supermarket in 30 years?:
''*I expect that in 30 years everyone will do their daily groceries online. You will no longer go to the store to buy some toilet rolls, you just have them delivered. For physical supermarkets to stay relevant they will become more of an experience. If someone wants something special or unique to eat they will come to the physical store. I can easily see chefs in the future stores! Cooking for the costumer with fresh and local products.*''

3. Interview with Mike van Santwijk of the Jumbo supermarket delivery service.
How does food packaging while delivering currently look like? And do you see points of improvement?:
''*Currently we have crates filled with bags with inside the normal groceries. Next to that we have frozen products in cool boxes and large products (toiletpaper) are delivered without a crate.*
The used crates are already deposit packaging just like the plastic packaging. I doubt there are any points of improvement, since it is all very efficient and the packaging we use comes back to us because the consumer has paid for it. I think the points of improvement lay in online store, making the ordering easier for customers, rather than the delivery.''

After every interview we reflected on it as a group this resulted in some valuable insights. As conducting interviews was one of my learning goals I was the spokesperson during the interviews, a second team member made notes. But after the first interview we already recognized little things, for example that the spokesperson should be sat next to interviewee at all time instead of the note taker. These insights were implied in the next interview where we again learned from little mistakes. For example that I should keep the questions really open, I don't want to influence the interviewee with my own ideas. I will take all these insights with me for future interviews.

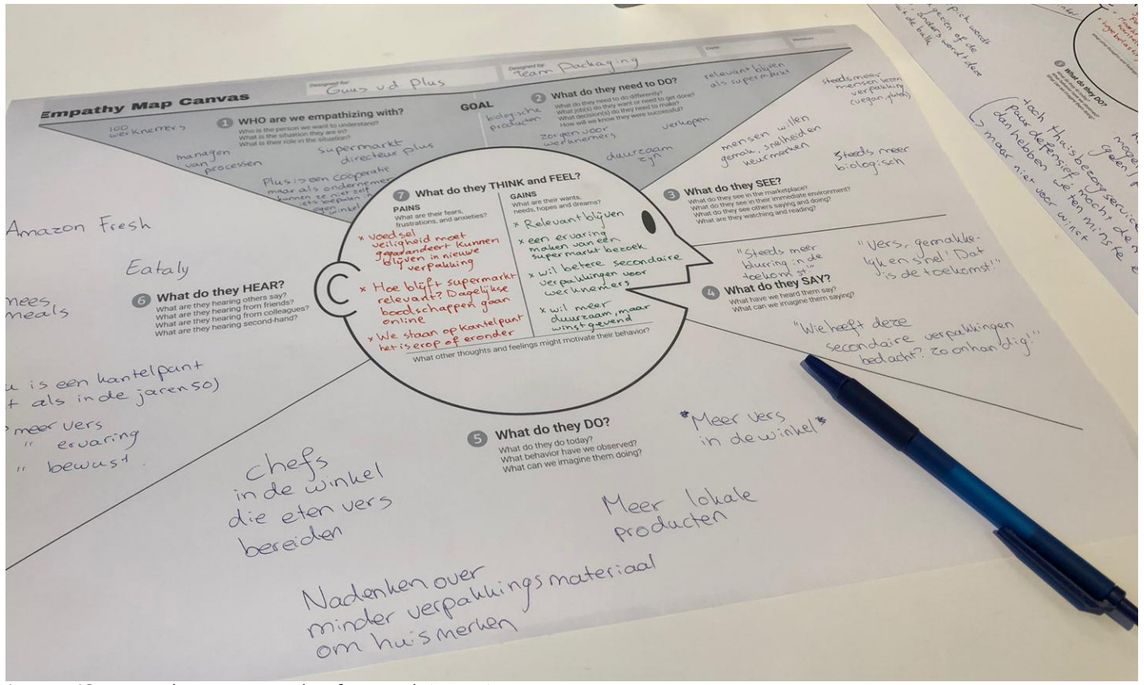


Image 18, empathy maps made after each interview

Future world building

My team and I created a so called future world, that we will be designing for. To sketch a future world helped us, as a design team, to all be on line about the future we are designing for. This vision is based on brainstorm sessions about the future of the packaging chain within the team and together with stakeholders or experts in this packaging chain.
These are the characteristics of the future world we took into account in our design:

- Majority of people shops for daily groceries online
- Consumers are interested in local products and fresh products
- Consumers are interested in speed and easiness
- Physical supermarkets will still exist but will merge with the catering industry,experience will play a much bigger role
- The number of large distribution centers will have grown

Final concept

As explained earlier we decided to look at the three worked out ideas that received the most votes and positive reactions from our potential user group and identified what aspect of these ideas spoke to people.
In several **iteration steps** we combined the aspects of no packaging waste and less food waste into a final concept.

The final concept is a service which, thanks to online ordering, makes it possible to shop for groceries without producing packaging waste. All products are delivered to a distribution center in bulk. Once a customer places an online order they can choose the quantity of their order and in the distribution center a so called 'foodbox' will be filled accordingly. The foodbox is a universal packaging that is available in several convenient to stack sizes. The foodbox will create a 'perfect' environment for the food product it is holding by cooling it to the ideal storage temperature for this individual product. also will this packaging keep track of the expiration date of the product, before and after opening and will communicate this to the user. Once the user used the product they ordered they can hand in the now empty foodbox when their next order is being delivered working with a deposit money system.

