

Creating a Design Tool:
**Designing for the End-of-Use
Consumer Experience
in a Circular Economy**

Master thesis by Hanna Timmerman



CREATING A DESIGN TOOL: DESIGNING FOR THE END-OF-USE CONSUMER EXPERIENCE FOR A CIRCULAR ECONOMY

A design tool to enable designers to understand the current consumer experiences and design new experiences for the end-of-use of circular products

Master Thesis

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PREFACE

This is the report containing my graduation assignment for the study Design for Interaction at the faculty of Industrial Design Engineering from the Technical University of Delft. For the past nine months I have worked on this assignment and this report is the outcome of my project.

This project has been the perfect way to combine my interests in sustainability, consumer behaviour, and design. I believe that change is necessary and that the design world must shift towards sustainable and circular design as being the norm. In the process of changing this mentality, the consumer must not be forgotten. Everyone has to work together to achieve this movement and create a positive impact on the world. I hope that the results in this report can contribute something to that shift.

I want to thank my supervisory team for the guidance during this project. The feedback I received from them made me view my findings and process with a critical eye and inspired me to dive deeper into the content, trying to improve my work. But most of all, I want to thank them for their flexibility and reassurance, allowing me to take the time to first take care of myself while working on my graduation.

Furthermore I want to thank my fellow students that participated in my tests. These tests were essential for my process and I am glad that they were willing to give me some of their time.

Hanna

EXECUTIVE SUMMARY

This report provides an analysis of the consumer experience at the end-of-use phase of a product. The study in this report focussed on the consumer-product relationship: how this plays a role in the process of product detachment, and what this means for products at the end-of-use, with a specific attention for products in a circular economy.

This end-of-use phase has been analysed with the goal of creating a design tool that enables industrial design students to design for the end-of-use consumer experience.

The analysis of the consumer-product relationship has been done through literature research and the development of the tool has been an iterative process. On the basis of the theoretical findings, a framework of detachment was developed that served as the basis for concept development.

The consumer-product experience consists of four main phases: pre-use, starting, use, and closing. The first three receive much attention from researchers and designers, resulting in tailored and positive experiences in these phases. Consumers are guided and stimulated to buy and use a product. The closing experience, on the contrary, has not received that same amount of attention and is disregarded or is denied altogether by companies and designers (Macleod, 2017). The consequence of this lack of interest by companies is that there are indifferent or even negative closing experiences.

By recognizing the end-of-use phase and closing experience, designers can try to design experiences that will be beneficial for a circular economy. Through designed end-of-use experiences designers can manage their products at the end-of-use and eventually control where they will end up. This would be beneficial for circular products that need to be returned to the loop after use.

A theoretical framework of detachment is developed that shows the process of consumers when wanting to detach themselves from their possession. This framework is based on the works of Roster (2001) and Türe (2014). The detachment process consists of two parts: (1) dispossession, which is the mental process of distancing yourself from the product, and (2) separation, which is the physical act of removing the product from your life. During the dispossession process, the consumer evaluates the product on what it is still worth to him and shows a dispossession behaviour to enable himself for physical separation.

To be able to design for the end-of-use experience, designers need to comprehend the detachment process, the consequences of the dispossession behaviours and need to be able to apply this knowledge into designing an end-of-use experience.

The developed design tool enables design students to analyse the detachment process with the use of consumer-product lifecycle, and recognize where opportunities lie for an end-of-use experience by reflecting on the lifecycle and defining a design goal, concluding the analysis. The tool will be used in a workshop context, where the students are introduced to the concept of detachment and the consumer experiences at the end-of-use. They are supported to find opportunities for which they could design a new end-of-use experience that stimulates their consumer to keep their product in the circular loop.

GLOSSARY

Some of the vocabulary used in this report is new or not generally known. Therefore, the terminology used in this report is explained here. In this way, everyone will have the same interpretation. The definitions are made according to my own interpretation and opinion on how well they describe the meaning.

Circular Economy

A circular economy is a new system where old products are used to generate new ones. Materials and product are kept in the system for as long as possible, relieving the strain on the earth by decreasing raw materials mining (Ellen Macarthur foundation, 2013).

Consumer experience

The positive or negative response consumers have to any direct or indirect contact with a company through products and services based on their perceptions and emotions (Richardson, 2010; Meyer & Schwager, 2007).

End-of-use

The end-of-use of a product is defined as the phase in a products' life where the product owner does not want to use the product anymore. However, most of the products at the end-of-use are still functioning. In this project, the focus will be on the end-of-use phase for non-broken products, because here lies an opportunity to avoid unneeded waste.

End-of-life

The end-of-life of a product is defined as the phase in a products' life where the product has broken down and has stopped functioning. The product can not be used by its owner anymore for its function. The end-of-life is also an end-of-use scenario because the product cannot be used (figure 0.1).

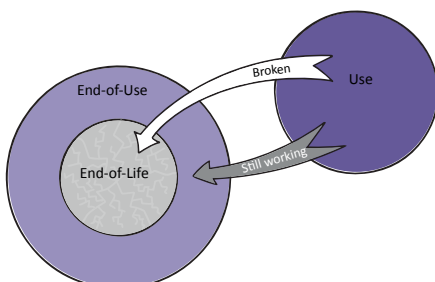


Figure 0.1: Visualisation of the difference of end-of-life and end-of-use

Product Detachment

There are various terms considering detachment, such as divestment, disposition, disposal, dispossession. The ones used in this report are chosen on how well they represent perception on product detachment the most (figure 0.2).

Detachment, this is the process of removing your possession from your life. The possession being a product that you own. Detachment consists of two parts, dispossession and separation.

Dispossession is the mental process of distancing yourself from your possession. This process is supported by dispossession behaviours. Those behaviours will be explained later in this report.

Separation is the final act of physically distancing yourself from your possession. Different ways of separation between owner and product will be illustrated later in this report.

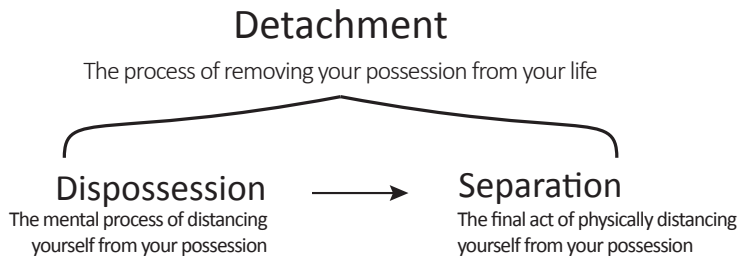


Figure 0.2: Visualisation of the term detachment

Values

Products are evaluated by consumers to decide how much it is worth to them. The product is evaluated on the financial, psychological and functional values determining its worth.

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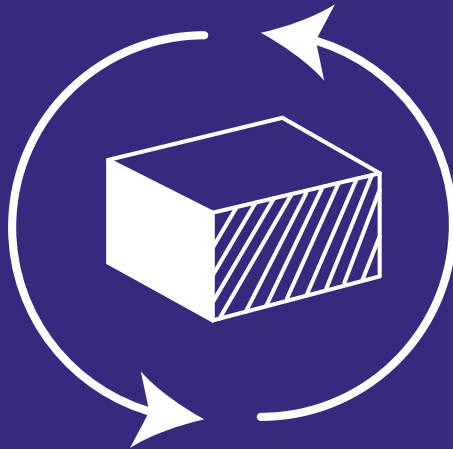
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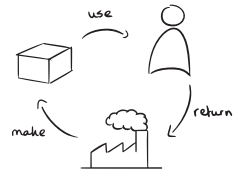
CHAPTER 1

Introduction



1. INTRODUCTION

Nowadays, companies and designers acknowledge that changes have to be made considering the high consumption patterns. These consumption patterns, which are now a linear take-make-waste pattern are harmful to the environment (Ellen MacArthur foundation, 2013). The ideas of Sustainable and Circular design are spreading, and the implementation of those concepts have been increasing steadily among designs and businesses. In a Circular Economy, products are made from resources provided by old used product and materials. They cycle through a loop, getting a new life each time.



A large part of this cycle is in the hands of the company. They can design and implement different materials, components and techniques to make a product circular. However, for consumer durables, the consumer becomes a part of that cycle as well. This means that after the product being owned and used by the consumer, it has to go back into the loop and function as the supply for new products.

However, there has not been a lot of attention for the consumer side in a circular economy even though this is essential to keep products in the loop. Moreover, the end of a consumer-product relationship has not received much attention from researchers and designers.

1.1 RELEVANCE

The part of ‘what happens after use’, the end-of-use phase and the elements within have not been explored by designers yet, and thus do not know how to apply that into a design. This is in stark contrast with the studies and methods available for the Pre-use and Use phases.

Therefore, this project will contribute to the field of Industrial Design by combining the different theories and pieces of information on product detachment together, and presenting designers an overview of the detachment process and the elements within.

1.2 GOAL

In this report will the consumer-product lifecycle be explored, with a focus on the consumer experiences at the end-of-use resulting in product detachment. The findings from this study will be translated into a design tool with the goal of creating awareness among designers about the existence of the end-of-use phase and the relevance for maintaining a circular economy. The main research questions for this project are:

- 1. How does a consumer detach himself from a owned possession?**
- 2. What are the current end-of-use experiences in this detachment process?**
- 3. How can these findings be translated into a design tool?**

To answer these questions, the project is divided into two parts.



Theory exploration

Different literature and theories available on the consumer-product lifecycles, consumer experiences, end-of-use, and detachment will be explored.



Concept exploration

Using research through design, different iterations of concepts of the tool will be tested to explore which methods and techniques can be use best.

1.3 APPROACH

First, the context of this project will be described. Chapter 2 describes the current education on circular economy and consumer experience for industrial design students. What are they being taught and what could still be added? The tool will be used for educational purposes. Having insights in what design students are currently capable of and what they are being thought about designing will give direction to what the tool should address about the end-of-use, where it would fit, and which methods can be used.

After defining the projects' context this study will explore the consumer-product relationship. To be able to design for consumer experience, it is necessary to understand how this experience is being built, and how the consumer-product relationship evolves. Chapter 3 will investigate the consumer-product lifecycle, trying to identify the current pain points in this cycle and especially at the end-of-use.

The pain points leave room for improvements at the end-of-use phase. But what does this end-of-use phase look like, and which experiences are evoked in this phase? Chapter 4 shows the exploration in the end-of-use phase and detachment process. The aim is to identify which elements play a role in the end-of-use experience and what the detachment process looks like.

Conclusions will be drawn from the findings and insights gained in the study. These conclusions will be used to create a scope for the tool that will be developed. Chapter 5 describes the design goal and scope of the tool.

The development of the tool will have an approach of research through design. Through concept iterations and testing will be explored what will work best to achieve the goal of the tool. Design questions (how to's) will give direction on the shaping of the tool and which methods and techniques are tested. Chapter 6 will describe all the concept iterations that have been developed and tested.

At the end of this iteration process, one final concept will be presented. The learnings of the tests are implemented into the final concept. Chapter 7 will show and explain this final concept of the tool, and final recommendations are made for further improvement.

To end this report, the project and process will be evaluated in chapter 8, conclusions will be drawn to answer the initial research questions, limitations of the chosen research methods are taken into consideration, and recommendations are made for future research.

CHAPTER 2

Design education and Circular Economy



2.1 INTRODUCTION

In this project will be researched how designing the consumer experience at the end-of-use of a product can be beneficial for products in a circular economy. Chapters 3 and 4 will dive into the current consumer experiences and the experiences at the end-of-use. This chapter will provide the context of this project and how it has originated.

In a circular economy, products at their end-of-use will be used as resources to generate or fix new products. Product endings are seen as an opportunity. Beforehand, it is thought out what second life (and third etc) it will have.

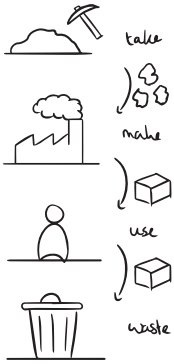
What is crucial in this type of economy is that the old products must come back at their end-of-use since they are the supply to create new ones; the loop has to be closed. And specifically for this research: what is the role of the consumer in this loop?

The concept of circular economy is slowly gaining ground in the design world. When looking at design education, what are design students being taught on circular economy? And more specifically, what is being taught on endings for both products and consumers?

The goal of this project is to create a design tool for design students. In order to do that, it needs to be explored what design students currently learn and know about the general design process, and in particular about circular economy. Having an overview of what their current skill set is can lead to finding which competences they are still lacking to design a successful circular product. The tool could then fill in that gap.

This chapter will explore the current curriculum of design students. What is the basis of the current design education students get taught? Which are the competences designers need to make a realistic/successful circular product? Which of these competences are being taught to design students at this moment? And finally, where and how can students be supported in completing their skill set?

2.2 A CIRCULAR ECONOMY

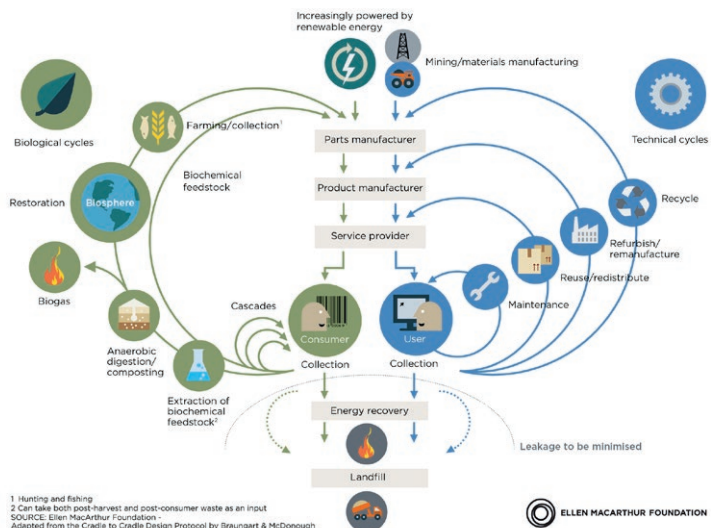


A circular economy (CE) is an industrial system that is restorative or regenerative by intention and design (Ellen MacArthur foundation, 2013). It replaces the current take-make-dispose patterns with an end-of-life concept with restoration with a closed looped system. A product could either enter the biological cycle or enter the technical cycles. This project focuses on products that are in one or more of the technical cycles.

The four lifecycle scenarios are reuse, repair, remanufacture and recycle, a product, material, or component could cycle through each of these loops. Figure 2.1 demonstrates the different cycles that a product or material can go through. This project will look at products that loop through the three outer cycles of Reuse, Refurbish and Recycle.

Furthermore, it aims for the elimination of waste through the superior design of materials, products, systems within business models, and shifts towards the use of renewable energy sources. This is different than the current practices, where companies extract materials from the earth, use them to create and manufacture a product, which is sold to a customer, who after using will discard it. The product will most likely end up in a landfill or will be incinerated. However, there are limits to these production- and consumption patterns, such as resource depletion and a polluted environment.

CIRCULAR ECONOMY - an industrial system that is restorative by design



1 Hunting and fishing
2 Can take both post-harvest and post-consumer waste as an input
SOURCE: Ellen MacArthur Foundation - Adapted from the Cradle to Cradle Design Protocol by Braungart & McDonough

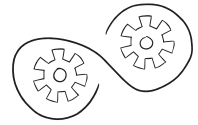


Figure 2.1: The butterfly diagram (Ellen MacArthur Foundation, 2013)

Even though there is an increasing awareness about the problems and limitations, design changes that are currently implemented focus more on resource efficiency, and new forms of energy are explored. But the key of CE is to ‘design out’ waste completely, which has been given less thought by designers so far (Ellen MacArthur foundation, 2013).

2.2.1 CREATE SYSTEMS

Although a circular economy revolves around making products having no bad effect on the environment, it is more than just designing products to be regenerative and using clean energy. It is a completely different form of business model that has to be implemented. Products need to be returned, sorted, disassembled, the materials need to be repurposed, a new product needs to be made, and presented back to the consumer. An entire system has to be created around a product in order for it to be in a closed cycle. Within this loop there are many different stakeholders that are not there in the linear economy. For example, starting with the consumer who takes the initiative to return the product instead of throwing it into the bin, a transporter of returned products, a collector of those products, a disassembler, and a remanufacturer etc. This is considerably more than just a waste collector who will incinerate the collected waste.



2.2.2 ADVANTAGES OF A CIRCULAR ECONOMY

The advantages of a circular system go beyond a neutral or positive environmental impact. The economy will benefit due to material savings, a decrease in raw material costs, decline of uncertainties and supply risks, and more employment in creating a user-centric economy (Ellen MacArthur foundation, 2013).

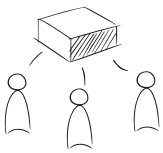
By building products that last, companies can reduce their material bills and warranty risks. Furthermore, they can implement a business model providing services, such as leasing, and setting up contracts with their consumers. They can analyse their consumers’ behaviour and preferences, and create a better fitting service according to these insights. This and product reliability could enable a positive brand experience,



resulting in brand attachment and loyalty (Mugge, Schoormans & Schifferstein, 2005).

For consumers there are additional benefits as well. Naturally, the price of a product changes, because the product is not made of expensive raw materials anymore. But additionally, premature obsolescence is reduced in built-to-last products, which decreases the number of times the product needs to be replaced.

Part of a CE is that companies can tailor products to a consumers' needs. This means that there is more choice and personalisation for the consumer. However, this will require some more input from the consumer than with 'regular' products.



2.2.3 FROM CONSUMER TO USER

What will change for the consumer in this economy, is that the concept of a consumer is being replaced with that of a user (Ellen MacArthur foundation, 2013). Instead of buying a product and consuming it, products are shared, leased, or rented whenever possible. If products need to be sold, contracts are set up to ensure the return after use.

However, as later will be explained, people like to have ownership over their products. This would mean that leasing will not always be the best way to bring the product to the customer. Therefore, the decision made to keep using the term 'consumer' in this report.

2.3 DESIGN EDUCATION AND CE

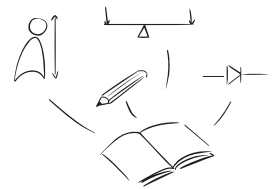
Strengthening the skill set of designers, entrepreneurs, engineers, product managers, etc, will help in having a bigger group of people re-evaluate and change the current linear patterns (Ellen MacArthur foundation, 2013). Knowing how design decisions influence the supply chain, is necessary for designers to support the closed-looped system (De los Rios & Charnley, 2017). Designers should know about the design strategies they can use to develop a sustainable or circular product and understand which one they should apply per design case. They should know the different end-of-use treatment and recycling processes that are

available, and the advantages and drawbacks of the application of recycled materials in products (Bakker, Wang, Huisman & den Hollander, 2014).

So with the realization that the current linear economy is not sustainable and maintainable anymore, the introduction of the idea of a circular economy, and acknowledgement that education will benefit the circular economy, it raises the question on how this is being implemented in the design education, and where opportunities lie for design tools.

2.3.1 THE BASIS OF DESIGN EDUCATION

Currently, in the design education little time is spent on sustainability and circular economy. When looking at the curriculums of TU Delft (TU Delft, n.d.), and also from the University of Twente (Universiteit Twente, n.d.), both bachelor programs are touching upon the development and form giving of products in general, technical courses such as statics, electronics and mechanics, design courses such as sketching, graphics, 3D modelling, strategies for business models and system engineering, and some social courses on human factors and human-product relations. TU Delft has one course in the second bachelor year called 'Design for Sustainability'.

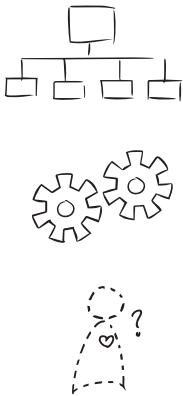


The basic educational books on industrial design such as the 'Delft Design Guide' (Van Boeijen et al, 2014) and 'Productontwerpen' (Eger et al, 2004) have little to nothing about sustainability, circularity, or responsible design. However, students can choose to follow courses on these topics in their minor or in the master elective space.

Having done my bachelor Industrial Design at the University of Twente, the standard design process that was being taught to me ended at having a final concept. This concept was thought out on paper but was not actually produced. I did not see the consequences of the product being produced. I did not have to think about the actual manufacture process in detail, what waste was created during the manufacturing process, and what happens with the product after use. At most, I had to select a recyclable material from which the product should be made.

However, designing how these products could be returned and dissected so that they can be recycled, or what to make with the recycled materials is still missing in the design process.

Designing for a CE means that the process consists of actively thinking and designing the end of the product. This is not being taught in the current bachelors' education programs.



2.3.2 CIRCULAR DESIGN COMPETENCES

The existing materials and methods for designers and circular economy are mostly focussing on circular business models and the technical aspects such as materials and recycle processes, but are not showing the bigger picture (De los Rios & Charnley, 2017). There are some overviews of different types of circular business models and design strategies for creating products with a longer lifespan (Bakker, den Hollander, Hinte & Zijlstra, 2014). When looking at the methods from the Circular Design Guide of IDEO (IDEO, 2017), the categories used to accommodate their design tools are: Understand (circular economy, products), Define (challenge, opportunities, business model), Make (product design, concept development, material choices), Release (product journey, launch) , and Advanced (material journey, product redesign, material selection). In the Make category, is one about user-centred research, which stimulates to talk with stakeholders from the whole process. This is not particularly specified for users, but also manufacturers. What is striking, is that there is a whole category for how to release your product/service/business model, but there is nothing on how to gather or collect your products.

However, the aspect of the consumer experience with a circular product or business is not yet a part of the available methods or strategies. Next to understanding the technical aspects of the products, understanding user experience and consumer behaviour is an important skill as well (De los Rios & Charnley, 2017). Through an understanding of user experiences and consumer behaviours, they would be equipped to meet customers' needs in circular business models. Moreover, with consumer durables, consumers are a link in the loop as well. If the consumers' needs, capabilities, motivations are not

being considered in the design process, the product could be (unintentionally) removed from the loop, by for example it being thrown away instead of returning it to the retailer.

Being aware of your consumer, and understanding their behaviour can be considered important for improving the design, to increase the chance of keeping the products in the closed cycles. For the company, this could mean having better control over their products.

It is different to work with individual customers and circular products than with business-to-business cases, where contracts are drawn up saying that the products used/leased should be returned (Ellen MacArthur foundation, 2013). There are no emotional attachments with business-to-business contracts preventing products to enter the cycle because there is no personal ownership.

2.3.3 DESIGN EDUCATION AND CONSUMER EXPERIENCE

Consumer experience itself is not a new subject. Both bachelors programs at Delft and Twente, have courses on human-product relations. The University of Delft has an entire master program dedicated on understanding experiences and interactions consumers have with products, companies, and with other consumers, called Design for Interaction. Examples of methods being taught in this master are Customer Journey (Van Boeijen et al, 2014), Mood-measurement with Pick-a-Mood (Desmet et al, 2016), Context mapping (Sleeswijk Visser et al, 2005), interviewing, observation, and co-creation (Sanders & Stappers, 2012).

The aim of these methods is to understand the context and situation, and the behaviours and experiences consumers have in these situations, getting to the core of problems, and come up with fitting solutions.

However, these techniques and methods would also be beneficial to apply to circular products, business and services. Especially since consumers are a part of the loop (maybe without even always knowing it), and will be essential to close the loop. Contradictory to in a linear economy, where the consumer is the 'second to last-station' before being burned or buried in a landfill.

2.4 CONCLUSION

In a circular economy, the current linear 'take-make-dispose' pattern is replaced by a circular pattern that revolves around seeing and using waste from old products as resources for new products and materials. Old and used products are either given a second life, or used to give life to another product.

In this closed-loop system are consumers a link in the life of the product, and are essential to close the loop. Designers should be aware of this and be able to work it into their design.

Yet, currently, the basis of design education is limited in their teachings about circular economy. The focus lies on the basic design process, technical courses, design courses, and strategy courses. There is only a small portion that revolves around sustainable, durable, and circular design.

In the methods and tools available for circular design, the focus lies again on the technical and strategic aspects. Yes, these are valuable skills for designers to have when trying to design and implement a circular product. However, what is still missing is the consumer side in the circular methods and education, which should also be part of the skillset of a designer that works in a circular economy. Moreover, there are tools and methods available to research the consumer context and experiences, but these are not applied in - or transformed to the context of circularity yet. This could be an opportunity for the tool that will be created in this project.

But what part of the consumer-product experience is of significance for designers to be able to focus on in their project? Where do opportunities lie for companies to create a better customer relationship? And in the end, have more control over their products. The next chapter will explore the current customer-product lifecycle, and how their relationship and consumer experience behave and change over time.

CHAPTER 3

The consumer product experience



3.1 INTRODUCTION

In order to be able to design for consumer experience, it is necessary to understand how the consumer-product relationship evolves, and which experiences accompany this relationship. When having insights into this relationship, a designer can see what is missing or going wrong and thus where opportunities lie. This chapter will look into the consumer-product lifecycle, what it currently looks like, and which experiences are involved with the goal of identifying the pain points in the life cycle that could influence the consumer behaviour when it comes to behaviours beneficial for a circular economy.

3.2 CONSUMER PRODUCT LIFECYCLE

The consumer-product lifecycle will be discussed here for products that are being owned by consumers, lease/rent/loan-products are left out of the scope.

Joe Macleod (2017) has created an overview of what a regular consumer lifecycle looks like. Starting with the period before the consumer actually has the product. The consumer feels a need to buy that product and makes some considerations before purchasing it. When purchased, he/she will use the product for the first time and continue using it. The use period will be followed by the closing phase, where the consumer lifecycle comes at its end.

An adaptation of Macleod's consumer life cycle is portrayed in figure 3.1.

Each of these moments in the cycle come with certain experiences which will be described in this chapter. The consumer lifecycle experiences have been divided into four phases: Pre-use experiences, starting experiences, use experiences, and closing experiences.

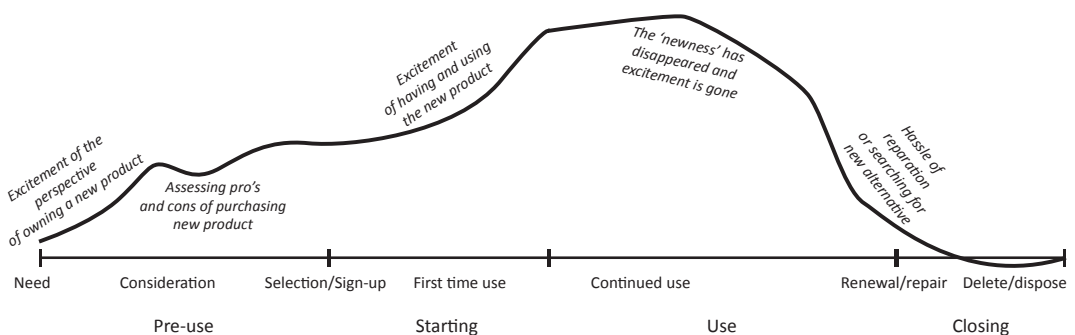
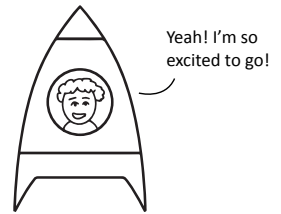


Figure 3.1: The consumer lifecycle (adapted from Macleod, 2017)

3.3 PRE-USE EXPERIENCE

The pre-use experience is the period before the consumer purchased the product. Advertisements and marketing strategies on tv, online, or in the physical store, showing consumers how their life will be (better) when they would purchase the advertised product. The need for the product is created by implying your current situation is not good enough, and this product will improve it considerably, that is why you need to buy it (Macleod, 2017).

The packaging is designed to grab attention, giving the first feeling of the brand personality, and how that reflects on self-identity (Belk, 1988). Which is possibly followed by a product purchase. The pre-use phase is mostly being persuaded to buy some product.

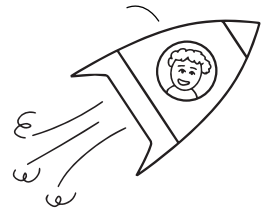


3.4 STARTING EXPERIENCE

After purchase, the first experience the user has with his new owned product is unboxing it, thus opening the package before using the new product for the first time. On YouTube you can find countless unboxing videos where the whole process of unpacking the packaging of a product is filmed and commented with either excitement or disappointment. Unboxing should be regarded as a critical moment in the experience, and be used as a touch point which designers should create and design to deliver positive emotions (Bae, 2016). By seeing unboxing as a ritual rather than a regular event, designers can create a controlled experience to make consumers feel certain desired emotions. And as a company you want your customer to have a positive first experience to, among other things, build a reputation (Dazarola, Torán & Sendra, 2012).

By creating an exciting first experience with the product, the user will take this feeling with him during further use.

Wow! This is a great start!



3.4.1 ONBOARDING

For using digital products, such as an operating system, an app or game, there is no physical aspect of unboxing. But it is still important for these type of products and services to have a good initial experience, otherwise the user will stop using them



quite quickly, or prevent them from buying the next release. This process of creating a good first experience is called onboarding. Onboarding is a method that can help people progress and advance from a novice into an expert or master (Nah, et al, 2013). Originally it is a term used in the business context to refer to new employees finding their way at a new employer, learning skills, company etiquettes, and the extra necessary knowledge to become a well functioning and effective employee (Renz, Staubitz, Pollack & Meinel, 2014).

But this term is now used to indicate the improvement of the user experience as well as the user engagement. In the gaming world, what lessons were learnt is that the first minute a player engages with a game and system, are the most important (Zichermann & Cunningham, 2011). This is where most decisions are made by the player. When the challenges require skills and/or abilities at a higher level than the player currently has, anxiety and doubt could cause to give up. Therefore onboarding is important to keep the user engaged (Nah, et al, 2013).

Translating this to digital products, such as computer programs, websites and apps, onboarding will be of significance as well, to have the users stay with the product after the first experience. The first experience the user has with a product sets the tone for the rest of the usage experiences (Roth, n.d.). Therefore it is essential to have a good first experience, otherwise the consumer is not going to stick around.

Helping the users through the system, slowly increasing the complexity with each step, delivering positive feedback, preventing them for the earliest possible fails, and let the user get to know the system and the system the user will create a positive first experience, and increasing the chance of the consumer staying with the product (Roth, n.d.). Maximizing the value and effect of the first time use, training and engaging the user without overwhelming him/her (Zichermann & Cunningham, 2011)

The increasing awareness about this subject results in smooth onboarding processes where the user is guided step by step to set up an app, is made to feel comfortable and ensured, and are helped without the feeling of being helped. A nice example of good onboarding experiences are games, where you learn how to operate the controls and learn about and access different features step by step.

EXAMPLE ONBOARDING

Figure 3.2 shows an example of how AirBnB onboards their new users. The user can choose how to register, either via Facebook, or create an own account with AirBnB. It is really easy, and straight forward. It uses a personal approach, with questions directed at you, such as ‘What is your name’ instead of just ‘Fill in your name’.

When you completed your account, the same personal approach is used to help you search for an accommodation.

It was really fast to create an account. Will it be this easy to delete your account as well?

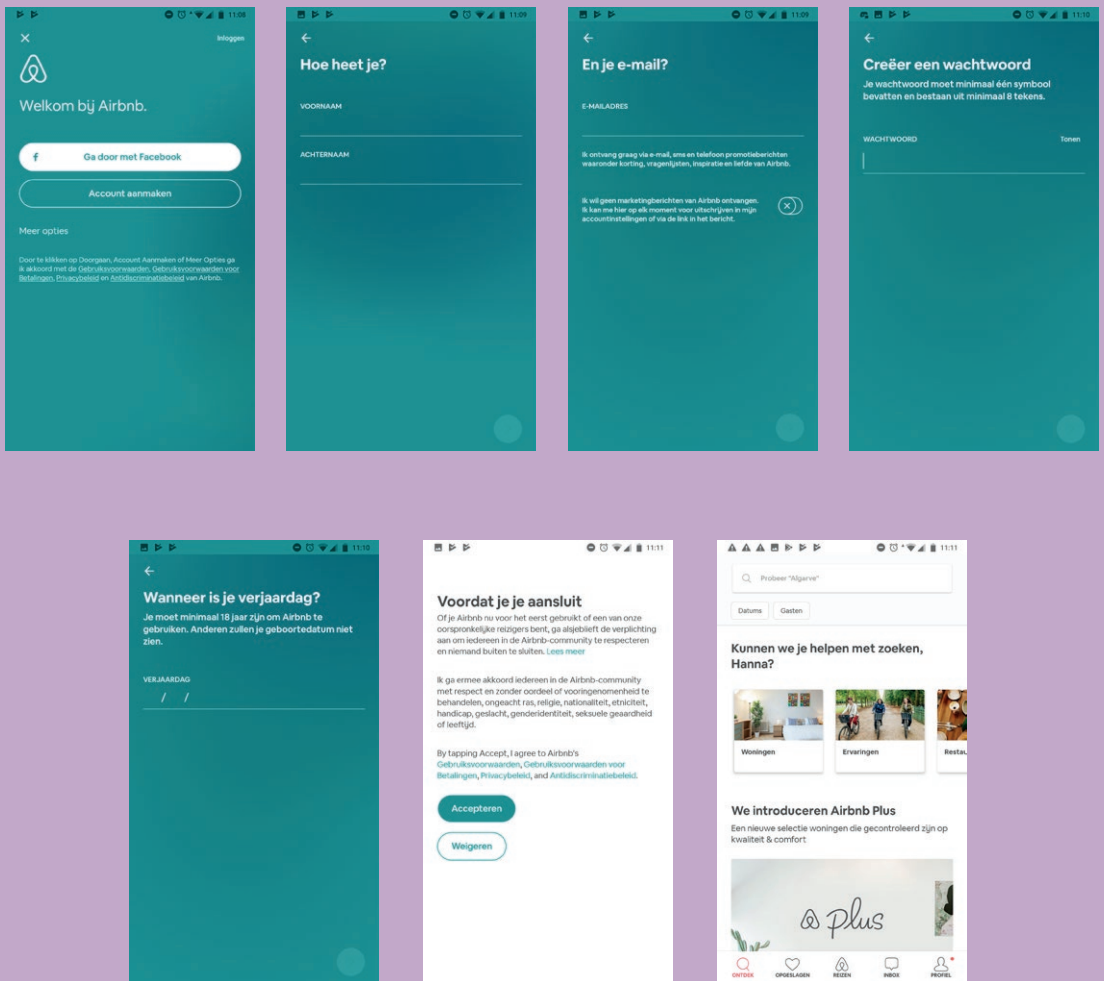
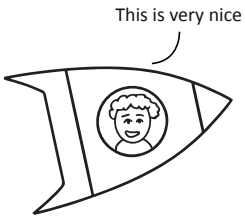


Figure 3.2: Screenshots of the AirBnB app of the process of registering a new account

3.5 USE EXPERIENCE



When designing a product, designers think about the ease of use of a product, the ergonomics, the functionalities, and other attributes that will create a positive use experience. These are the first things taught during an education in industrial design. Questions are asked such as: Who is your target group, what do they want, what do they like, how do they use the product, and how can you adapt the design to their wishes and characteristics. Designers look for example at the colour of the product, from which nice material it should be made, how the handle should feel, how the buttons should feel and sound when pressing them, and if the hinge is running smoothly. These are examples of all sorts of product characteristics that are deliberated and designed when creating a product to ensure a positive use experience (Eger et al, 2004).