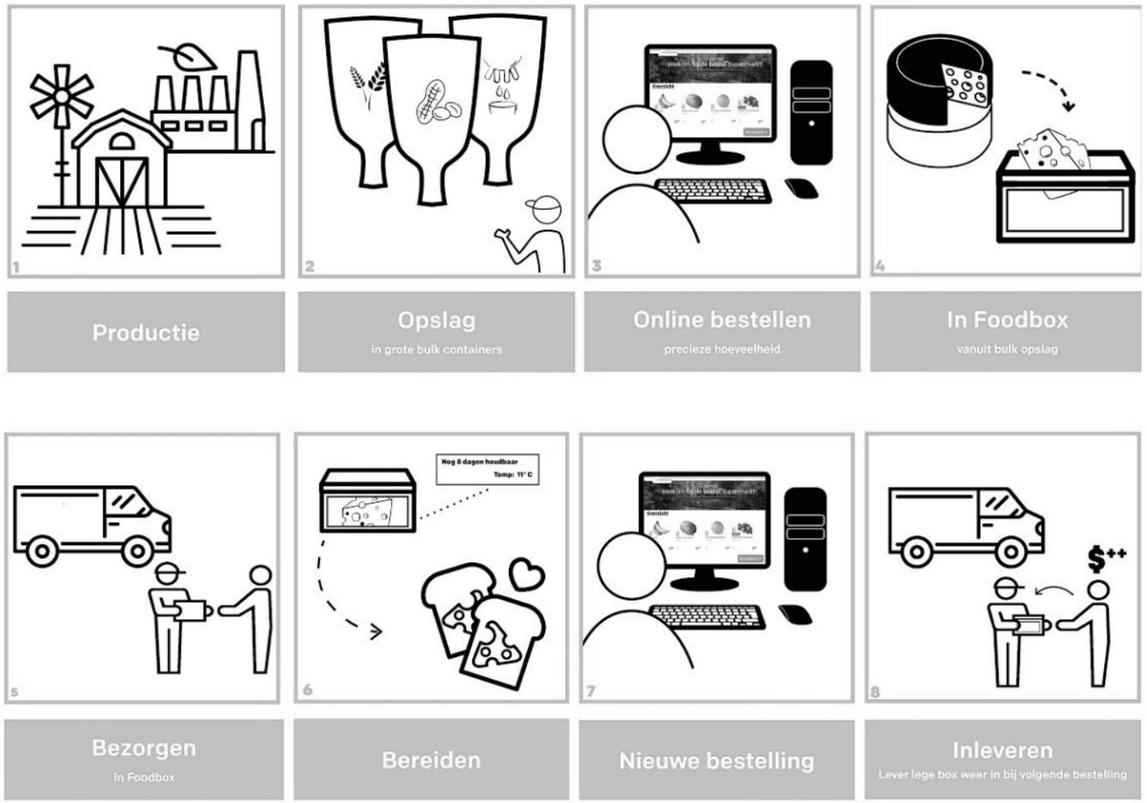


Image 19, storyboard final concept

Target group

After finalizing the concept we wanted to work out further we defined our target group as **everyone in the Netherlands who does grocery shopping and has access to the internet**. Because this target group is so wide we have to take into account a lot of different user experiences. After speaking to the many visitors in the museum I started to get a clear image of the different types users we are designing for. I decided to create persona's to better understand my users needs, behaviours, experiences and goals. It helped me to empathise with the users I'm designing for by stepping out of myself.

Image 20, Personas

Activities

CREATE

The Create phase consists of prototyping and testing in an iterative way of working.

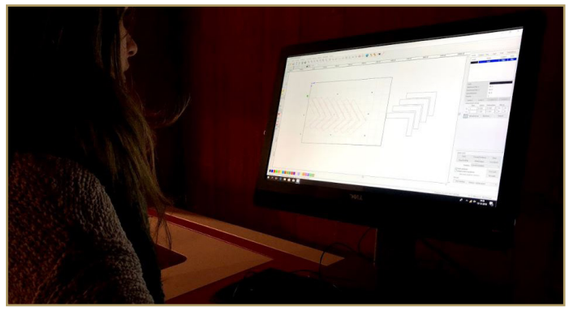
Prototyping

Because visualization is so important for instant feedback from museum visitors, we made prototypes of our ideas in all stages of the process. I learned that the fidelity of a prototype can influence the feedback you receive. Not only from visitors or outsiders but also from within the design team. I learned to recognize the following three moments that should influence the level of prototype fidelity.

At first exploring, when exploring a concept or idea I learned I shouldn't make the prototype too nice. A polished model makes the design looked "finished" and not open for discussion. For example when I was brainstorming about a shape. I just needed to show the essence, not the real material or color. I made together with my team over 40 cardboard models to help us decide on multiple different things. Like shape and size. I had never done this before, I'm used to only making a prototype for a user test or a final presentation when I'm already sure about the shape and size. But I experienced this as very nice, once I was holding the shape of the 'Foodbox' we discussed in my hand I immediately got inspired again for possible different and improved shapes.

The same idea partly holds when building a prototype for user tests. I want to show my users that I'm still in the learning phase and open for feedback but the prototype should also be understandable for an outsider of the project and not break during usage. When building a prototype for user testing I often still used cardboard, convenient to hide the wires of my Arduino inside, but this time I decorated the boxes with images to give it the impression of what it will eventually look like without building this final version. For another user test I also 3D printed a model of the concept. It wasn't on scale nor from the right materials, but it perfectly showed its functions.

The last instance I learned to build a prototype for is selling. Here you build a prototype to persuade others, thus in ultra-high fidelity and extremely well crafted.



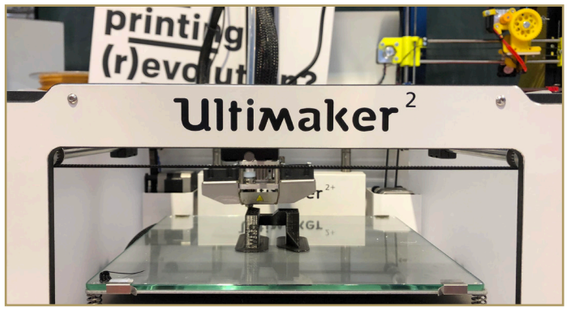


Image 21, using a laser cutter and 3D printer to make prototypes

I'm not a handy person so my prototypes used to never be impressive or strong but with the help of other interns I learned many new things in this area. I learned how to build 3D models and use a 3D printer, how to handle the laser cutter, and the infinite possibilities cardboard and tape. It was clear to see that the interns from other levels of education had a way more practical background, I believe this made our cooperation very valuable and educational for both of us.

Foodbox, Shape and Size

To categorize the food items available in a supermarket I looked at the paper 'Het mandje van de consumentenprijsindex, de bestedingen van consumenten en de meting van de CPI in 2017' by Walschots to learn what are mainstream and much sold supermarket items in the Netherlands (Walschots, 2017). This helped my project team and me to gain clarity into the different groups of items that are available at most supermarkets.