However, not only the physical attributes and the ease of use contribute to the product experience. There is an emotional experience as well, which arises from the aesthetic experience, and experience of meaning (Desmet & Hekkert, 2007). Desmet introduced a basic model of product emotions where three variables evoke an emotional response. Figure 3.3 shows the basic model of product emotions. The model indicates that emotions arise from encounters with products that are appraised as having beneficial or harmful consequences for the individual's concerns. Concerns could be for example a concern for safety, but also the feeling of belonging to a group. Whenever the product cannot measure up to the concerns, the consumer will think of stopping to use the product. Especially when this happens sooner than the user expected, it will afflict the brand image. Appendix 1 shows examples of possible concerns and appraisals for smartphones. These examples will be the basis for my initial idea generation and formulation of my project brief. Understanding and accommodating these concerns could help extend the use time. Even though product life extension is also beneficial for circularity and keeping products longer in the loop, this will not be part of the scope of this project. It will focus only on products that, after their very long lifetime, are at the end-of-use. It is unrealistic to assume a product life would not end.

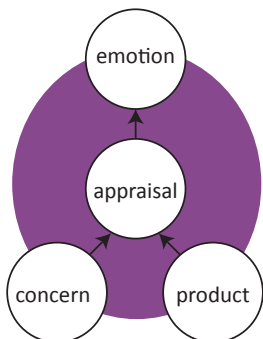
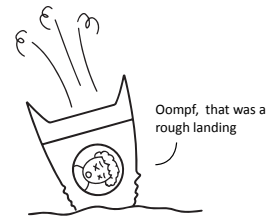
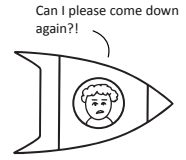


Figure 3.3: Framework of product experience
by Pieter Desmet

3.6 CLOSING EXPERIENCE

Currently, the first three steps of the product experience are being designed in order to meet, build, and support the consumers' needs. However, there is still one phase that is part of the overall experience that is being forgotten, ignored, or purposely avoided by companies and designers, and that is the end-of-use of a product (Macleod, 2016). Consumer behaviour research has mostly focussed on purchasing behaviour, whereas every phase in the consumer cycle is valuable (Mugge, et al, 2005a). Therefore, less is understood about the consumer-product relationship, even though their experiences and feelings towards their old product play a role in replacement decisions.



3.6.1 OFFBOARDING

The starting experience and use experience are well thought out, but the closure experience is missing. Nowadays, when a product or service breaks beyond repair or people feel the need to replace it even though it is working or could be repaired, it means that a new version or upgrade needs to be bought. This starts a new onboarding experience, and the off-boarding phase is skipped altogether.

A misconception about providing a good closure experience is that it encourages customers to leave a company after being done using their product or service, which companies currently assume (Macleod, 2017). They are in denial that their customers might want to ever leave their service and reject the thought. That is why they avoid it completely, and the business-consumer relationship slowly bleeds to death, without either of them really noticing.

Another scenario is when the consumer wants to end a service relationship, is that it is almost made impossible by the customer-service with vague websites, emails or very long phone calls where the customer is being forcibly persuaded to stay in the relationship. This will only leave a negative experience, preventing the customer to consider to use one of their other services.

Contrasting the inviting, encouraging, joyful, and helpful starting experience, stands an emotionless, authoritarian tone, referring to the text of the Terms and Conditions. If somehow the relationship between consumer and company goes wrong, the company can easily distance itself from any responsibility. This behaviour is provided by the legal agreement in the Terms



and Conditions. And these are almost always too complex for the regular consumer to fully comprehend and understand but signs it anyway because he wants to use the service.

3.6.2 OFFBOARDING FOR PHYSICAL PRODUCTS

What is the influence of this missing experience for physical products? I notice around me a lot of information about how you could best get rid of your products after use, from for example companies, the municipality, recycling agencies, commercials, and also friends. However, different sources give different options and suggestions on where you have to dispose of your products in order to for it to be 'good'. For example, I am still doubting which products are allowed to be thrown in the plastic bin or should be with the regular waste. Or which products can be thrown into WeCycle bins in the supermarket? All these uncertainties, make me keep the products (USB-cables) until I really know where to put them, or on one day I will throw a certain package in the plastic bin and the other time in the normal bin, doubting if I am doing it right each time.

The kind of support used during onboarding is also useful in creating a good closure experience. Having a clear message for what the consumer can do at the end-of-use gives him more confidence in judging the situations, and spending less time on making a decision (Webster & Kruglanski, 1994). Ambiguous messages may cause discomfort in the decision-making process because uncertainty threatens the cognitive closure. Furthermore, leaving openness in the supplied information about the right thing to do at the end-of-use, might lead to conflicting information which could jeopardize the closure experience as well. Thus, having the same kind of guiding, confirmative, and empowering messages that are used during onboarding could be really beneficial in the offboarding process and creating a positive end-of-use experience. For physical products and specifically consumer durables, this would make the consumer more secure in knowing how they should separate from it, and where it will taken care of in the right (intended) way. Taking away the doubt and speeding up the decision-making process, and getting products back in the circular loop quicker.

EXAMPLE OFFBOARDING

Earlier, I created an account for AirBnB. But now I want to delete my account. Since I downloaded the app, and created my account there, I searched on the app for a way to delete my account. Through the app it is not possible. The process is shown in figure 3.4.

Through googling 'delete airbnb account' I got to the page of AirBnb explaining what to do. However, they first start to tell me about deactivating, which is not what I want. I should contact them to ask if my account can be deleted. By going through five different webpages and selecting three times why you want to contact customer service, I can finally contact them and again another time explaining why I want to contact them. I am redirected to a chatting screen. After a while I got a response, with "I will send it to the specialized department", and a link to the terms and conditions is sent to me. Apparently, my data will not be completely removed after my account is deleted. After a couple of days, I get an email which says I have to send a copy of my proof of identity, which in the case that you do not have it lying around, requires an extra step. I should do this by post, or via email but no email address is given. This whole process is very discouraging, and when you compare it to creating an account, this is a cumbersome process. What is striking is that the customer service is called: Customer experience.

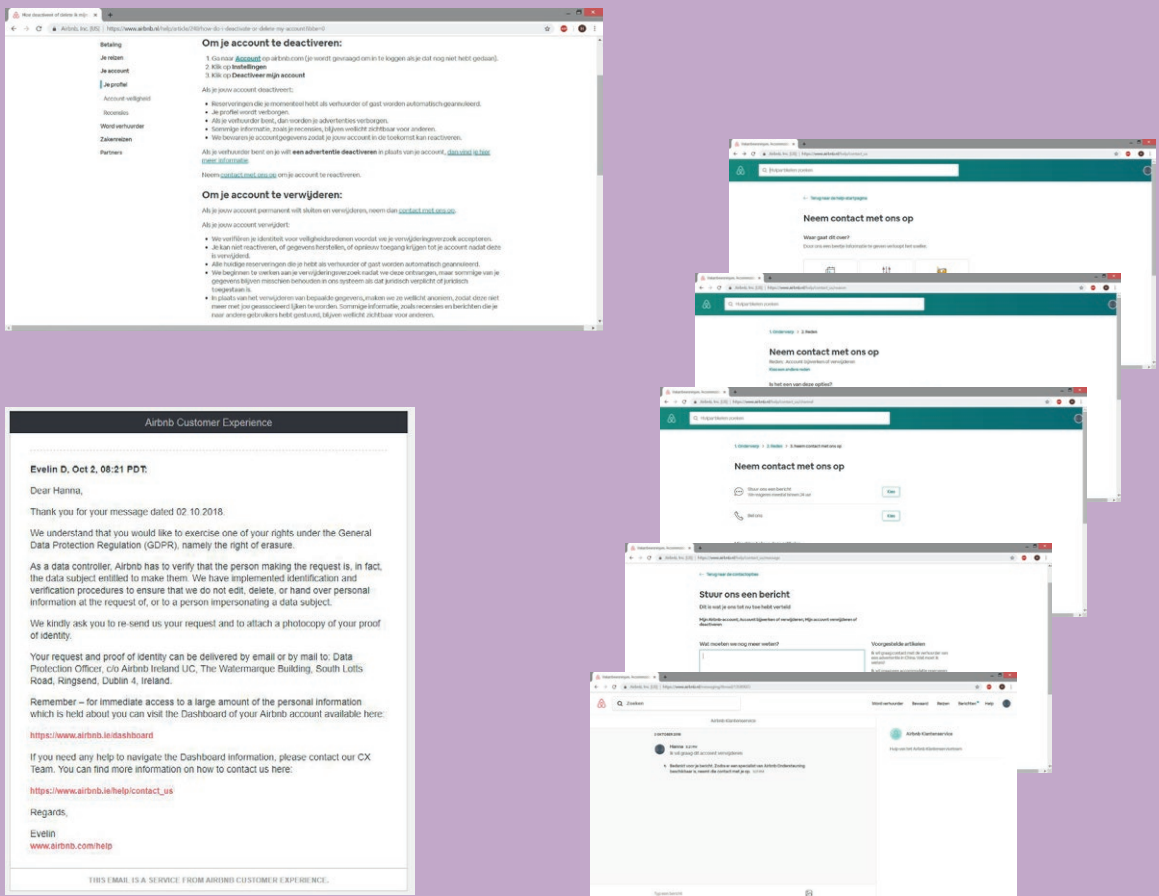


Figure 3.4: Screenshots of the AirBnB app and website of the process of trying to delete the account

Next to the practical side of how to separate, it could also help consumers to say goodbye to their product if there is an attachment between the two that makes it hard for the consumer to separate from. Chapter 4 will dive deeper into this attachment and how it influences the closing phase.

Checklist consumer experience

- create the need
- onboarding
- usage
-

3.6.3 DENIAL

This denial of endings by both consumers and companies has been for decades and probably even for centuries in the making (Macleod, 2017). Our relation with endings has changed significantly. For example, in the early ages people did not live long, and (infant) death was a common part of life. People were used to death and learned how to live life with this factor being present at all times. Jumping forward in time to the present, we have good hygiene, vaccinations, hospitals, medication, and breathing machines that try at all costs to extend our lives, postponing the end as if it can be avoided.

When looking at our consumption patterns, there are big changes as well. We used to produce our own stuff, and deal with them when they break by fixing it, repurposing it, or disposing of it properly where it does no damages to our other possessions. However, with the technological revolution, the companies became responsible for the waste disposal, taking the responsibility away from the user. Nowadays with broken products, we either bring them back or throw them in the trash for someone else to deal with. That distancing removed the consumers' individual responsibility, not considering the consequences of their purchases and disposals to the world.

By failing to acknowledge the importance of dealing with endings, we lose our ability to improve them. Companies and brands do not see the ending of a customer relationship as a way to build a good reputation. The end should be a moment of reflection for both the company and the consumer on how their relationship was, the experiences and memories they have, and if and how they want to continue, start over, or close-off (Macleod, 2017).

Understanding the consumer behaviour at the end-of-use of a product/service, a company can facilitate a fitting experience that they want their customers to have. Everyone goes through a thought process when thinking about ending something. In chapter 4 will be explained which consumer behaviours there are at the end-of-use phase. For a circular company that provides products that are designed to have multiple lives this is very relevant. Especially in this case it is of importance that their customers take responsibility of their ended product, to ensure that it can actually enter the planned second life by closing the loop.

3.7 CONCLUSION

The consumer-product lifecycle consists of four phases, each with their different experiences: Pre-use, Starting, Use, and Closing. The first two are mostly exciting experiences, and in the Use phase this excitement will start to fade. However, the Closing experience is still a negative one. This comes because there has not been thought about by designers and companies. In comparison to a guided and supported first experience, there is no to little guidance at the end. Companies are still in denial that consumers would want to leave their service or end the relationship. Resulting in not thinking about it by designers and companies, or creating a bad experience where they are desperately clamping themselves to their customer, making it very hard and complicated for their customer to leave. Leaving a negative experience. Even though a positive closing experience would be beneficial for both consumer and company. Having a bad final experience will prevent the consumer from considering the company again in the future.

The closing experience is an opportunity that still could be exploited.

For physical products, having a similar guiding experience, as in the starting phase will help consumers to make decisions on what they should do with their product at the end-of-use. This will also support the consumer to say goodbye to a product he/she is attached to and find it difficult to separate from. Not knowing or being insecure about how you should get rid of your product could lead to products ending up in the wrong place, for example in the trash bin.

Removing doubts and uncertainties will make consumers more confident in what they want to do. It could help them to bring the product to the right place after use where it can go back into one of the closed cycles and get to live a new life.

This raises the question of what these doubts are, and where they come from. Having insights in these questions will help to design an experience to support the consumers to overcome these uncertainties, speeding up the decision-making process, and having the product back in the cycle faster.

4.1 INTRODUCTION

In the previous chapter was concluded that creating a positive end-of-use experience is favourable for companies, products, and consumers. However, currently this is not being actively designed yet, resulting in insecure consumers not knowing how they could detach themselves from their possession. Knowing and understanding where these uncertainties come from can help designers to think of solutions for the end-of-use phase to help consumers feel more confident in their decision to detach. For a circular product, this could mean that consumers are more assured in their decision of way of detachment that ensures the product a second life.

But where do these uncertainties come from, and how can designers apply this information to design an end-of-use experience?

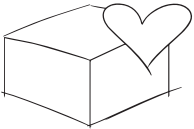
This chapter will explore the current end-of-use experience, and which elements play a role in this experience. It will focus on product detachment, where consumers mentally and physically distance themselves from their product. In the field of research of product detachment, different terms are used considering detachment, such as 'dispossession' and 'disposition'. These terms are used to find relevant studies and information on the end-of-use phase and experiences.

To check if the findings are complete and did not miss something, a survey is being held among consumers on the topic of why people have or have not detached themselves from a product (yet).

However, in order to detach themselves from a product, consumers have to be attached to the product. Therefore, this chapter will briefly look into product attachment to find out how a consumer-product relationship is being built.

4.2 PRODUCT ATTACHMENT

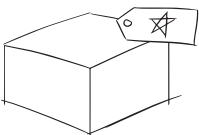
Product attachment is giving a product a special meaning, making the product irreplaceable (Mugge et al, 2005), because a replacement could not sustain that same meaning. For example, the product could be a reminder of the past and therefore carry a symbolic meaning. Products which the owner has grown attached to will most likely have a longer lifespan compared to products with no attachment. Prolonging a products' life comes before the four cycles of reuse, repair, remanufacture, and recycle. When products live longer, the need for- and the frequency of replacement is lower. Therefore designing for attachment and product life extension are fitting to be circular strategies as well.



4.2.1 ATTACHMENT THROUGH SPECIAL MEANING

Unfortunately, memory development is difficult for the designer to influence. However, the designer can think of situations how and where the product can be used, where meaningful memories can develop. For example, stimulating social contact with products designed for shared use with others, or using scents as a trigger for memories (Mugge et al, 2005). Other strategies of developing attachment are: creating unique and customized products, co-design with the consumer, enable personalization by the consumer, and products that age with dignity, such as leather.

A product with a special meaning becomes irreplaceable, making detachment more difficult and thus less desirable, resulting in an extension of the product life. This special meaning of the old product pulls the consumer back when he is attracted to a new product.



4.2.2 ATTACHMENT THROUGH PRODUCT CHARACTERISTICS

Several reasons could cause a decision to replace an owned product that is still functioning (Mugge et al, 2005). First, the product appearance or functionalities could be worn out. Second, the product has become outdated and is not compatible anymore with other products and services on the market, or legislation. Third, due to technological changes, the consumer may become more demanding of a better product. Other products have more features, which makes them more desirable. Fourth, changes

in fashion, the consumer wants to keep up with the trend. And finally, changes in a consumers life, such as family or financial circumstances.

Strategies of prolonging the life of a product through its characteristics are: increasing product reliability and durability, making the product easy to repair, giving the product a long-life guarantee, implementing a modular product structure where parts of the product can be renewed/easily upgraded, providing variation, and reducing the products fashionability with a more classic design.

4.3 PRODUCT DETACHMENT

Even though prolonging the product life is a very good first step in sustainability, it is unrealistic to assume that consumers will use their product indefinitely. At some point, the consumer decides to stop using the product, resulting in the end-of-use of the product. At the end-of-use of a product, the owner will consider separating from his possession. Separation is generally seen to be a relatively mundane, thoughtless act of little importance to consumers (Roster, 2001). This might very well be a consequence of the missing closure experience.

However, as previously mentioned, there are strategies implemented for product attachment, resulting in an emotional bond between consumer and product. Therefore, it is possible that is not just a simple and mindless act of separation, which makes it even more relevant to understand how consumers make such decisions.

4.3.1 CONSUMER PRODUCT RELATIONSHIP

First of all, possessions are valued for the meaning they embody, the functionalities they provide, and the contributions they make to our well-being (Roster, 2001). However, during the time of owning and using the product, circumstances change or we change. This influences the value of the possession, either increasing or decreasing it. When there is a value decrease, the owner might consider separating from/or replace the product.

A meaningful possession is conceptualized as a vessel (a commodity object) carrying public meanings (A commodity's widely held meanings) and private meanings (personal meanings not widely held) (Lastovicka and Fernandez, 2005). Examples of public meanings are: reflecting self-identity and playing a role in social communication. Examples of private meanings are: defining identity and defining personal history.

Meanings can be positively or negatively charged or shift from one to the other. For example, a product that reflects someone's identity, and is negatively charged, conflicts with the owners feeling of identity and its expression. It reflects an undesired self, or past-undesired self, where the context and meaning have changed over time from the desired self to an undesired self. Separating yourself from such a product is then quite easy and relieving (Lastovicka and Fernandez, 2005). To separate yourself from of a positively charged possession that is valued as an extension of someone's self, might be more painful, really feel like losing something, and harming your identity.



4.3.2 OWNERSHIP

Furthermore, being able to say you own something is an important experience for the consumer (Macleod, 2017). It provides them with the empowering feeling of freedom, control, and the ability to do the with the product what they desire. Moreover, an owned product helps build their identity. Considering how ownership ends or is transferred could be of significance for the closing experience. Joe Macleod argues that once a product is no longer deemed useful, the consumer will perceive it fairly quickly as waste. And that he will distance himself from the responsibility of the product when he throws it in the trash. However, there is quite a process that precedes separation where responsibility is taken towards their products. It could be experienced as quite painful to separate from a product. Of course, it depends on the type of product. Naturally, there are differences between empty food packages, toothbrushes, shoes, phones, cars, and pianos.

4.4 DETACHMENT PROCESS

It is safe to assume that there are values embodied by the product that influence the decision to (not) separate from it. Even though a new product pushes a product owner away from his old possession, the old product exerts a pull on its owner (Mugge et al, 2005), by symbolizing certain values. Therefore a separation/replacement decision consists of two decisions, one: what to do with the old product, and two: acquiring a new product (Roster & Richins, 2009). Three types of decisions are available:

- 1) the consumer may buy a new product and separates from the old one
- 2) the consumer buys a new product and keeps the old one
- 3) the consumer avoids making the decision, takes no action, does not purchase a new product and keeps the old one.

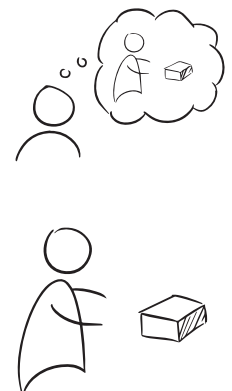
When the different reasons of the decision to keep the old product are taken into account in combination with the reasons of acquiring a new product, it could give better insights in the separation decision, making it possible to predict the consumer decision on separation/replacement. If you can predict when, why, and how the consumer makes the decision, you could play into that with your design, supporting their decision, and even influencing it to your benefit.

The importance and relevance of reasons or values can change, due to changing environments (Roster, 2001), and will make detachment easier or harder. In the case of lingering values that prevent separation even though the owner wants to separate, it will take some time for these values to decrease in importance to prevent painful experiences when separating.

For example, a possession might be considered part of someone's identity, and doing a part away of who you are might be scary, distressing, and unpleasant. So first there is a mental process taking place before the consumer is able to physically separate himself from the product (Young and Wallendorf, 1989).

Therefore, in this report will be made a distinction between these two processes as well. Firstly, there is dispossession. This is (sub/un)conscious deciding that a product should be removed from the consumers' life and the mental process of saying goodbye to the owned product. Secondly, there is the actual separation. This is the act of physically removing the possession from your life.

After the separation is a moment of reflection, where the now



formerly owner reflects on whether the complete detachment process was successful (relieve, good riddance) or unsuccessful (regret) (Roster, 2001).

4.5 FRAMEWORK OF DETACHMENT

Figure 4.1 shows the framework of detachment I developed. In this framework shows the two phases of detachment: dispossession and separation. Within the process of dispossession, the consumer goes through multiple steps to enable himself for physical separation.

It all starts with the first decision of considering to separate from/replace the product. To decide whether to actually do it, the owner (un)consciously evaluates the product to decide what the product is worth to him or means to him. If there are still valuable attributes of the product that makes the consumer not wanting to separate from it yet, the user might (un)consciously try to decrease these values with behaviours that will allow for separation at a later moment. If this behaviour is successful and with a new evaluation it appears that these initial obstructing values are diminished/disappeared, the consumer is finally able to physically separate from the product.

The framework is made from a combination of the different theories in literature about dispossession and detachment. The basis for this framework were the studies from Roster (2001) and Türe (2014). Roster had created a model of the psychological process of dispossession. In this model, she has already identified some distancing behaviours. Since additional behaviours complement these initial behaviours, 'dispossession behaviours' is chosen as the overarching term because not all were about distancing yourself from the product. They are complemented by the findings from Türe, who classified some additional behaviours.

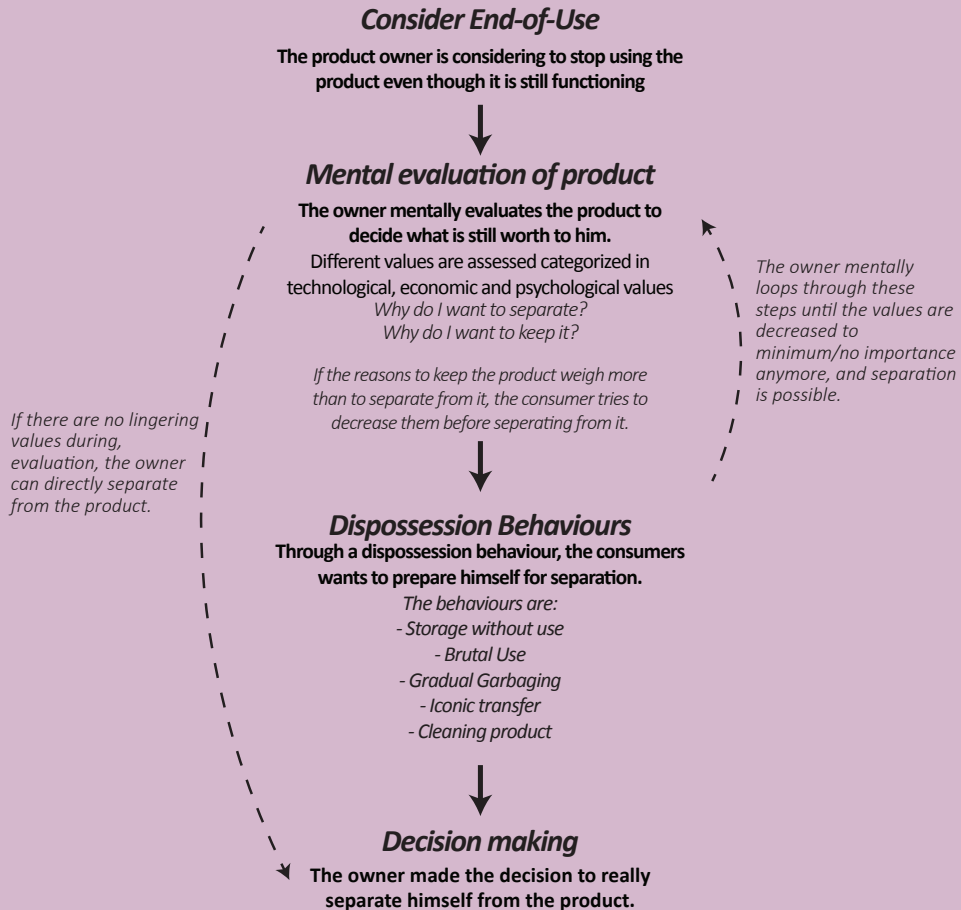
The steps will be discussed in the coming paragraphs which will go into more detail about the different considerations, values, and behaviours consumers could have in the dispossession process, and which ways there are for consumers to separate from their product.

Framework of Detachment

The process of removing your possession from your life

Dispossession process

The mental process of distancing yourself from your possession



Separation

The final act of physically distancing yourself from your possession

Reflection

Owner reflects on how he feels now he has separated from his possession.

Does it feel like good riddance, or is there regret?

Figure 4.1: Framework of Detachment

4.6 CONSIDER END-OF-USE

First of all, often it is not one single reason for consumers to decide they want to separate from their product. Most of the times it is a combination of different things. The separation/replacement decision is influenced by three factors (Van Nes & Cramer, 2006).

First are the product characteristics, such as wear and tear, where the product is replaced because one or more functions do not function anymore. And maybe for improved utility, a replacement product has better or newer functions and is safer/more economical to use in comparison to the older product.

The second factor is the consumer and his characteristics. An example for an upcoming separation is improved expression, where the product is considered to be end-of-use because of the decreased comfort of use, quality, and/or design. When the consumer has new desires, he just wants a new product that fulfils his desires even though his current product is still functioning.

Finally, there are the situational or external influences. Sometimes situations change in the life of a consumer, for example, he moves to a different house, not having space for all his old stuff, or not wanting to bring it all. Other examples are changes in life: a starting relation, break-up, family expansion, or a deceased in the family (Roster, 2001).

Each of these factors or combinations can influence the initial thought of deciding it is time to remove a product from your life, and the first two factors could be influenced by design.

4.7 MENTAL EVALUATION

As mentioned before, possessions are valued for different reasons. Different product attributes are evaluated by the consumer to determine what the product means to him. From now on these attributes will be called values. In each stage of a products' lifetime, values can grow, increase, decrease or disappear again. A product lifetime is the duration of the life of a product starting from acquisition (new or second hand) and ending at the moment of separation (Van Nes & Cramer, 2006). The lifetime of a product is a result of the owner's decision, and thus determined by the user, and not the designer. But which values could a product embody for an owner? And

how do they influence the decision to separate or not? There are already many values described in literature, and these form the foundation for the dispossession behaviours later in the dispossession process.

To keep an overview, they have been clustered into three different main themes: technological values, economic values and psychological values. The terms for these come from the three categories of relative obsolescence (Cooper, 2004), each actually category being a different type of product lifetime (Van Nes & Cramer, 2006).

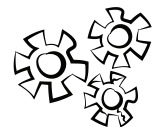
For each of the values is described what it contains and how the consumer responds to them at the end-of-use. From examples of stories and values in the different studies by Jacoby et al (1977), Okada (2001), Roster (2001), Mugge (2005) similar values are grouped under the same overarching value.

4.7.1 TECHNOLOGICAL VALUES

This category contains the physical product characteristics. Different attributes of the product are evaluated by the consumer in order to decide it is time to separate from it.

Functionalities

The first value belonging in this group are the functionalities. When certain side functionalities break or do not work properly anymore, the owner might use this as an excuse to separate from/replace it (Jacoby et al, 1977). However, the main function of the product is still working. Imagine a water boiler, it still boils water, however the light indicating that it currently heating up is broken. Or that a new version of the product has more features.



Effectiveness

Second is the effectiveness of the product. This contains both usability and performance quality. It is important that the product works as it should. The effectiveness could decrease due to use, wear and tear, dirt, and age. The owner could then decide what the threshold is of acceptable effectiveness and at which point it is better to separate from it.





Materials

Third, wear and tear do not only influence the effectiveness, but also the product appearance. A product's material appearance might be considered in the evaluation. If it is visible that for example the product casing is worn out, with cracks and scratches, the consumer might desire a new looking product (Mugge et al, 2005). However, damaged materials might not be valuable for consumers, cracked mobile phone screens or dirty pipes and tubes in a coffee machine might still be valuable for the remanufacturing industry. If the product owner understands the values a product might have for other people than consumers, he could decide to part with it differently than throwing it in the trash.

4.7.2 ECONOMIC VALUES

Within this group are the economic values described.



Purchase cost

The first one is the purchase cost. Even though it is a factor influencing the purchase decision, at the end-of-use it could still have an effect on the parting decision (Okada,2001). The use of frequency and enjoyment of use should justify the cost. The owner keeps a mental account of all frequency of use and the quality/enjoyment of use. When this is not yet equivalent to the cost price according to the owner, the mental cost is positive, making it painful to part with it yet.

When they have been high, the use has justified the cost, making it easier to part with.



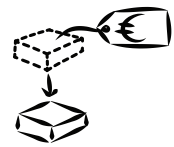
Resell price

In order to break even with the purchase cost and low enjoyment of use, he might decide to keep it longer to 'prolong its use time', or sell it for an acceptable price. Therefore, the second economic value is the resell price. The product is brought back on the market as a commodity (Türe, 2014). For products that were expensive or their transferable value is significantly affected from the changes in technology and fashion, such as cars, electronics, and jewelry, re-commoditizing is a good way of separation (Türe, 2014). The owner makes an estimation of how much it would still be worth if he were to resell it. Different aspects of the product

are considered to make an estimation, such as aesthetics, effectiveness, overall quality, the frequency and enjoyment of use. But emotional values could play a role as well. The owner wants to have a feeling of getting the right price according to his estimation, and know that it is going to someone deserving, and otherwise, he might prefer to keep it but not use it anyway (Roster, 2001).

Replacement cost

Furthermore, the consumer might consider the replacement cost (Okada, 2001). Is the cost of the replacement product low enough to justify separating from the old product? Or could the old product still be used for a little longer?



Repair and maintenance cost

A factor related to this is are the repair and maintenance costs, where the benefits of maintaining the product do not weigh up to the benefits of simply replacing the product. Furthermore, maintaining is generally not seen as an enjoyable or engaging task (Salvia et al, 2015).



4.7.3 PSYCHOLOGICAL VALUES

Finally, a product could embody different psychological values. A product could carry symbolic meanings for example, such as emotional and relational values (Roster, 2001). These values could remain lingering, taking years to diminish, resulting in products being kept long past their immediate usefulness and relevance. People who are highly involved with their product in a sentimental and emotional sense are more likely to keep it (Jacoby, 1977). But here applies that product replacement decision is driven by both the economic factors and the psychological factors (Okada, 2001).

Emotional

Emotional values could grow when the owner has used the product for a long period of time or at a special moment and has grown attached to it. An example of a product is a backpack that has travelled the world with you (Mugge et al, 2005a) or a family heirloom that has been in the family for a couple generations. This could prevent separation because it would mean that the



owner would also part with the meanings and memories it carries. It has become irreplaceable since other (new) products do not carry that exact same meaning.

Relational

When a product is used in a context with multiple people, it stimulates the relationship between those people. Therefore, a product could have relational value (Türe, 2014). The product could represent the good or the bad times he had with family and/or friends. As a result of memories being created with these kinds of products, these become harder to detach from (Roster, 2001; Mugge et al, 2005). A replacement can never symbolize the same meaning.



Aesthetic

Through the aesthetics of a product, a consumer can express his style, status, and identity. However, this is very susceptible to obsolescence, because aesthetics are very trend sensitive, that change rapidly, resulting in a mismatch between a wanted expression of identity and expressed identity (Lastovicka and Fernandez, 2005).



Identity

Expression of identity goes a little deeper than just aesthetics, since not all people follow trends, but just have products that they like and fit to them. However, your identity can change, or your taste changes. If this happens, you feel that your possession doesn't fit with your identity anymore, and start thinking of separating from your possession. Or it could be kept as a memento of your past.

But here applies that product replacement decision is driven by both the economical factors and the psychological factors (Okada, 2001).

Moral

The final psychological value is the moral value. Consumers might sense that their product is still valuable even though they do not use it anymore. They think it would be a shame to throw it away, and therefore storing it until they find a better use for it. However, they could gain this value through detachment (Türe, 2014). People can feel morally good when giving the product a second life. This could be done by means of giving the product



away when the product is still functioning properly.

Becoming aware of another in need, such as charities, is necessary to highlight an objects' transferable value. By giving it to good friends, or relatives, the relationship with them could be enhanced, increasing the relational value.

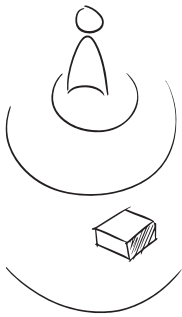
It is important for the product owner that there is an appropriate recipient that is appreciative of the gift (Okada, 2001; Türe, 2014). He will get the feeling that there is indeed a value through detachment and the feeling of regret and that he should have held onto the product will be prevented.

4.7.4 SUBCONCLUSION

These are the different values consumers evaluate their product on in the dispossession process. The values give insight in when and why consumers still have doubts about whether or not to separate from their possession. When you can identify which (and how) values play a role for a specific type of customer, you can start to think of a design accommodating them in overcoming them.

4.8 DISPOSSESSION BEHAVIOURS

When it appears that there are still values lingering, it makes the thought of separating from it is painful. Through different dispossession behaviours at this end-of-use stage, the consumer tries to decrease the weight of these values, making it less painful to separate from it. It enables the consumer to make the decision whether or not to separate from it, and how to separate from it.



Through such behaviours possessions migrate further and further away from the innermost parts of someone's life (Roster, 2001). Roster also described different behaviours used for distancing yourself from your possession. The most interesting ones are Storage without use, Neglect, Hierarchical downgrades in terms of the object centrality of functional roles in users life, and Cleaning. Additionally, there is Iconic Transfer (Lastovicka & Fernandez, 2005). Similar concepts for 'neglect' and 'hierarchical downgrades' are also mentioned by Türe (2014), but here they are called 'Brutal use' and 'Gradual garbaging' which feel more descriptive of the actual behaviours.

Some of these behaviours serve as a preservation of attached memories and feelings, while others act more as justification for separation ensuring an end-of-life. For each of these will be explained why product owners might show this behaviour.

Next to the behaviours that prepare consumers for physical separation, there are also end-of-use behaviours where people transform the product or keep it for treasuring (Türe, 2014). Product enhancement is illustrated as how people transform their possession. However, these are not keeping the product in their original state and quality level, and do not prepare the consumer for separation. Therefore, these are not taken into consideration in my project and in the framework, and will not be discussed here.

4.8.1 STORAGE WITHOUT USE

With storage without use, the product is (unconsciously) placed in transition, that shows the intention to eventually dispose of the product (Roster, 2001). However, there are still some lingering values, so it is first up for a trial disposal. If this trial goes right, then it becomes available for real disposal.

It serves as a separation of certain goods from other goods that are possessing more immediate relevance but are kept closeby when the need would arise. After the trial of separation is successful, the consumer is able to really separate.

The consequence of this behaviour is that a product will be sooner at its end-of-life, which makes this behaviour not beneficial for circularity (figure 4.2).



Figure 4.2: Example of storage without use
Phones in a drawer

4.8.2 BRUTAL USE

With brutal use, the consumer wants to have optimally used a product before separation from it (Türe, 2014). With brutal use, the owner purposely becomes less careful when using the product, making it break down faster, and justifying disposal and possible replacement. Even though it is a deliberate sabotage of the product, resulting in a shortened lifespan, there is no lingering value when the product is disposed.

With this behaviour, the end-of-life is ensured faster, just as with the previous behaviour (figure 4.3).



Figure 4.3: Example of Brutal Use
Drifting with your car



Figure 4.4: Example of Gradual Garbaging
Cutting up an used towel to use it as cleaning cloth

4.8.3 GRADUAL GARBAGING

Gradual garbaging contains downgrading the product value step by step in order to optimally use the product (Roster, 2001; Türe, 2014). The product can be used for different purposes throughout its life. Firstly it serves its main purpose, the purpose for which it is bought. But when the product is not applicable for the intended use anymore, it could serve other purposes. This can be continued until the product cannot serve any purposes anymore, and becomes available for disposal. For this type of behaviour the owner should be able to see the possible new purposes. An example mentioned by Türe is about clothing that is first bought to be representable at work, then is downgraded to leisure clothing for at home, then it becomes clothing to do chores in, getting dirty and worn out, and the final step is cutting them up and using the pieces of fabric as cleaning cloths.