Based on Walschots' paper we decided to design multiple shapes and sizes for the Foodboxes that will be replacing all current packaging. We also distinguish boxes and bottles in our designs. Beside the shape of food products, my team and I looked at both stackability and ergonomics when designing the shapes and sizes of the boxes (and bottles).

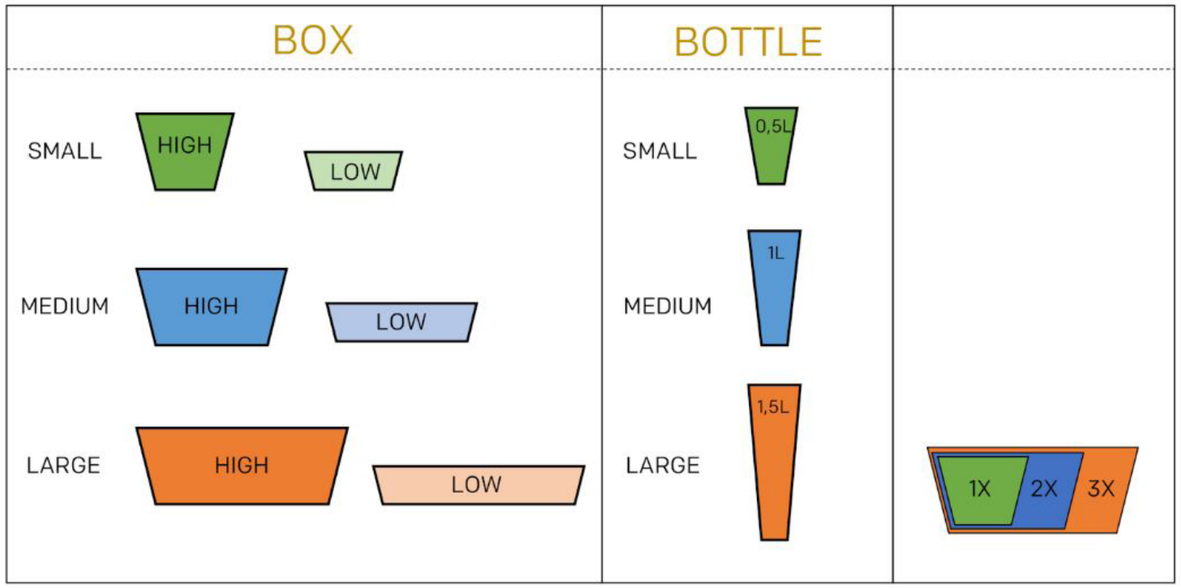
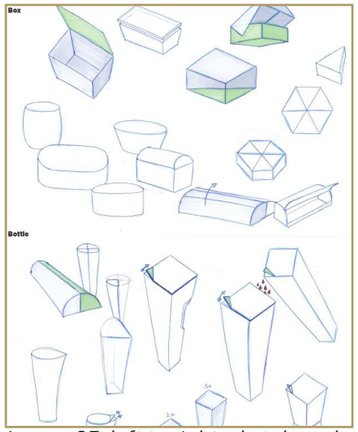


Image 22, first designs for shape and size of the Foodbox

The small box is designed based on ergonomics sizes of a Dutch hand (DINED, 2004). The medium box is in length 2x the size of the small box and the large box becomes 3x as large as the small box. Image 22 shows these basic box sizes all other sizes will later be derived from.

The bottle is also made based on ergonomic sizes based on the Dutch hand (DINED, 2004). The small bottle will have a content of 0.5 liter. The medium bottle has a content of 1 liter and the large bottle 1.5 liters. These quantities are based on the average of already existing quantities for drink bottles in stores today.



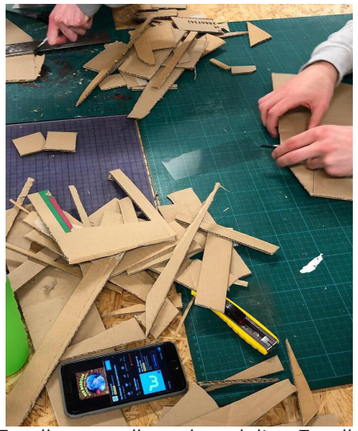



Image 23, left to right: sketches shape Foodbox, cardboard modeling Foodbox, user testing the Foodbox shape

Beside the size of the boxes also the shape is important. Next to speaking with museum visitors about this shape my team and I decided to prototype different shapes we had in mind and use them to test with visitors. While building these prototypes I already noticed how this also helped me while brainstorming for other possible shapes. When holding the physical bottle in my hands it was easy to say, "I like this, but this is annoying. Let's make the same bottle again only more dented over here". I experienced this as very helpful and inspirational. I will continue to do this in my future projects.

image 24 shows the stand my team and I designed to also get feedback on the possible shapes for the bottle Foodbox.

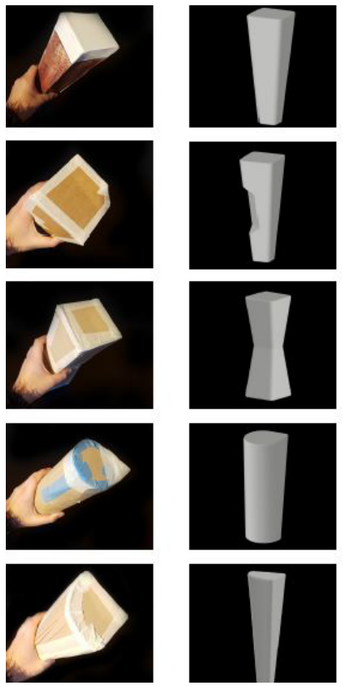


Image 24, left to right: feedback stand in the museum, cardbord and 3D models of bottle shapes

Feedback we received, both verbally in conversations and left at the test stand on post-its, showed us that the rounded bottle (test bottle 4) was public's favorite. This because test participants experienced the sharp edges of the square bottles as unfriendly to touch.
The rounded bottle was also favorite because, according to test participants, it was clear where you have to pour from the bottle. This in contrast to the quarter circle bottle (test bottle 5) which was also rounded but lacked, according to test participants, an easy and clear way to pour.