This behaviour does not leave the product at its original quality level and ensures the end-of-life of a product. Therefore this behaviour is not beneficial for a circular economy (figure 4.4).



Figure 4.5: Example of Iconic transfer
Someone who used to have an old-timer kept a picture of it to keep the memories

4.8.4 ICONIC TRANSFER

With an iconic transfer, the private personal meaning of the to be separated from product is transferred to another object: the icon (Lastovicka & Fernandez, 2005). The products are seen as vessels that carry the meaning but that meaning can be detached from the first product and attached to the icon. The original product is 'relieved' of the meaning, making it easier to dispose of.

This behaviour keeps ensures that the product gets a second life.

Therefore, this is a beneficial behaviour for circular products (figure 4.5).

4.8.5 CLEANING OBJECT

Cleaning object serves as a way to rid them of 'contamination' and restoring them to their natural state (Roster, 2001). It removes the personal meaning attached to the product. Now this meaning has been erased, it will be easier for the owner to dispose of the product. Furthermore, those personal memories are now protected from corruption by unknown future use by an unknown new owner. Or it serves as giving the product and new owner a fresh start if the product transfers owners.

This behaviour keeps the product at the same quality level and helps to give the product second life.

Therefore, this is a beneficial behaviour for circular products.

4.8.6 SUBCONCLUSION

The dispossession behaviours Storage without use, Brutal use, and Gradual gargabing are lowering the product quality and decreasing its life. These should want to be avoided or changed by designers if these behaviours occur for their circular product, since products and materials should remain at the highest potential quality for as long as is possible.

Iconic transfer and Cleaning object keep the product at the same quality level. These are behaviours that could be stimulated, and maybe it could be even tried to change a harmful behaviour into a healthy behaviour. Seeing how the values will lead to a behaviour, should make designers realize the consequences of the values, and that playing into these values would be beneficial for their product, flow of resources, and business.

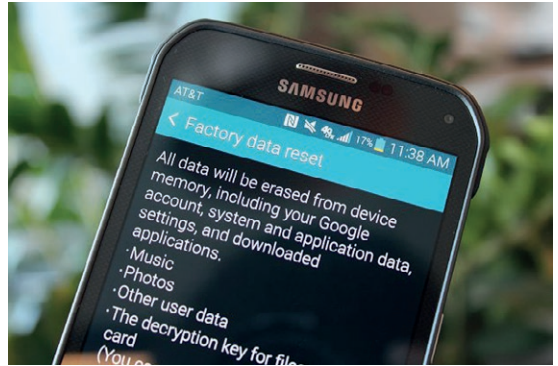


Figure 4.6: Example of Cleaning object

- 1) Washing your clothes before donating them
- 2) Factory reset of phone before it passing it on7

4.9 WAYS OF SEPARATION



Giving it to a stranger



Giving it to family/friend



Donating



Exchanging



Bringing it to a second hand store



Bringing it back to the store



Resell it



Throwing it in a recycle bin



Throwing it in the trash



Bringing it to municipal waste collection

Separation is not only throwing something away. It could be any form of physically removing the product from your life. Figure 4.7 shows the different ways of how a product owner can separate himself from his possession. These were found from a combination of literature, results of a questionnaire among consumers, and own experiences.

There are five different modes of separation: Sharing, Exchanging, Donating, Recycling, and Throwing it away (Albinsson & Perera, 2009). These five modes consist of multiple ways to achieve them.

For sharing, you can give it to friends and family, or to strangers (Türe, 2014). Exchanging can mean exchanging your product for money, thus reselling it (Okada, 2001). But it can also mean trading it for another product, for example with clothes exchanging events (Albinsson & Perera, 2009).

Donating can be done through various channels, for example, it can be given to charities or to a second-hand store. Here the consumer does not get anything in return for the product.

With recycling, the consumer can put the old product in a recycle bin, bring it to a recycling station, return it to the store where he bought it, or return it via an online service. The company will then recycle it.

Finally, a consumer could 'just' throw it away in the trash bin. This is the easiest and fastest way, with no effort. Or if it is not suitable for the normal waste disposal, he could bring it to the municipal waste collection.

Based on the individual characteristics, consumers may prefer one approach over another (Albinsson & Perera, 2009).

For a circular product it is important that the product has multiple lives. Therefore, giving it away, or selling it, so that it can be reused by someone else is fitting to one of the circular loops. The bringing it back to the store is very interesting for companies offering circular products and need those products back to close the loop. When returned, they could ensure the product to enter one of the other cycles. Throwing a product in the trash is one of the behaviours that should be limited.

Figure 4.7: Possible ways to separate from a product

4.10 QUESTIONNAIRE

To confirm the information found in literature, and to get some examples of functioning products that are considered for separation, an online questionnaire was held among regular consumers from different types of households: from students to working people. A total of 28 people responded, with ages ranging between 19 and 61. They were asked which functioning product they separated from, why, and how. And which functioning product they still wanted to separate from, why, and why they have not done it yet. The results of how they separated from their product, are used to complement the findings from the literature. The results can be found in Appendix 2.

Figures 4.8, 4.9, 4.10 and 4.11 portray the results of the questionnaire. Different products were mentioned within the categories of furniture, clothing items, (kitchen) appliances, books, and other.

The reasons why people (want to) separate from their product endorse the ones mentioned by Roster and van Nes & Cramer.

The most mentioned reason why people (want to) separate from their product is that they do not use it anymore. Therefore, for the products still in possession, and the assumption is made that they are stored somewhere without being used. Reasons that were mentioned as to why they do not use it anymore are that the product is outdated, in bad condition, is replaced, or they

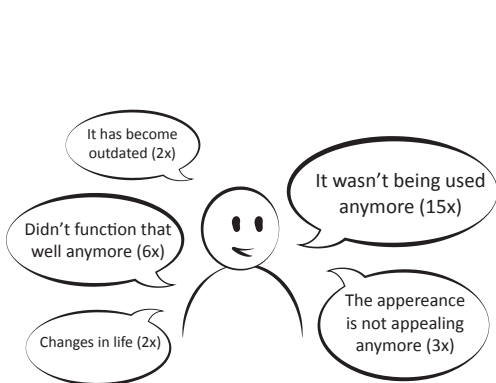


Figure 4.8: Results question 'Why do you want to separate from your product?'
(Product is still in possession)

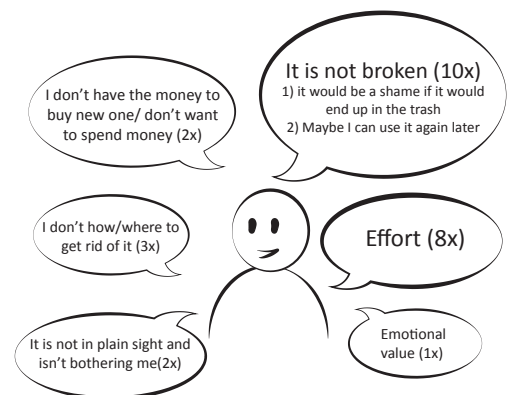


Figure 4.9: Results question 'Why didn't you separate from it yet?'
(Product is still in possession)

dislike the appearance.

When asked why people did not separate from it yet, even though they want to, two main answers are given. 1) it is still working, so it would be a shame if it would be trashed; maybe I will use/need it again in the future. 2) it is an effort to separate from it in the right way (thus not throwing it away). People said that bringing it to a waste collection point or second-hand store, or finding a buyer is just too much effort, and therefore store their product longer.

4.10.1 EFFORT

Effort was not yet a reason that was being considered in this study of why people do not separate from their product yet. However, effort is not a value of a product. The unused stored products mentioned by the respondents are still there because it will take more effort to bring it somewhere than just keeping it stored. Storage without use is thus a very effortless behaviour. This raises the question of how much mental and/or physical effort the other behaviours ask from the consumers, and how the difference in effort relates to the frequency of the behaviours being shown. This would be something for further research.

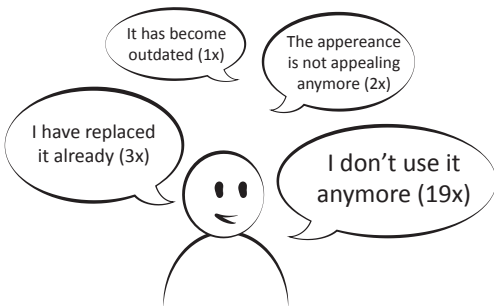


Figure 4.10: Results question 'Why did you want to separate from your product?'

(Products that respondents separated from)



Figure 4.11: Results question 'How did you separate from it?'

(Products that respondents separated from)

EXAMPLES DECISION MAKING

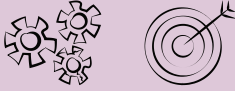
So how are these values and behaviours related? And how could we use them to analyse the consumer behaviour and decision-making process of why consumers decide (not) to separate from it yet. Two fictional examples are given of the detachment process of a smartphone.

EXAMPLE 1: TO SEPARATE

John works a lot on his phone for his job. He depends on a fast and updated phone with enough storage to be able to do his job. However the phone can not keep up with his requirements, but is still suitable for less intensive usage.

Why would he want to replace his current phone?

The phone has simply become too slow for him to be efficient at his work. Apps are slower in responding and the storage is full.



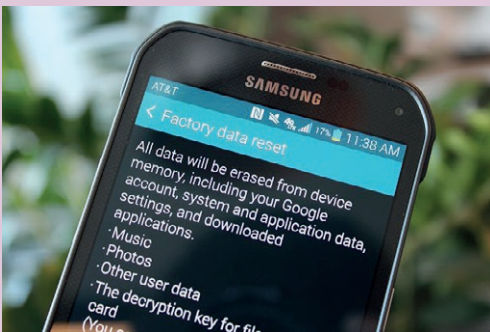
And why would he separate from the old one?

For John, the phone is not usable anymore. But for someone else who uses it less intensively, the phone might still be useful. He could give it to someone that only uses the phone for social media and simple games. In this way, he can make someone else happy.



So what happens with the product?

John resets the phone and empties it of all his data. He gives his to his niece, who used the phone for chatting with her friends and listening to music. It can be used for an extra couple of years, before it completely becomes out of date.



OR EXAMPLE 2: TO NOT SEPARATE

Mary likes to stay up-to-date with the changing technologies and buys the newest release of a smartphone. However, this old one is still functioning well and could last another couple of year. What will she do with her old phone?

Why would she want to replace her current phone?

She likes the new look of the new phone, and likes the newest functionalities in the phone such as unlocking with a face scan.



But why would she not yet separate from the old one?

First, the purchase price was quite high and she used to phone for only a year and a half. That is not long enough to justify the cost in her opinion. Moreover, the phone functions well, and nothing is broken, so it can still be used.



So what happens with the product?

Because the old phone can still be used, Mary deems it still valuable and will keep it as back-up for when her new phone has a defect. It will be stored in a drawer with other back-up electronics.



4.11 CONCLUSION

In order for a consumer to be able to detach himself from a product, there should be product attachment. With product attachment, the product embodies a special meaning for the consumer, making it more difficult to detach from, and thus can be used to extend a products' life.

However, every product will someday be at its end. This existing attachment influences the end-of-use experience. Consumers go through a detachment process, where they mentally and physically detach themselves from a product.

People attach different values to a product, such as technical, economic and psychological values. Lingering values will make consumers doubtful or insecure whether they are ready or able to separate from it yet. Through different dispossession behaviours, consumers might deal with these values, decreasing the importance and weight of them before being able to separate from it. Separation means physically removing the product for your life, in any kind of form.

Having insights into these values and how behaviours arise from these values could help designers to understand why, when, and how people want to detach themselves from their owned product. However, how can designers get these insights for their designed products and their customers? Moreover, how can designers apply these insights in their design process, product, and end-of-use experience?

I want to create a tool that will help them identify the values and behaviours, and have them apply the insights to and design idea for an experience. The next chapter will define the design brief.

CHAPTER 5

Design brief



5.1 INTRODUCTION

From the previous chapters it has become clear that designing a positive end-of-use experience is beneficial for product, company, and consumer. Furthermore, we know that consumers attach values to a product, that influences this experience, making consumers doubtful whether or not (and how) to separate from it. Here lies an opportunity for designers.

However, this is still a new field of knowledge not easily accessible by designers due to not having one overview of information showing all the aspects of the end-of-use experience. Furthermore, next to understanding the detachment process, they should also be able to apply this into their design. This chapter will specify the goal of the tool that I want to design.

5.2 DESIGN FOR DETACHMENT

Designers who understand user experiences and behaviours would be equipped to meet the needs of their customers. In order to do this, designers should learn the strategies they can apply to develop a circular product with a desired end-of-use experience that promotes circular consumer behaviour. Being aware of the current consumer experiences and behaviours is the first step towards being able to design for it.

When looking at the amount of effort and consideration being put in the starting experience you see that the unboxing is seen as a ritual, and the onboarding process is made encouraging, easy and understandable. Translating this to the end-of-use, reassurance, encouragement and empowerment would help consumers greatly in making the right decisions without hesitation or insecurity. Having the same kind of guiding used during onboarding in the process of offboarding, would be beneficial in creating a positive closure experience.

Therefore, I want to design a tool for designers that helps them understand the current end-of-use situation for their (to be designed) products, and enable them to design fitting end-of-use experiences. By having a design tool available that guides the designers through the process of understanding the current experiences, and how to apply that knowledge to create a desired end-of-use experience, it can help them unravel the problems with their current product/service.

Furthermore, by designing this experience, designers can try to control the consumer behaviour, and thus the way of how they separate from their possession. This would be interesting for companies and designers who make circular products, where the loop should be closed by consumers bringing their product back to the company after use instead of throwing it in the trash.

5.3 DEFINE THE SCOPE

First needs to be determined what the tool should achieve. Does it need to help designers to understand the behaviours, or just create awareness? Or does it guide them with designing the end-of-use experience, or only evoke a discussion? There are many different goals a tool could be used for.

To define what I want to achieve with the tool I started creating some first ideas (Appendix 3). These originated from the examples possible concerns and appraisals from appendix 1. Through these first ideas, directions could be identified. The three main themes that came forward were: awareness creation, understanding the experience and designing for the experience.

After going through all the ideas, the decision was made to create an educational tool that helps designers understand the detachment process and use those insights to design an end-of-use experience. I want to let the designers explore the behaviours and values and how they relate to each other. I will focus only on detachment, and exclude product attachment and extension of product longevity.

5.3.1 TARGET GROUP

The tool will be for industrial design students, to have them 'grow up' as designers with the awareness and relevance of the detachment process. They can take the things they learn during their education with them and bring them into their future workplaces. They will be educated on this concept and can add designing for detachment in their skill set. It will be in addition to the current teachings about the technical and business aspects of a circular economy.



5.3.2 USE CONTEXT

The tool will be used in educational projects where the students design products. In the ideal future, circularity is taught as being the norm when designing products, and all products are designed to be circular. The tool will be applicable for consumer durables, that are owned by the consumer. For circular products it will be more suitable since it is better to have more control over them to close the loop.

In the context of a course, this could take place in a workshop type of setting where a whole morning or afternoon of about 4 hours is available to work with the tool. Even though it is given in the context of a course, the idea is that students can work on it alone, without active facilitation by a teacher guiding them through every step being present at all times. The tool should lead and instruct the students on what they have to do.



The students should already have a concept of a product that is mostly defined but with room for changes for which they can analyse the end-of-use experience. The tool will focus on consumer experience and not on product development. Therefore should the concept already be defined so they do not spend too much time on product ideation, but really dive into the end-of-use consumer experience.

5.3.3 USE REQUIREMENTS

- 1) The tool will be an introduction to the whole concept of end-of-use and detachment. Therefore, no prior knowledge is needed. Therefore, the tool should work through the whole detachment process from beginning to end step by step.
- 2) Since it is the first time people get acquainted with this topic, the goal of the tool is to stimulate the thinking process, open up discussion, and enable the students to create some nice or fun ideas for experiences.
- 3) The ideas should not be fully worked out and defined concepts, because it still is the first time getting to know the detachment process. Idea directions could differ from product to service to marketing etc, and is not fixed. It depends on their findings in the analysis of the experiences.
- 4) It should be relatively easy for the students to understand what they are supposed to do with the tool and follow the process. The process of the tool should be a coherent story that shows how certain things relate. Questions and explanations should provide enough support them in the usage.

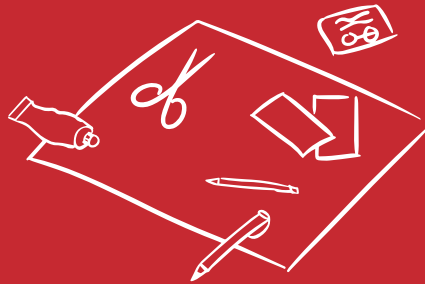
With a defined target group, use context, and use requirements, design goal is formed. This describes what the goal should achieve.

5.4 DESIGN GOAL

Design a tool for designers that helps them understand the detachment process at the end-of-use and apply those insights to design for an end-of-use experience beneficial for a circular economy

CHAPTER 6

Concept Development



6.1 INTRODUCTION

With the design goal defined I will start with developing the tool. The goal of the tool is to have industrial design students understand the detachment process at the end-of-use and apply those insights into a design for an end-of-use experience. Therefore needs to be explored which methods and techniques will work best to achieve this goal. The design questions that will be investigated are:

1) How can the detachment process be explained?

2) How can the students be enabled to identify the problems in the current situation?

3) How can the students look at it from both the consumer side and designer side?

4) How can the students gain insights into the consequences of the detachment process for consumers, product, and companies?