Image 25, Foodboxes stacked

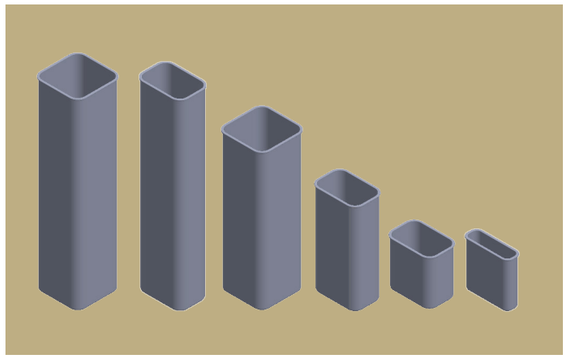
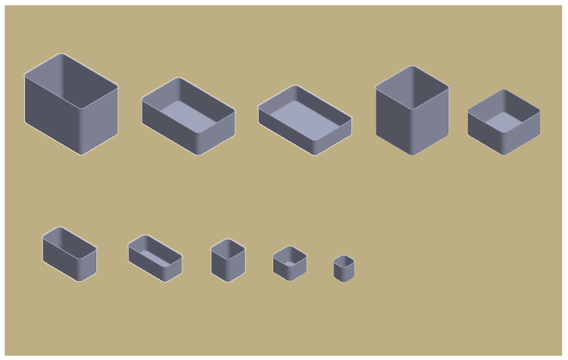



Image 26, left: bottle shapes, right: box shapes

It took multiple iterations to come to the final shape of the foodbox. Eventually the final shape was based on a combination of the feedback from tests and the connectivity with the cooling system.

Final shape: Square with rounded corners for both boxes and bottles.

Foodbox, closing the lid

In the Ask phase my team and I learned that opening and closing certain packages is experienced as a huge burden for certain groups of people (e.g. people with disabilities or people who lack the strength that is sometimes needed when opening packaging). This is why we saw the design of the lid of high importance. Next to user friendly the lid should also be able to close the boxes air- and watertight, this to elongate the shelf life of the food products and to prevent spillage from boxes that contain liquids.
After multiple iterations of clips and turning lids, we chose to continue with using magnets and a sealing edge to close the lid.
We made this decision based on testing the different lids we prototyped with two museum visitors who were parkinson patients. They both experienced the lid with magnets as the most convenient lid. This because the lid clicks itself in place once you hold it above the box and it doesn't require a lot of strength to pull the lid off again.

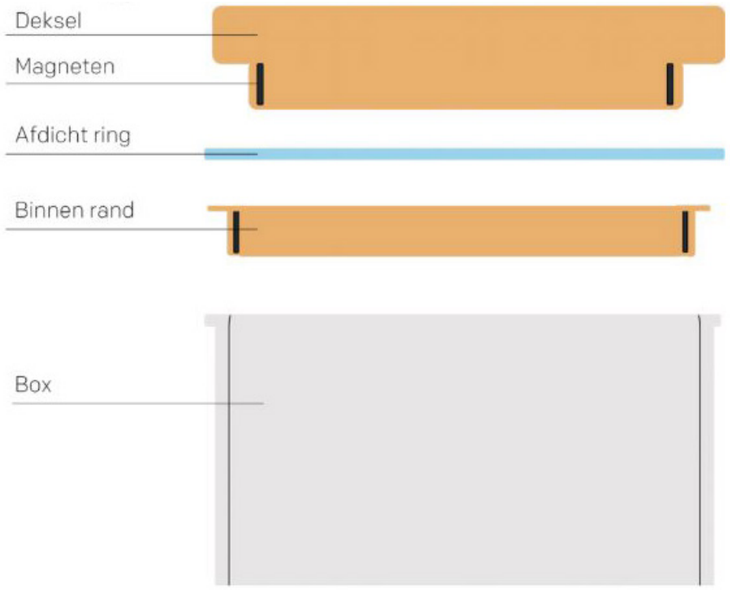




Image 27, museum visitors testing the closing closing mechanism

Cooling system

To be able to use the Foodbox as intended it needs to have to cooling element. My team and I wanted to make the cleaning of the boxes as easy and cost low as possible, and thus we wanted it to be possible to put the boxes in the dishwasher. However this limited the possibility to put a lot of technology inside the box. This is why we started to look at other ways to cool the box and show information about the state of the food product it contains to the user beside putting the technology and a screen inside the box.

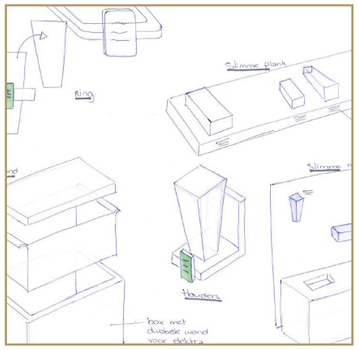


Image 28, left to right: sketches cooling system, prototyping cooling system 'Houder', prototyping cooling system 'Slimme Plank'

	Ring	Dubbele wand	Houder	Slimme plank	Slimme muur (magneten)
Het ophangsysteem is vriendelijk in gebruik	● ● ○	● ● ○	● ● ○	● ● ●	● ● ○
Het ophangsysteem kan de Foodbox effectief koelen	● ○ ○	● ● ●	● ● ○	● ● ○	● ● ○
Het ophangsysteem kan de temperatuur eenvoudig meten	● ○ ○	● ● ●	● ● ○	● ● ●	● ● ●
Het ophangsysteem kan het gewicht meten	● ● ●	● ○ ○	● ● ●	● ● ●	● ○ ○
Het ophangsysteem moet universeel zijn (One size fits all)	● ● ○	● ○ ○	● ● ●	● ● ●	● ● ●
Het ophangsysteem moet zo compact mogelijk zijn	● ○ ○	● ● ●	● ○ ○	● ● ○	● ● ○
Het ophangsysteem is makkelijk te integreren in het huidige huishouden	● ● ○	● ● ●	● ● ○	● ● ○	● ○ ○
	12/21 57%	**16/21 76%**	**15/21 71%**	**18/21 86%**	**14/21 67%**

Image 29, using the kesselring method to decide on the best cooling system looking at our program requirements

After prototype multiple cooling system possibilities we used the Kesselring method to determine which cooling system we would continue with (Image 29). The criteria used in the Kesselring method were derived from the earlier formulated program requirements (appendix page 46).

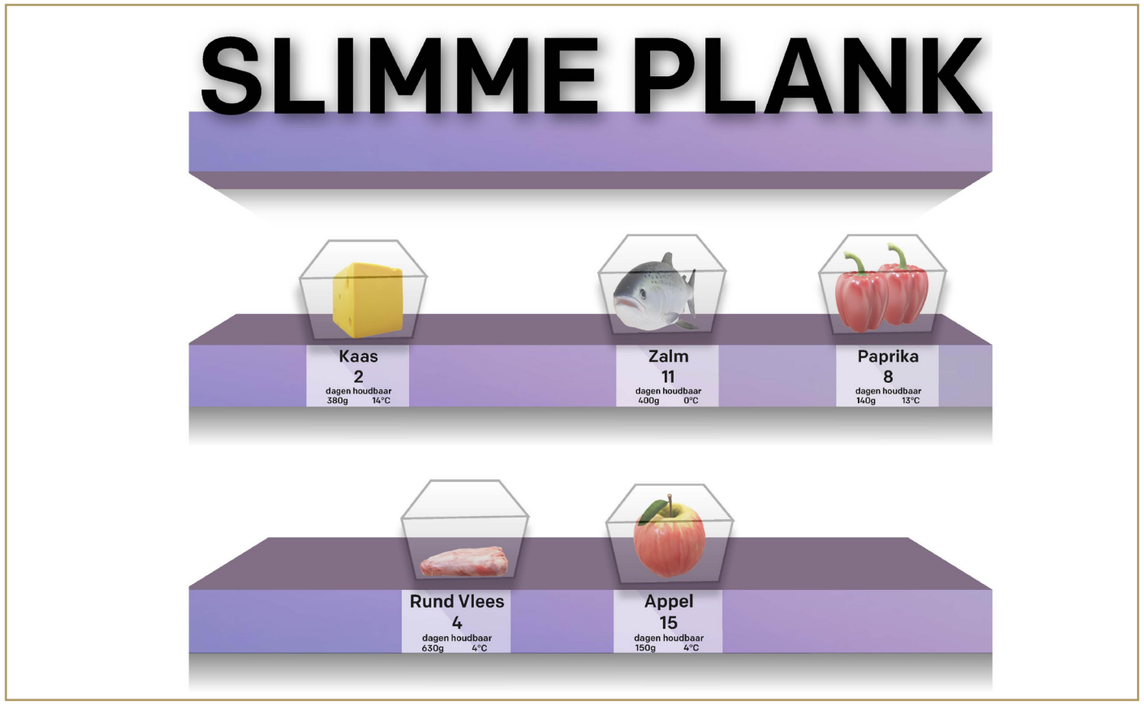


Image 30, illustration of the Smart Shelf

We continued with the Smart Shelf. On this shelf, that can be hung on a wall or be mounted in a cabinet, the user can place multiple boxes next to each other. The shelf will recognize the Foodbox placed on top and will communicate information about the content of the box to the user. Across the whole front of the self will be a large screen, this is where the shelf shows the information about the Foodboxes. On the screen below said foodbox. On this screen the user will be able to read the products name, the amount of days until it's expiration date, the temperature at which the box is kept and the box its weight. Because of this weight sensor the shelf can measure if the box has been opened (the weight will have lowered). And adjust the number of days until the product its expiration date accordingly.
The Smart Shelf will cool the Foodboxes by cooling the contact area between the box and the shelf. It will cool this area underneath each box to a different temperature, this to make sure that each food product is conserved at its ideal storage temperature. Storing at food product at its ideal temperature can gain days on the product its shelf life, thus making it a good step in preventing food waste.

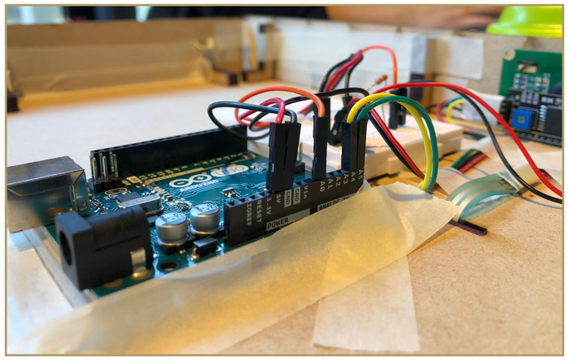


Image 31, building a working Smart Shelf prototype

Website

Beside the physical prototype is also the online experience an important aspect of our design. We created a working website (https://zinin2019.wixsite.com/zinin). Zinin being the name of our theoretical online supermarket.
The user can choose the products in the store, for now only private label, that they want and the desired quantity of the product. These products will appear in the shopping cart. In the shopping cart you indicate whether you already have the Smart shelf, that influences the choice of the Foodbox. The Foodbox without insulation or the Foodbox with insulation.
On the website the user can log in with their user data and they can see their order history. In this order history they can see each of their products separately when clicked on the relevant order or when they go to the 'my products' tab. In this tab the user can see which products they still have at home, which products are empty and how long the products are still preservable.

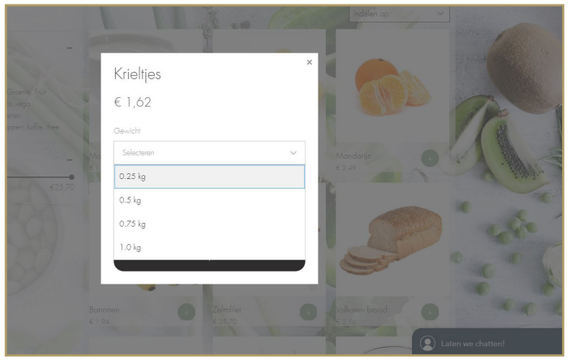


Image 32, building the company website

Branding

Together with designers Rob Vermeulen and Guido Stompff I worked on the branding of our theoretical company. By designing a logo, tagline, formulating a value proposition, and working on a marketing strategy (appendix page 47). Naming our company Zinin, with the tagline 'zinin eten, zonder afval'.