5) How can creativity be stimulated to help the students design an end-of-use experience fitting to the identified problems?

6.1.1 METHOD

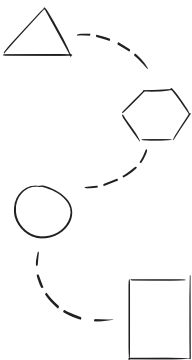
To finally have the concept of the tool that meets the requirements and achieves the goal, I will use an iterative design process. In this process I will try to answer these questions through different design iterations. Through these iterations can be explored which methods and techniques are suitable approaches to achieve the design goal and answer the design questions.

The different concept iterations will be tested with master students from the the Faculty of Industrial Design Engineering of the TU Delft through low-end prototypes. The tests will be observed with a focus on how the students interact with the tool and what problems they encounter. This method is good for validating assumptions made about the measure in which the used techniques in the tool will be useful (van Boeijen et al, p131, 2014). Furthermore, it is a useful method because it will show how the students will use the tool. Everything could be planned out, however, users are unpredictable. Seeing how the students interact with the tool, the

process and steps, will give insights into what should be changed in the design to achieve the intended use (Gould & Lewis, 1985). The students are also asked to give feedback and suggestions on the tool. Through the observations and feedback can be determined what should or could be changed in the next concept to improve it and get closer in reaching the design goal. This type of process has been chosen because it allows the problem to be broken up into sub-problems, and focus on investigating the design questions separately. Later, the complexity can be gradually increased by implementing multiple design questions into one iteration. To have to focus on a small portion of the problems helps in maintaining an overview and not being overwhelmed by trying to solve the whole problem at once.

The target group is very accessible, which allows for quickly setting up a test and validating the concept iterations. Insights can be gained fast, and the results can be implemented into a new iteration.

Moreover, the students are industrial designers who are trained to see opportunities and solve problems. Therefore, they can express their thoughts on what would help them or not in the tool and suggests changes. For this reason, their suggestions and feedback can be used to make improvements in the concepts.



Finally, this iterative process is a fluent process. Assumptions can be tested quickly and a new concept iteration can be made. By seeing how an iteration of the tool is being used can validate or disprove assumptions. This helps in making a new concept where the findings are implemented and that will be closer to reach the design goal. Testing the concept iterations will help to prevent stagnation of the design process and thus use the available time optimally and get the most out of it.

On the next page will be an overview of all the concepts that were developed and tested (figure 6.1). For each is described which main questions it tries to answers and which techniques are used. A total of 7 iterations have been tested before coming to the final concept. Predecessors of the tested concepts will not be discussed in this report. These were walked through by myself to make some final improvements on the concepts before testing them with the students.

OVERVIEW CONCEPTS

CONCEPT 1 - VALUE CARDS

Which design questions are tackled?

1

Approach

Different cards with explanations of the values to judge whether or not they are relevant for a consumer



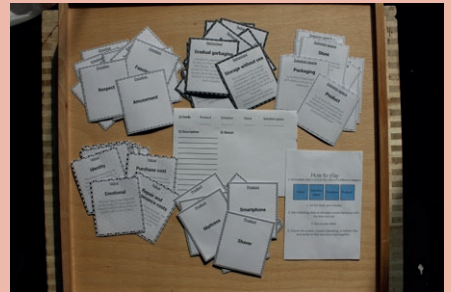
CONCEPT 3 - GAME

Which design questions are tackled?

5

Approach

Card game with different factors within four different categories. From each category a factor will be chosen that together provide a direction for a solution.



CONCEPT 5 - TEMPLATE V2

Which design questions are tackled?

1, 3, 5

Approach

Different sheets that show part of the detachment process forming the story process together. Through using figures of consumers and designers, the difference is made from which perspective should be thought. Using an association flower should stimulate the designers to see where they could intervene.



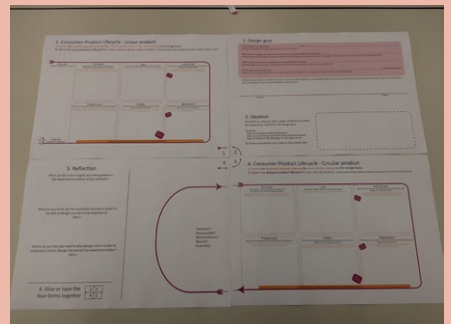
CONCEPT 7 - TIMELINES

Which design questions are tackled?

1, 2, 3, 4, 5

Approach

The customer journeys and product lifecycles are kept in the tool. But this time they are more related to each other to make it easier to see how the dispossession behaviours influence the product lifecycle. A linear lifecycle will be compared with a circular lifecycle, and shows how the designed experience influences the lifecycle by closing the loop with the final sheet.



OVERVIEW CONCEPTS

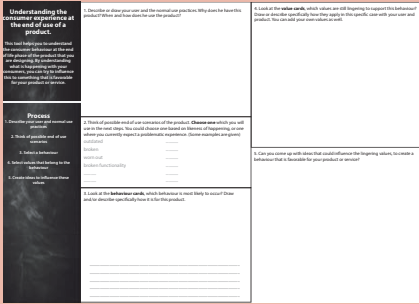
CONCEPT 2 - TEMPLATE

Which design questions are tackled?

1,4

Approach

A template that guides the students through the steps and provides context of use of the a new iteration of the value cards and the new behaviour cards.



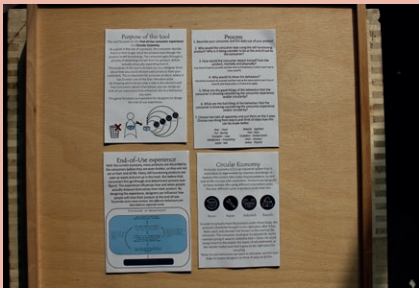
CONCEPT 4 - PROCESS CARD

Which design questions are tackled?

1, 2, 4, 5

Approach

A card with questions that guides the students through the analysis of the detachment process and what are the good and the bad consequences. Using two sets of opposite terms should create solution spaces that helps the students to focus on one kind of direction for ideation.



CONCEPT 5 - TEMPLATE V3

Which design questions are tackled?

1, 2, 3, 4, 5

Approach

Different sheets work through the whole process. The framework of detachment is left intact. Different colors differentiate the parts of the consumer side vs the designer side. Customer journeys, product lifecycle are used to find the problems and a design goal to define what problem the students will be focussing on with their ideation.



Figure 6.1: Overview of the prototyped and tested concepts

6.2 CONCEPT 1 - VALUE CARDS

The question that is examined with this concept is:
How can the detachment process be explained?

This concept investigates this by showing the different found values and how they relate to the decision making process on cards.

The values are next to the dispossession behaviours key elements in the detachment process, therefore there will be started with exploring how these can be explained to the design students.

The first concept idea is a first iteration on value cards (figure 6.2). The different values from chapter 4 are explained on these cards. Each category has a different color. The layout of the cards is simple because the focus lies on the content. Later will time be spent on the graphic layout of the cards.

Each card has a title (name of the value), a short description of how it plays a role for the product owner, and questions for the designers to help assess if this certain value could play a role in decision making of the product owner. Appendix 4 shows enlarged pictures of the cards. These cards were tested with two design students.



Figure 6.2: First version of the value cards

6.2.1 TEST 1

Aim

The aim of this test is to find out if the values that were found will also be understood by other designers. By seeing how the design students discuss the different values, and how they relate them to the end-of-use, will be discovered if the current descriptions are clear, and if they actually create more understanding about the end-of-use consumer experience.

Participants

This test will be done with two master design students, one from Design for Interaction and one from Integrated Product Design.

Procedure

The two participants will be introduced to the topic of circular economy, the concept of end-of-use experience, and how the project relates the two. Then they will be introduced to the different value cards, and are explained that values influence the end-of-use experience and the consumers' decision whether or not to separate from his product. Finally, they are shown a persona of 'Coen' that describes his use/purchase behaviour for a smartphone (Appendix 5). The students have to select which values might be important for this persona for his decision to keep his old product.

Results (figure 6.3)

The two students read all the cards one by one and based their decision on what they have read. However, there was little to no discussion happening between them. Furthermore, they selected cards as reasons for keeping the product only sometimes, but most of the times they selected the values as reasons to buy a new product.

When they were asked what they thought of

the value cards, they said the descriptions were clear. However, the cards contained thought stimulating questions but they didn't find them relevant and didn't know what to do with them.

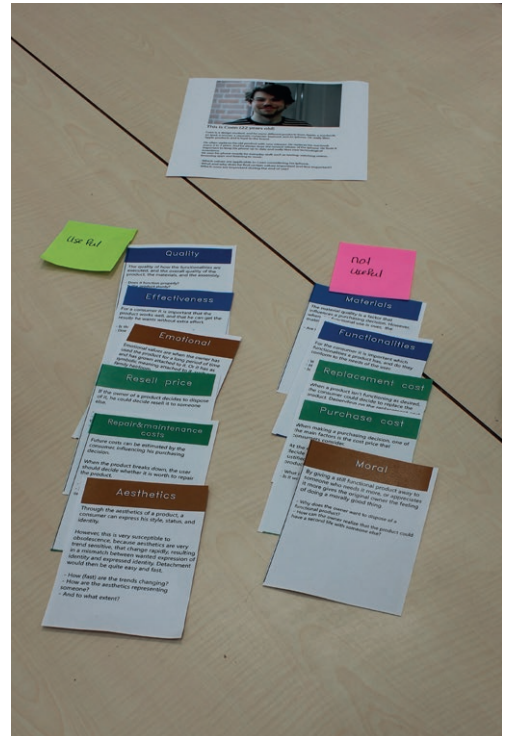


Figure 6.3: The values divided on relevant/not relevant by the participants

Discussion

Even though the participants found the description of the values clear, they found it difficult to see how they could use that information. Of course, the values are only a part of the whole experience, which could explain why they didn't have a big discussion since they didn't see how the values fit into the complete context of end-of-use experience.

6.2.2 CONCEPT REFLECTION

Conclusion

Although this was a small test, the main learning is that a context should be created in which the cards can be used. This will considerably help the design students to understand how these values play a role in the consumer experience. When creating the next concept, the focus will lie on implementing a context for the cards, to help the students understand better how this influences the decision making.



TAKEAWAYS

- 1) Provide context where the value cards will be used in
- 2) Make the same type of cards for the behaviours
- 3) Use titles for the text on the cards to make it clearer

When looking at conveying the message of the existence of the detachment process, and the values in that in that process, the students were not able to see how this would be important to know. Furthermore, the values alone do not give a complete representation of the detachment process. Designers are trained to think of creating new products, and thinking about how you can sell your product. This was noticeable during the test, where the students were more inclined to assign the values as to why the persona would want to buy a new one than to why someone would want to keep a product. Therefore, the tool should make it more clear that it revolves around the end-of-use phase of the product.

6.3 CONCEPT 2 - TEMPLATE

From the first test was learned that the value cards on themselves are not supporting the students to understand the end-of-use experience and how the values influence the decision making in the detachment process.

Therefore a context needs to be created in which these cards can be used. This context should show the detachment process and where the values fit in. The design question that will be examined with this concept is:

- 1) How can the detachment process be explained?
- 2) How can the students gain insights into the consequences of the detachment process for consumers, product, and companies?

This iteration is a template that guides the students step-by-step through the tool. Furthermore, in addition to the value cards, behaviour cards were made with explanations of the different dispossession behaviours (Appendix 6). Moreover, the values cards have been updated with more explanation on how they influence the consumer to show one of the dispossession behaviours and the questions were removed (Appendix 7). The combination of the different cards and having the students use them in the tool is an attempt to discover if this could be a way to explain the detachment process to the students.

<p>Understanding the consumer experience at the end of use of a product.</p> <p>This tool helps you to understand the consumer behaviour at the end of life phase of the product that you are designing. By understanding what is happening with your consumers, you can try to influence this to something that is favorable for your product or service.</p>	<p>1. Describe or draw your user and the normal use practices. Why does he have this product? When and how does he use the product?</p>	<p>4. Look at the value cards, which values are still lingering to support this behaviour? Draw or describe specifically how they apply in this specific case with your user and product. You can add your own values as well.</p>
<p>Process</p> <p>1. Describe your user and normal use practices</p> <p>2. Think of possible end of use scenarios</p> <p>3. Select a behaviour</p> <p>4. Select values that belong to the behaviour</p> <p>5. Create ideas to influence these values</p>	<p>2. Think of possible end of use scenarios of the product. Choose one which you will use in the next steps. You could choose one based on likeness of happening, or one where you currently expect a problematic experience. (Some examples are given)</p> <p>outdated _____</p> <p>worn out _____</p> <p>broken functionality _____</p> <p>_____</p> <p>_____</p>	<p>3. Look at the behaviour cards, which behaviour is most likely to occur? Draw and/or describe specifically how it is for this product.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
		<p>5. Can you come up with ideas that could influence the lingering values, to create a behaviour that is favorable for your product or service?</p>

Figure 6.4: The template

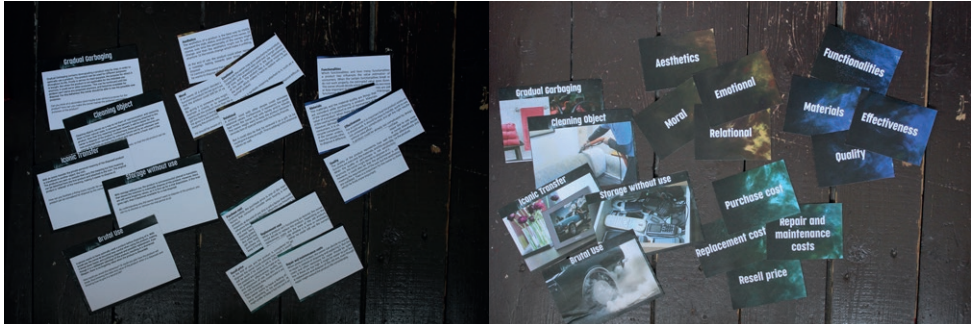


Figure 6.5: The behaviour and values cards.

The template focuses on the end-of-use phase. During the walkthrough of the different versions before coming to a final one, the decision is made to make the distinction between end-of-life and end-of-use. Because end-of-life products are broken products, that maybe could be repaired. However, repair is a behaviour with the intention to keep the product, and this project focuses on the part where consumers decide to separate from their product.

At the end of the template, the participants will be asked to think of an idea that keeps the product in the loop. This question is too see whether the students are able to see what the current consequences are for the product state, and how that could be changed.

Use

In the first step the designers should define the user and usage scenarios so they have some context about their target group.

The second step asks designers to think of possible end-of-use scenarios that could appear for that product and user.

Then they have to look at the behaviour cards and choose the most likely one, followed by looking at the value cards. By asking the designers to specify how the values play a role for their consumer and product, they can identify which one (could) cause problems.

The final step is thinking of design solutions that influence the lingering values found in step four.

This step is purely to see whether the first parts help the design students come up with ideas to solve the problem with the current behaviour. This template was tested, together with the behaviour cards, and new version of the value cards.

6.3.1 TEST 2

Aim

The aim of this test is to find out how the designers could be guided through understanding and designing of an end-of-use experience. The main focus of the concept is having the designers understand the current detachment process and corresponding experiences, and which factors influence this. A small part of the test will be destined for trying to create an idea to improve the end-of-use experience to see whether the insights gained in the process give ideas.

Participants

The test will be done with two master design students, both from the track Design for Interaction.



Figure 6.6: Participants filling out the template

Procedure

The students are first introduced to the topic of end-of-use experience, and how this project relates to that. They will get a small explanation of the existence of values and behaviours and their role in the detachment process but do not yet get to read the cards. Then they will be given the template, and explained what its goal is. Next, they will

be asked to fill out the template for a smartphone, but they can decide the target group. The behaviour cards and value cards will be given at the specific steps where they are needed, to not cause unnecessary distractions during the first couple of steps.

Finally, they can ask questions when something is unclear in the template, but no direct hints or examples will be given that could steer their thoughts and ideas. Afterwards, they are asked to give some feedback on their process and the tool.

Results (figure 6.7)

During the first step, they wrote user characteristics, product characteristics, and some usage scenarios as well. In the second step, they wrote both end-of-use scenarios as end-of-life scenarios.

During the third step, they read all the behaviour cards thoroughly. They didn't choose the obvious behaviour of Storage without use, but they went for Cleaning object. The pictures on the cards helped them understand the behaviour better in addition to the textual explanation. However, they wondered out loud about Brutal use, but together they figured it out. One even said: "I could imagine you do this with old shoes. You wear them in more rough situations, such as walking in the forest with mud. When you don't mind them being dirty anymore".

Step five caused the most problems and raised the most questions. The inquiry that was used there is based on the assumption that the chosen behaviour at step three is bad. However, they chose 'cleaning object' and giving the phone to a relative. This is actually already a good behaviour considering circularity.

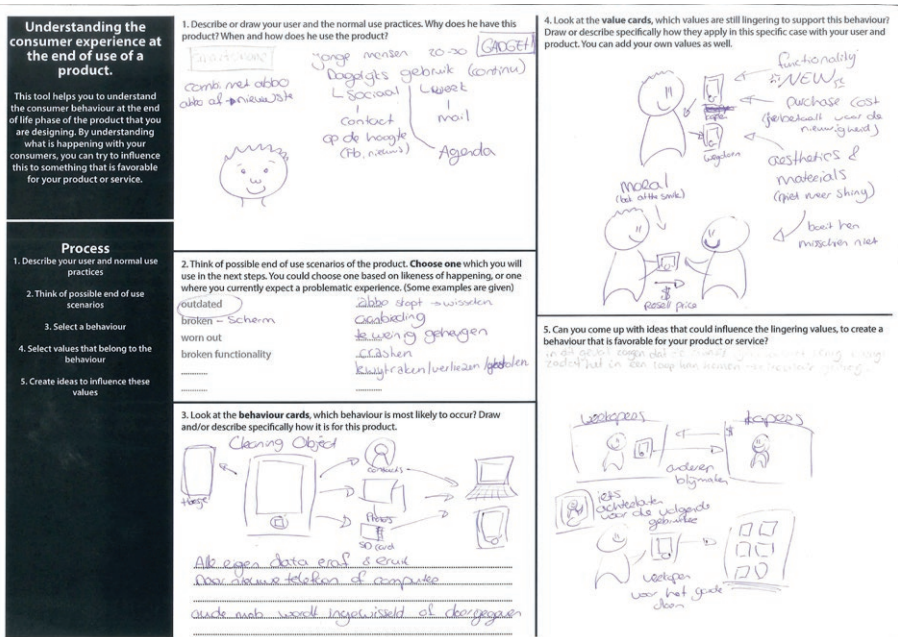


Figure 6.7: The template filled out by the participants during the test

The participants had some comments and suggestions as well. They thought the order of behaviour and values should be reversed, however after they were explained that working back from behaviour to values is easier, they agreed that it was more logical.