Image 33, Zinin business cards

Activities

EVENTS

Grand opening of the ‘Luxury?’ exhibition in the Cube design museum

Participation in the Hello Designer tour

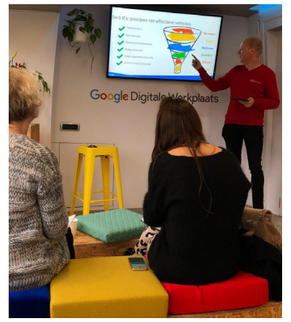
Participation in the Global Goals Jam

Assisting Guido Stompff when hosting a Design Thinking workshop for startups at Chemelot

Having a stand at the Dutch Design Week

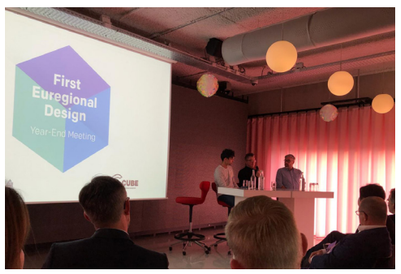
Two day long ‘design for senses’ conference

Weekly visits of the Beleefbus



Visit of the Google digitale werkplaats

‘Waste, Back to use’ conference at the Chemelot innovation and learning labs



Attendance at the first Euregional Design Year-End Meeting

Activities

Networking

The Cube design museum was an interesting place to work on my professional network as most of its visitors have in some way a relation to designing themselves. With visitors from mostly Germany, Belgium and the Netherlands this was a great opportunity to learn more about designers in the area beyond the countries borders.
Events organized by or in the Cube design museum also have this international foundation. Often with the intention to use the proximity of the border as an opportunity instead of an obstacle.
I experienced this as very inspirational, I had for example no knowledge about the size of the design scene in Aachen. It shocked me that there are so much design activities happening so close to home without me being aware of it.
I got to meet and talk to many interesting designers. Like visually impaired designer Simon Dogger working on an emotion scanner for the blind and Paulien Strijland Design and Technology executive from Silicon Valley working at the Chemelot innovation campus coaching startups. I introduced myself as a professional design student and referred to my website and online portfolio. We agreed to stay in touch via social media.
Next to the networking events I also got to use the network of the museum for my project, this leading to the involvement of 4 companies besides the Cube design museum in my project. I was the contact person of our project and received the feedback that I behaved professionally and that it was experienced as pleasant to work with me.

Image 34, speaking at events in the name of the museum

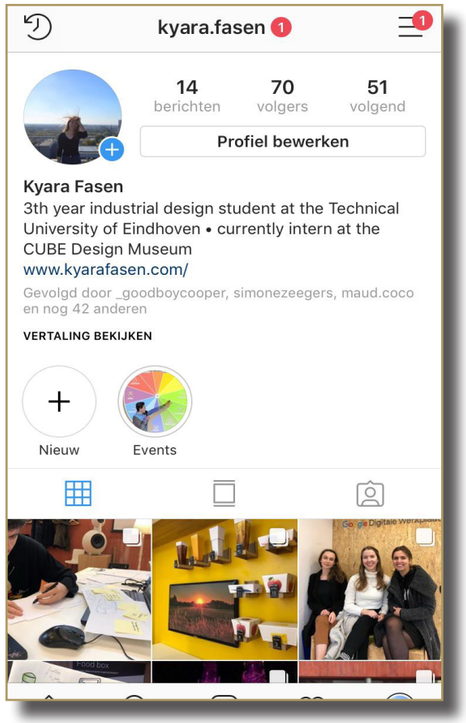


Image 35, Instagram page showcasing my projects

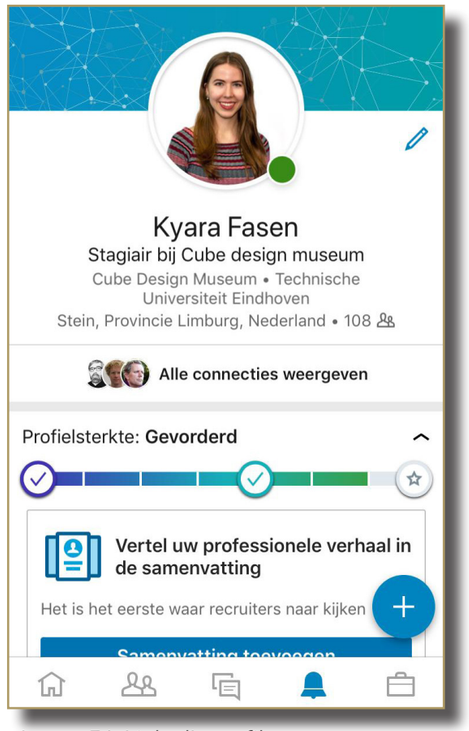


Image 36, LinkedIn profile

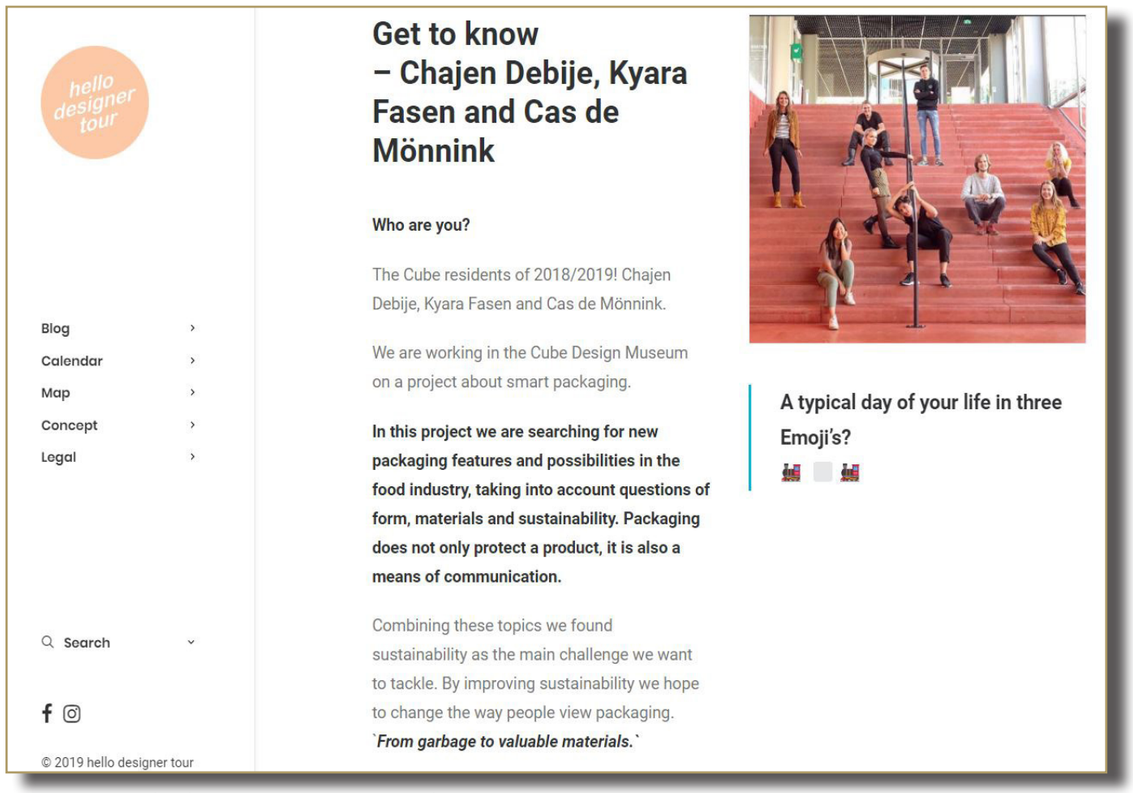


Image 37, article about my team mates and I

Results

Company

Zinin is a online supermarket that makes it possible for everybody to do their groceries without being left with packaging waste.

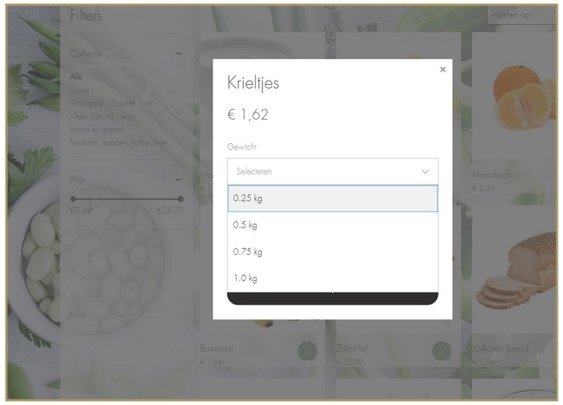
The user orders their products in the desired quantity at the Zinin website and receives the items at home (or at a pickup point) in a Foodbox. These Foodboxes are the replacement of packaging as we know it now.
Foodboxes are reusable and work with a deposit money system. The user can place the filled Foodboxes on the Smart Shelf if he or she owns one. The Smart Shelf cools the Foodbox to the ideal storage temperature of the product it contains. The self also shows its user how long the product in the Foodbox is still preservable, also after opening.

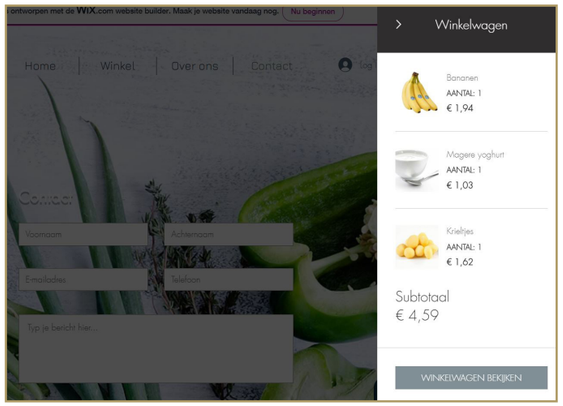
When Foodboxes are empty the user can return them in during the delivery of their next order.

Website

https://zinin2019.wixsite.com/zinin

The user can choose the products in the store, for now only private label, that they want and the desired quantity of the product. These products will appear in the shopping cart. In the shopping cart the user can indicate whether they already own the Smart shelf, that influences the choice of the Foodbox. The Foodbox with insulation or the Foodbox without insulation.
On the website the user can log in with their user data and they can see their order history. In this order history they can see each of their products separately when clicked on the relevant order or when they go to the 'my products' tab. In this tab the user can see which products they still have at home, which products are empty and how long the products are still preservable.



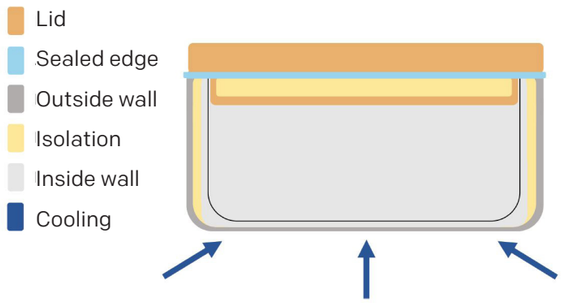


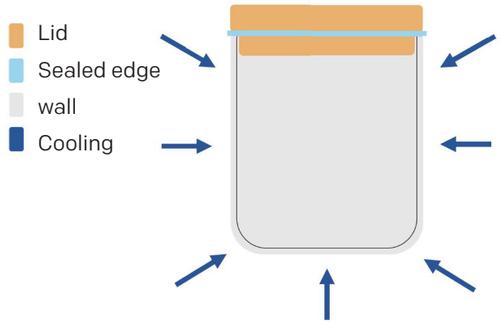
The Foodbox

The Foodbox replaces packaging as we know it. Foodboxes are reusable packages and work with a deposit money system.