Moreover, because they chose an already positive behaviour, they were confused on what they should do at step five. They suggested to create an extra step where they could write what is positive and what is negative, so then they can either change the negative values or enhance the positive ones. Furthermore, they found that the design ideas they created were quite obvious. Moreover, they recommended that the tool should have something unique to stand out since there are already many design tools available in the form of cards and templates.

Finally, they didn't read the black boxes on the left of the page, and after they read it at the end they didn't think it was clarifying enough what the purpose is of the tool and the process was not yet a

useful addition.

Discussion

The main aim of the template was to have the students understand better how the end-of-use experience worked, and the factors involved. How the values influence the behaviour is being understood by the students. However, how they create and end-of-use experience is not yet fully achieved.

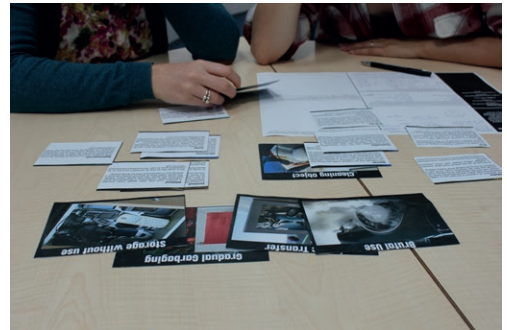
Furthermore, there are still many details that are not right that hinder the effectiveness of the template. For example, in the step where asked about end-of-use scenarios they were provided some examples, however, some were examples of end-of-life. This caused confusion. Moreover, the template was made in the assumption that the behaviours chosen are bad ones. But when chosen a positive one, the phrasing of the assignments are not fitting which disoriented the participants. They suggested to create an extra step where they could write what is positive and what is negative, so then they can either change the negative values or enhance the positive ones.

Therefore, the step between finding values and designing is too big. Additionally, it is not yet clear enough that they should create ideas to stimulate/achieve circular behaviour. Because the template is quite straight to the point and doesn't really use different techniques to stimulate idea generation, the results are quite obvious. This was also mentioned by the participants. They recommended that the tool should have something unique to stand out since there are already many design tools available in the form of cards and templates.

Conclusion

Even though the relation of the values and behaviours is being understood, many improvements can be made. First, having the students making the link between the detachment process and the corresponding experiences. Moreover, the relation of end-of-use with circularity should be made more explicit. Especially of the consequences for the product with the certain behaviours, and designing experiences that make products stay in the loop. Furthermore, the phrasing should be improved to be more straightforward and less ambiguous, being left open for interpretation. This applies to explanations, questions, and examples. Moreover, there should be thought about on how to present the goal of the tool, and the process the designers will go through, in order for them to know where they are going to work towards to. However, a too long or elaborate of an introduction should be avoided, because that would cost too much time which could be spent on filling out the template.

Finally, this template is not unique enough to really provide inspiration. It could be used for having designers understand the situation, but for designing, this tool is not stimulating and out of the box enough.



TAKEAWAYS

- 1) Create a clear introduction to the goal of the tool, and the process the participants will go through
- 2) Make clear distinction between end-of-use and end-of-life
- 3) Relate the tool more to the goal of stimulating circular consumer behaviour
- 4) Use more neutral phrasing to fit with both positive and negative behaviours.
- 5) Find different ways to stimulate idea generation

6.3.2 CONCEPT REFLECTION

Through using the value cards and behaviour cards at the same time, and seeing how they relate gave the students insights into what things play a role in the detachment process. Forcing them to think about how these values manifest themselves they gained more feeling with the topic.

However, what the consequences are of the behaviours are still unclear, and should receive more attention. Moreover, how the consumer feels in the detachment process could be emphasized, especially how the values influence this. Therefore, the goal of the tool is not yet clear enough, and the students don't know where they are working towards to.

6.4 CONCEPT 3 - GAME

During the second was learned that the tool should provide inspiration for ideation. Therefore, the design question that will be tried to answer with this concept is:

How can creativity be stimulated to help the students design an end-of-use experience fitting to the identified problems?

This concept focuses purely on the ideation part of the tool. Through a game with multiple factors, a problem context is created and a solution direction is scoped. It makes the problem concrete for the students and allows them to focus faster on one problem definition.

The analysis of the consumer behaviour and end-of-life experiences are left out of this concept. This concept is purely to explore different techniques of idea stimulation.

The concept is a game, played by four people, and is inspired by the card game 'The thing from the future' by Situation Lab (figure 6.8).

Factors on the cards

Designing for an end-of-use experience means designing for a specific type of product and tackling lingering values and/

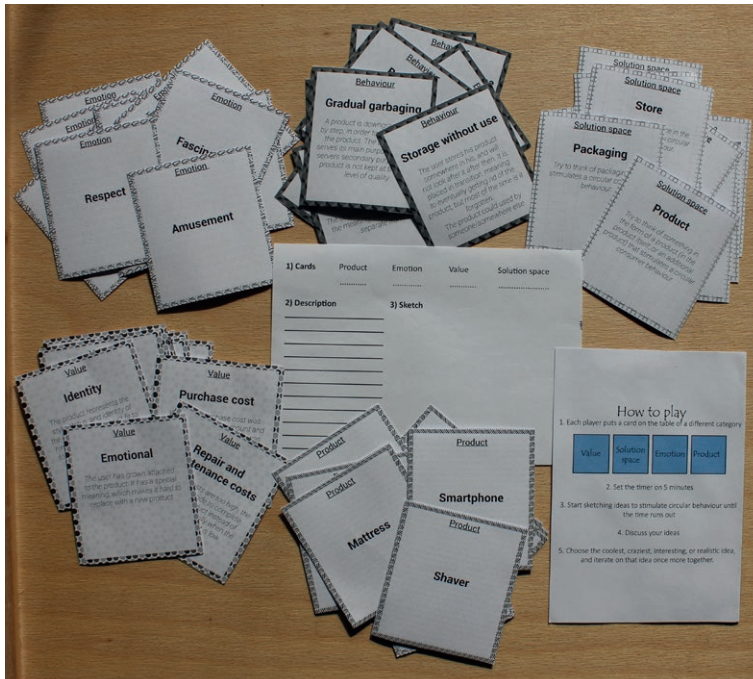


Figure 6.8: The game with the five different categories and sketching paper

or dispossession behaviours. The experience should give the consumer a positive feeling, which could be decided by designers what they want their consumer to feel. And finally, the experience could happen through different channels, such as in the store, product, packaging or service etc.

These factors together form a design context where students can try to design an experience fitting to all these factors.

Use

There is a stack of 60 cards with different factors on them. These factors are divided into four categories: product, solution space, value/behaviour, and emotion. Each player gets to pick 8 cards and can put one card in the middle of the table. For each round, there has to be one card of each category on the table. The players have to think of ideas of creating an end-of-use experience fitting these four factors in 5 minutes, using the sketch papers. Then they have to discuss their ideas with each other, choose one idea and iterate on that one together for another 5 minutes on a blank paper.

It is not about creating a fully worked out concept, but it about having the designers be aware of the different factors playing a role, and creating out-of-the-box ideas for it.

Categories

- 1) The product category shows for which product they have to design for.
- 2) The solution space gives more direction where they should create ideas for.
- 3) The value/behaviour are the different values and consumer behaviours and the end-of-use. There only has to be one of them on the table, otherwise there will be too many factors, and making it too complicated for the player to take all of them into account.
- 4) The emotion is the feeling the consumer should have with the designed end-of-use experience.

With the game, are also some information cards, providing some context about circular behaviour, end-of-use experience, and an introduction to the tool.

This card game is tested with three design students.

6.4.1 TEST 3

Aim

The aim of this test is to see if this kind of game could inspire designers to create more out of the box ideas on how to shape an end-of-use experience that stimulates circular consumer behaviour. In this concept, the focus lies on idea generation and does not go into depth into the understanding of the end-of-use situations.

Participants

This test will be done with three master design students. One from Design for Interaction, one from Integrated Product Design, and one from Strategic Product Design.

Procedure

First, the participants will be introduced to the topic. Then the tool and its goal will be explained, and this is meant as an educational tool. It will be emphasized that the goal is about creating ideas for experiences that are stimulating circular behaviour among consumers.

After the introduction, they will start playing the game. They will each get 8 cards, and put a combination of four cards on the table. In 5 minutes they individually generate ideas on the sketch papers. When the 5 minutes are over, they explain to each other their ideas, choose one, and iterate together on that specific idea once more. The participants play the game twice, once for a randomly chosen product, and one time for a smartphone.

Afterwards, they are asked to give some feedback on their process and the tool.

Results (figures 6.10 - 6.13)

Before starting, the participants had a lot of questions and had trouble understanding what they had to do. During the first round,

they had some problems with creating ideas based on four factors. The factors for the first round were: toothbrush (product), relief (emotion), product (solution space), replacement cost (value). At first they had Cleaning object as behaviour, however, they found the combination of that with a toothbrush and circularity not really fitting, so they replaced the behaviour card.

After explaining their ideas to each other, they quickly chose one idea and iterated together. This went quite well. They found it necessary to define a target group, so they could focus more on how to form the solution. In the end, one noticed that they kind of let lose of the factors on the cards, so the final idea didn't fit that well to the cards anymore.

The second time they played the game, the individual round went better. One participant even made a very quick paper mock-up. The factors in this round were: smartphone (product), satisfaction (emotion), packaging (solution space) effectiveness (value).

During the feedback round, there were some mixed opinions. First, they liked that they were forced to work with certain factors. They were able to focus easier



Figure 6.9: Participants playing the game

and work in one direction, speeding up the thought process. However, they found four factors too much. They found the emotion category difficult but really liked the solution space. A suggestion was made to only use one card at a time.

Furthermore, they liked the part where they collaborated, but it was unclear that the tool is educational, and that it is not expected that they provide a fully worked out concept.

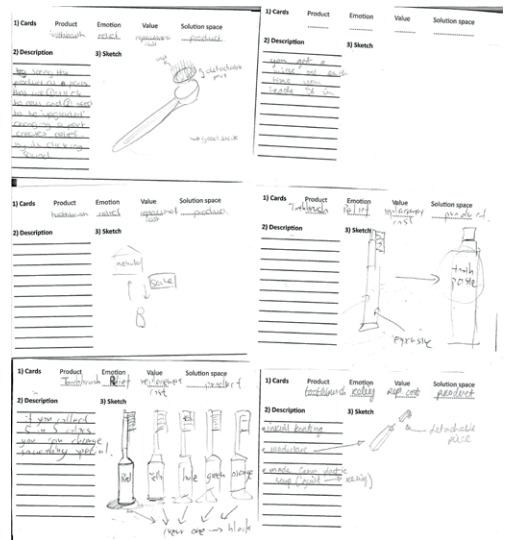


Figure 6.10: Sketches of the round with the toothbrush

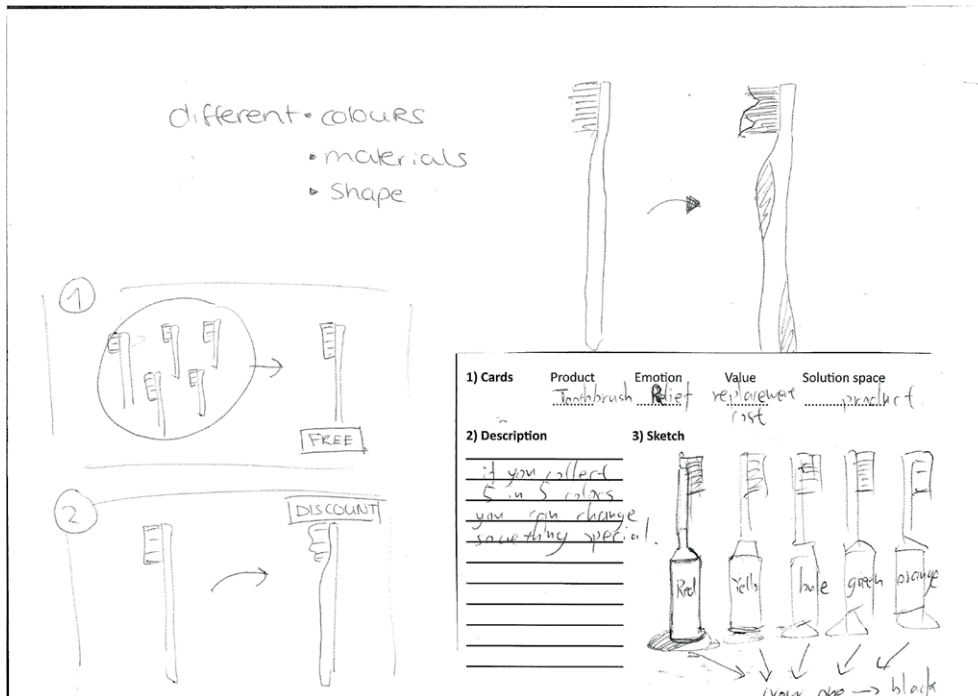


Figure 6.11: Result of the chosen concepts for a circular toothbrush

Discussion

The ideas that the participants came up with are more out of the box than the ideas that were generated with the template in test 2. But there are some improvements to be made. Firstly, the goal should of the tool be made more clear, that it is purely educational. Additionally, there should also be a (short) visual and textual explanation about the end-of-use and circularity incorporated in the process.

During the part where they work together, they forget about the four factors they have lying on the table.

Finally, because this game focuses purely on the idea generation, the participants didn't have knowledge about the current end-of-use processes and experiences. It seemed that this knowledge would have helped them understand better what they were supposed to do.

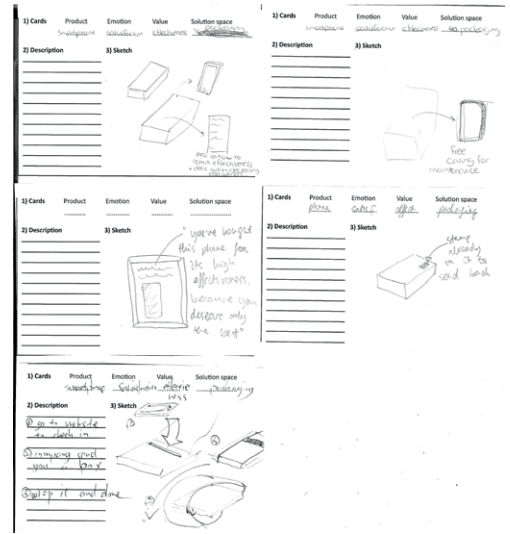


Figure 6.12: Sketches of the round with the smartphone

1. when I buy the phone, I can choose the selection of returning at the end of life of the phone
→ discount
2. get the new phone with a cool design box
→ already have the stamp in it.
→ returning
→ wrap it up

Figure 6.13: Result of the chosen concepts for a circular smartphone

Conclusion

Even though the generated ideas were good, and not that obvious, which was the main purpose of the tool, the bigger picture of how this tool fits in with the end-of-use experience is missing. Maybe it would be better if there is an analysis of the process before they start with idea generation.

I do believe that four factors are not too much, as some participants mentioned, but they need more background information of the consumer experience and their behaviours in order to be able to actually work with the four factors. It is understandable they encountered some difficulties.

Finally, a moment of reflection should be built in, where they lay their idea next to the four cards and check in what amount their idea matches the factors.



TAKEAWAYS

- 1) Generating ideas without analysing and understanding the situation of the end-of-use experience is difficult for the participants
- 2) There should be a clear introduction of the goal of the tool, and how to work with it.
- 3) In the end, there should be a moment of reflection

6.4.2 CONCEPT REFLECTION

This game could be a form of creativity stimulation. However, on its own it will not work. Furthermore, there needs to be a problem definition and understanding of the problem before solutions can be created. To find a problem, the students need to have insights in the detachment process. Finally, when having defined a problem after analysing the detachment process, the game will be unnecessary since it provides different elements for a problem definition that already has been defined according to their findings.

6.5 CONCEPT 4 - PROCESS CARD

This concept is quite straightforward; it is a card which shows the steps the designers will follow (figure 6.14). This was made at the same time as concept 3, so it doesn't have the takeaways from that test incorporated in it.

This concept is to see whether the analysis of the detachment process and design can be combined into one tool, or if that would be too much. An additional card provides information about the end-of-use experience and consumer behaviours that are helping to close the loop. The designers can just use blank paper to answer the questions for each step. The questions are similar to the ones from the templates. However, there are no examples given.

The main questions that are trying to be answered with this concept are:

- 1) How can the detachment process be explained?
- 2) How can the students be enabled to identify the problems in the current situation?
- 3) How can the students gain insights into the consequences of the detachment process for consumers, product, and companies?
- 4) How can creativity be stimulated to help the students design an end-of-use experience fitting to the identified problems?