When a user orders products from the Zinin website they will be delivered in Foodboxes. These Foodboxes come in different shapes and sizes to fit many different food types and order sizes. However all the boxes have the generic easy to open lid and are easy to stack, considering transportation costs.
There are two designs for the Foodbox. One for the near future, a foodbox the user can store in their fridge, and one for 10 years into the future. In this 10 years from now future Zinin is a well known brand and consumers feel secure purchasing a Smart Shelf from this brand. The Foodboxes that match the Smart Shelf are provided with a chip necessary for recognition by the shelf and are isolated on the sides so they can be stored outside the fridge.
The Foodboxes will be closed by a sealing edge and magnets. These magnets and sealing edge ensure that the boxes can be air- and watertight, but still easy

to open.

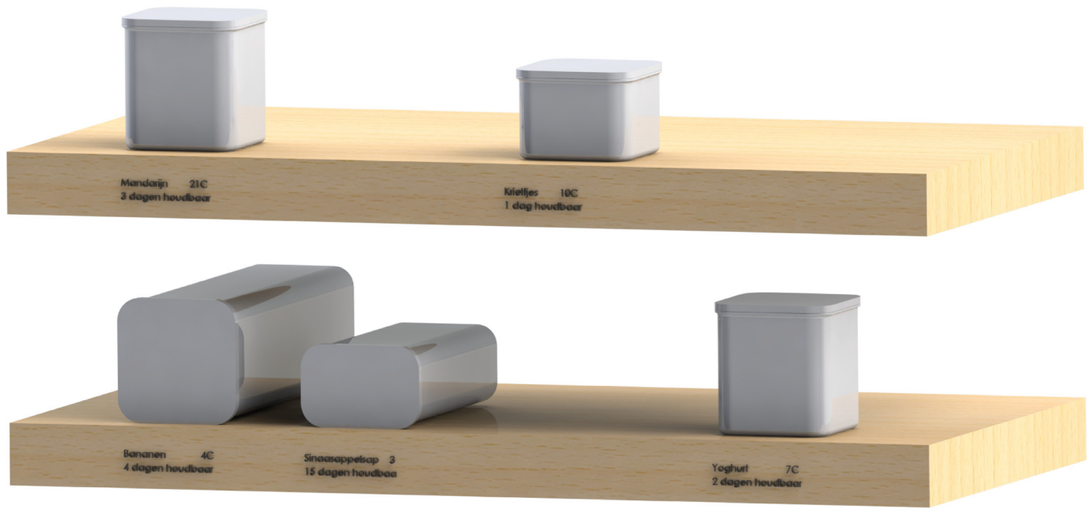




The Smart Shelf

The Smart Shelf is an interactive device that innovates private food storage. By using the Smart Shelf the user makes a step in preventing food waste.

The Smart Shelf makes it possible for its users to have a clear overview of their products and gives said food products a longer shelf life by storing it at the optimal storage temperature.
If the user places a filled Foodbox at any place on the shelf, it will recognize the Foodbox and cool the box to the optimal storage temperature of the individual product it contains by cooling the area below the box. This affects the shelf life of the product. This shelf life is measured and communicated with the user by means of showing the information on the shelf below the box and in the app/on the website.
At last the self measures the weight of the product, this makes it possible to indicate whether the box is nearly empty.



Acknowledgements

First of all I would like to thank Anja Köppchen for hiring me and giving me this great opportunity. I found it really valuable to work in such an inspiring environment as the Cube Labs.
I would also like to thank Anja Köppchen, as well as Rob Vermeulen and Nina Simons, for taking the time to coach me. Not only within my project but also helping me to grow within my personal goals. Furthermore I want to thank my teacher coach, Matthias Rauterberg. For guiding me in formulating the right goals.

At last a big thanks to everyone at Cube for making me feel so welcomed from day one. Working in the labs was a great experience and a big part of it is because I had all these talented, supportive and kind people by my side: Chajen, Cas, Rick, Levy, Thomas, Nina, Jessica, Tippayaporn, Geordi, Jur and Sjuul. I learned so much from you and I will miss our fun work days!

Image 36, Cube design museum interns 2018-2019

References

REFERENCES
1. Cube design museum. (n.d.). Cube In Residence Programme. Retrieved January 7, 2019 from https://www.cubedesignmuseum.nl/en/node/517

2. Milieu centraal. (n.d.). Verpakkingen. Retrieved January 7, 2019 from https://www.milieucentraal.nl/minder-afval/verpakkingen/

3. Meldpunt Verpakkingen. (2014, February 26). Voor mij hoeft die plastic dop niet! Retrieved January 24, 2019 from https://meldpuntverpakkingen.nl/inzendingen/4156/voor-mij-hoeft-die-plastic-dop-niet.html

4. Open HPI D-Scholl Potsdam. (n.d.) Brainstorming techniques [Video]. Retrieved January 24, 2019 from https://open.hpi.de/courses/ideas2018/items/49tYjR7iGHCSMavDSuDRmQ

5. Stompff, G. (2018). Design Thinking. Amsterdam, Nederland: Boom.

6. Vermeulen, R. (n.d.). Contact. Retrieved January 7, 2019 from https://www.robvermeulen.design/contact/

7. Walschots, J. (2017). Het mandje van de consumentenprijsindex, de bestedingen van consumenten en de meting van de CPI in 2017. Retrieved January 24, 2019 from https://www.cbs.nl/-/media/_pdf/2017/06/het-mandje-van-de-consumentenprijsindex%20(1).pdf

8. Wu, A. (2014, July 18). Good product, bad package: top sustainable packaging mistakes. Retrieved January 24, 2019 from https://www.theguardian.com/sustainable-business/2014/jul/18/good-product-bad-package-plastic-recycle-mistakes

IMAGE REFERENCES
1. De Wit, R. (2016). Gevel Cube design museum [online image]. Retrieved January 7, 2019 from https://www.nationalestaalprijs.nl/archief/2016/projecten/karakteristieke-stalen-bouwdelen/cube-design-museum

2. De Wit, R. (2016). Gevel Cube design museum [online image]. Retrieved January 7, 2019 from https://www.nationalestaalprijs.nl/archief/2016/projecten/karakteristieke-stalen-bouwdelen/cube-design-museum