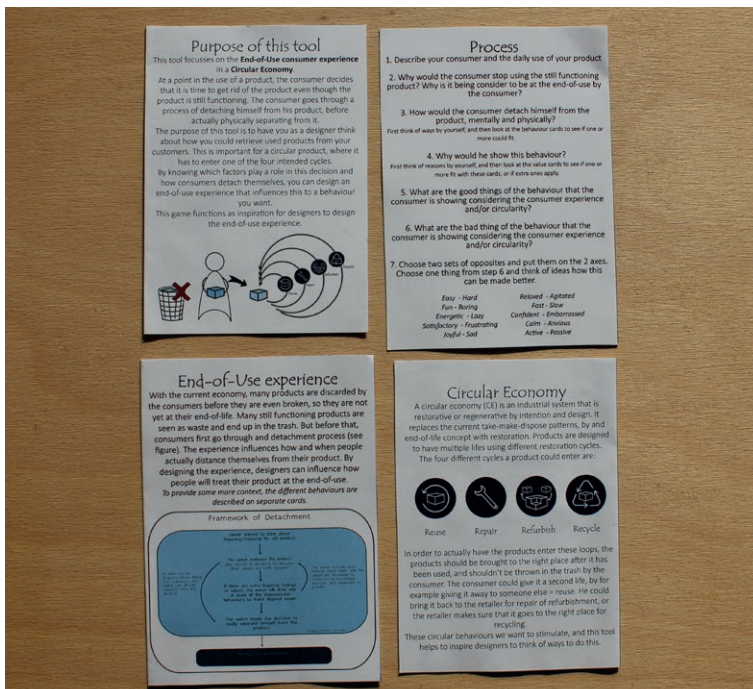


Figure 6.14: The process cards

This is done by guiding the students through the process of determining when something is at the end-of-use and using the value and behaviours cards to fill in the detachment process. Furthermore, they are asked to think of the consequences for the product and its circularity, and identify how these emerge from the behaviours.

The method to stimulate creativity is to have the students choose two sets of opposite keywords and set them out on a paper divided by two crossing axes. This will create four solution directions.

Use

The steps are:

- 1) Describe your consumer and the daily use of your product
- 2) Why would the consumer stop using the still functioning product?
- 3) How would the consumer detach himself from the product, mentally and physically? (First think of ways by yourself, and then look at the behaviour cards to see if one or more could fit)
- 4) Why would he show this behaviour? (first think of reasons by yourself, and then look and then look at the value cards to see if one or more fit with these cards, or if extra ones apply)
- 4) What are the good things of the behaviour that the consumer is showing considering the consumer experience and/or circularity?
- 6) What are the bad things of the behaviour that the consumer is showing considering the consumer experience and/or circularity?
- 7) Choose two sets of opposites and put them on 2 axes. Choose one thing from step 6 and think of ideas how this can be made better. (draw 2 axes in the middle of the paper, crossing each other, resulting in four compartments)

Energetic-Lazy

Joyful-Sad

Fast-Slow

Calm-Anxious

Satisfactory-Frustrating

Relaxed-Agitated

Confident-Embarrassed

Active-Passive

6.5.1 TEST 4

Aim

The aim of this tool is to combine the analysis of the end-of-use consumer behaviour with idea generation that uses opposite factors. The participants will be able to understand the experiences and through this understanding know where they could design certain experiences.

Participants

This test will be done with two master design students, one from Design for Interaction, and one from Strategic Product Design.

Procedure

The students will get introduced into the topic of end-of-use consumer experience, circular economy, and will be shown the framework of product detachment. This will be followed by the process card with the different steps they will walk through. The value cards and the behaviour cards will be given to them at the steps where they should be used, to prevent unnecessary distraction in the earlier steps.

They use a smartphone as case study.

Afterwards, they are asked to give feedback on the process and the tool.

Results (figure 6.16)

The students were very thorough when it came to answering the questions. They discussed a lot with each other. A clear persona was made, based on own experiences. When thinking of how a consumer detaches, they first thought of reasons themselves before looking at the value and behaviour cards. It was good to observe they came up with answers on their own, that were also on the cards. When having read the cards, the participants added some extra they didn't think of by

themselves. However, what was noticed that some of the texts on the value cards were too long or confusing, resulting in discarding that value completely.

The task of writing down the good and bad things considering circularity were a good set-up for the final task of the idea generation.

By choosing two sets of opposites, and putting them on a vertical and horizontal axe, they were able to come up with some fun and nice ideas.

The feedback they gave showed that it helped to have both the understanding and idea generating aspects in one tool. The using the sets of opposites was enjoyed by the participants. One participant said, "it gave direction, but didn't limit me too much".


Finally, they did say that the text on the cards is too long and that illustrations would be a nice addition.



Figure 6.15: Participants using the value cards during the test

Discussion

As seen during the test, a combination between analysing and idea generation works well. However, this will mean that timespan for using this tool should

1.  Apple iPhone.

- Easy to use
- CONVENIENCE
- A price/quality

DESIGNER

- uses phone for job related stuff
- taking pictures
- social media
- music

TRUST because of past experience

Daily used 24/7

2. Low Battery life.
No updates anymore for the "old" phone.
If it's too old. (New phones are already launched)

3. product

- Knowing ~~about~~ if the use of the phone is same/different → getting use to new functions.
- When making sure that all the content is safe and transferred on the new phone
- prepare for it
- put into a drawer when it's useful again → (working/holiday)

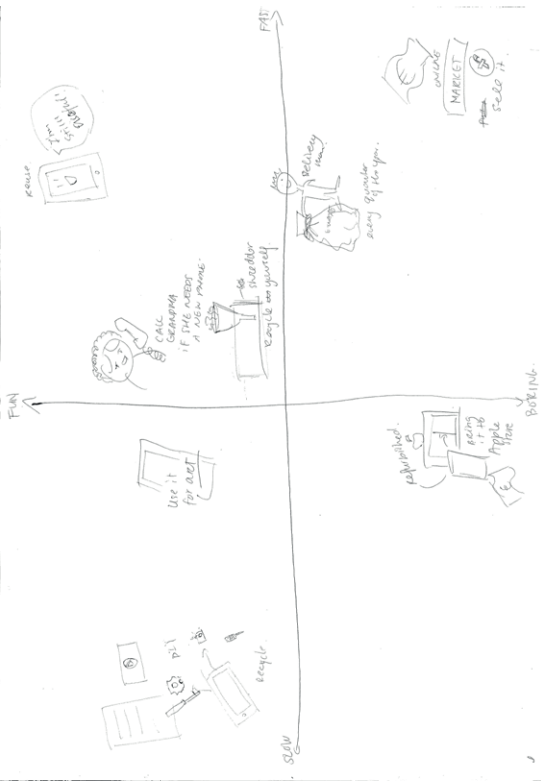
4. This still worth some money.
She knows that it's still valuable.
She doesn't need the money that much.
→ She can't afford to sell it.

Effectiveness
Purchase cost
Resell price
Emotional.

5. She knows that she can reuse it again.
She doesn't create waste.
Life-extension of the product (prolongs)

6. it takes up space
His just delaying life → still dispose it.
Don't go in loops.

7. Reuse
Repair
Recycle.



REUSE from existing phone

CALL CLEANING "IF THE NEED" "FOR PHONE"

REPAIR share the spare part recycle on your side

RECYCLE Apple

REUSE from existing phone

FIN

PAST

reuse

repair

recycle

reuse

Figure 6.16: Answers of the participants to the questions on the process cards

be longer than 30 minutes as was used during the test. Furthermore, the balance between the focus on experience and circularity is still not quite there yet. The participants focussed during the generation part more on experience than on circular behaviour and solutions. This should be emphasized even more. Lastly, when shown the framework of detachment, the participants would like to see the tool to relate more to that.

Conclusion

It is important to go through the whole process of analysing and idea generation. However, it could be an option to have multiple tools, each with their own purpose, but that they still relate to each other, and can be used in a consecutive order.

Having a forced solution context helps the students to create more ideas since there are 'requirements' that the solution has to fit to.

Furthermore, the text on the different cards are too long, and illustrations would be helpful to make them better and quicker understandable and shorten the text.

Finally, the framework of detachment should be incorporated more into the tool, because that gives a really good sense of context for the participants and makes them understand better what they are doing, and where they should focus on.



TAKEAWAYS

- 1) Having analysis of the end-of-use experience followed by idea generation is very useful, it could be split into multiple tools that are used consecutively
- 2) Incorporate framework of detachment into tool to provide context
- 3) Use more illustrations and less text on the cards

6.5.2 CONCEPT REFLECTION

Walking through the steps of this tool and using the value and behaviour cards did give the participants insights into the detachment process and how these influence that. Asking the specific questions about what is good and bad about the behaviours helps them to see the consequences. However, to have the students be able to extract the problems from the detachment process and behaviours is not fully achieved yet. The technique to stimulate creativity gives direction to the students, however, the ideas were very superficial and didn't really solve problems, due to not having determined a problem statement.

6.6 CONCEPT 5 - TEMPLATE V2

This concept contains both analysis and idea generation. It is derived from the framework of detachment and is dissected per step. The main questions that will be explored with this concept are:

- 1) How can the detachment process be explained?**
- 2) How can the students look at it from both the consumer side and designer side?**
- 3) How can creativity be stimulated to help the students design an end-of-use experience fitting to the identified problems?**

The tool is a template with different sheets (figure 6.17). Each sheet is a step in having the design students understand the detachment process and consequences. The tool tries to let the students see the end-of-use phase from both consumer side and designer side through the use of layout and figures of a consumer and designer. In the tool, the students are asked to define when a product is considered to be at the end-of-use. Continuously, they are asked to think of why consumers wouldn't want to separate, and what kind of behaviour they will show because of that. Furthermore, the concept will try to explain the detachment process and identify the problems by defining what they need to change with the found behaviours by asking the question of what would happen with the product due to the chosen behaviour. In the end, they have to reflect on their process by thinking and writing down the insights they have gained on detachment. Finally, the new method to stimulate creativity is having the students fill out an association flower. Through flower association,



Figure 6.17: The sheets of the concepts, and the latest version of the cards

people are stimulated to generate associations around a central term (Tassoul, 2009). This is a way to first start with the more common associations, but after a while, creative and individual associations will start to appear.

Use

Globally seen, it leads them through the detachment process. Step 0 shows the purpose of the tool and the different steps of the tool.

The first step is to define the product, how it is circular and what you want your consumers to do with your product in order to close the loop.

In the second step, the designers look at the product from the consumers' perspective. Here they will analyse when the consumer decides the product is at the end-of-use, and which values and behaviours are playing a role. A new iteration on the value and behaviour cards can be used by the designers.

The third step looks at it from a designers perspective and what kind of experience they want to achieve. They choose a solution space (product, packaging, service, sending, delivery, store) to focus on in the ideation step, and use an association flower to think of all the elements in this solution space that could play a role in the experience.

This is followed by step 4, the ideation step. Here they create some small ideas on how to create the experience they want their consumers to have.

Finally, the designers reflect on the process, what new things they have learned, their design ideas, and what they still find unclear or missing.

6.6.1 TEST 5

Aim

The aim of this test is to see if the combined processes of analysis and design creates more insights and more out-of-the-box ideas for achieving end-of-use experiences. The tool walks the participants through the whole process, from the introduction to reflection. Furthermore, each test has a different kind of inspiration, and this time it will be stimulating creativity through an association flower.

Participants

The test will be done with three master design students, two from Design for Interaction (P2 and P3), and one from Integrated Product Design (P1). P1 is doing a project of her own about the circularity of a Philips Senseo machine and has knowledge about what a circular economy is.

Procedure

The students will get a short introduction to the graduation topic, and they will be told that this is an educational tool. They will be given the different sheets in the right order, starting with an introduction sheet with more explanation of the process and tool. The behaviour and value cards will be given at the specific steps they are needed to prevent distraction.

Even though the reflection asks a question about what they still find unclear or missing, the participants are asked to give feedback on the process and the tool as well.

The product they will take as a subject when using this tool will be a Philips Senseo Machine because one participant (P1) is doing her project about retrieving those machines. In this way, it can be tested if the tool is universal, and if and how it helps people actually working on a specific project.



Figure 6.18: Participants filling out the template during the test

Results (figures 6.19 and 6.20)

The students looked shortly at the introduction page but started quickly on the first step. Because P1 has knowledge on Circular Economy and the product, she provided most of the context for the product definition. For step 1.2 they wrote how each of the cycles could apply to the product.

During the second step, the participants discussed a lot with each other on the different behaviours, values and when the product is at the end-of-use. They found the cards really helpful. They only read the key sentence on what a behaviour was and the example.

In step 3, they did not immediately see the difference between the images of the consumer and designer, causing some confusion from which perspective to fill out the questions. Furthermore, they had trouble choosing only one solution space, they felt that multiple things were related to each other. The association flower was helpful for inspiration. Finally, the ideation part went really well, and the participants looked back on their process during the

ideation. They also took references from existing ideas and translated them to their own product and problem.

In the end, when filling out the reflection, the students were really enthusiastic about the tool and felt that the overall process is good. They said it is nice to be forced to focus on a small part of the problem instead of trying to solve it all. Furthermore, they learned to look at the problem from both consumer and designer perspective. They saw and acknowledged now that there is a mental process of dispossession happening before the actual physical separation.

However, what they missed, was a step where they should think of why the consumer might want to separate, next to the question of why he doesn't want to separate.

Moreover, P1 was really excited by the tool, she learned some new things, and it allowed her to see her project and problem from a different perspective which gave new insights. The discussion with the two other participants also gave her new insights and ideas. She was very happy about the ideas they created.

Discussion

Even though the participants were saying that they find the tool clear, and forced them to think about a small portion of the big problem, it is not yet perfect and multiple things could be improved. For example, the phrasing of the questions was not always clear, and participants discussed a lot with each other on what they think the question was and what they are supposed to do. Furthermore, the terms end-of-use and separation should be explained better.

During the test was noticed that the big picture of what and why the participants are asked to fill out got lost. This happened in the process of making the many iterations of this concepts before ending up with this version. Therefore they just filled it out step by step, but couldn't see why and how everything relates to each other. A suggestion was made, that the process described in step 0 could be visual and the relation between the steps are shown.

What the participants also said, is that they didn't read the text accompanying each step. Even though they agreed it is not that much of text, they admitted to be lazy, and therefore didn't read the text. Making the information more visual would stimulate them to look at it more.

Conclusion

The overall goal of the tool is achieved, the participants worked through it, understanding more of the detachment process with each step. They looked at the end-of-use experience from the designer perspective as from the consumer perspective. And they learned that there is a mental separation process happening before the physical act of separation.

The combination of analysis and ideation is working well together. The main issue with the concept is that the 'why' is lost. Why use this tool (educational, ideation?), why these steps and what is their relation to each other? Moreover, next to the step of why consumers don't want to separate from the product, the participants missed the step of why consumers do want to separate.

Furthermore, the phrasing of the sentences should be clearer and more

1

Circular Economy

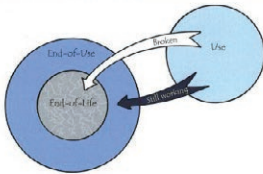
A circular economy (CE) is an industrial system that is restorative or regenerative by intention and design. It replaces the current take-make-dispose patterns, by an end-of-life concept with restoration. Products are designed to have multiple lives.

The four different cycles a product could enter are:



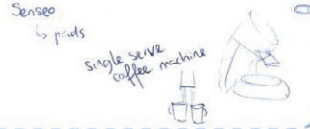
End-of-Use

With the current economy, many products are discarded by the consumers **before** they are even broken, so they are **not** yet at their end-of-life. So still functioning products that are not being used anymore are at their **end-of-use**.



Product definition

Describe and visualise the product you for which you will study the end-of-use phase.



This is the how the product is envisioned to be circular. (Which of the four cycles will it go through?)

- repair - some parts are replaceable by user
- some parts/systems by a service/company
- refurbish - bought a secondhand/refurbished machine
- reuse - if secondhand bought or part
- recycle - people need to return it/recycling point

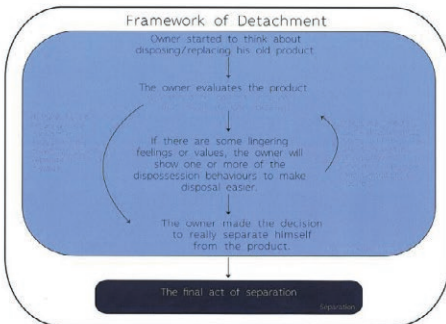
This is want we want the consumer to do at the end-of-use

For people to deliver it in its whole to a recycling point / store its bought at / etc.

2

End-of-Use experience

Many still functioning products are seen as waste and end up in the trash. But before that, consumers first go through a detachment process (see figure). The experience influences how and when people actually distance themselves from their product. By designing the experience, designers can influence how people will treat their product at the end-of-use. In the case for a circular product this will mean stimulating a circular consumer behaviour. The consumer will give the product a second life by for example returning it, reselling it or giving it away.



Consumer experience

Finish the sentences and visualise the situation.

My possession is at the end-of-use when...

need for upgrade
independent of coffee of this specific machine

But I will not separate from it yet because*...

There is still a value. - money
- function (back-up machine)
- effectiveness
- moral

*You can take inspiration from the value cards

I will separate from it when...

And will most likely show this behaviour**.....

if it's replaced
storage without use

**You can take inspiration from the behaviour cards

Figure 6.19: Filled out sheets forms by the participants (continues on next page)

3 Defining End-of-Use experience

This is ^{what} we want the consumer to do at the end-of-use (From step 1)

deliver at recycling point / store

(From step 2) I will separate from it when...

it's replaced

We want to design an end-of-use experience where consumers... (Emotion? Behaviour? Effort? etc)

where it feels like no effort
where you feel good about your behavior
where the return-experience is fun

Choose one solution space where you are going to focus on and write that down in the middle of the flower.

Product - Store - Service - Packaging - Sending - Delivery

Think of possible elements that you associate with the chosen solution space which could play a part in this solution.

Write them down in the flower petals. You can add as many petals as you want.



4 Designing End-of-Use experience

Create ideas for end-of-use experiences that either change or stimulate the consumer behaviour to be more circular.

Use step 3 as inspiration where you could make design interventions. (It is not about creating a fully worked out concept, but it is just about thinking of different design solutions)

confetti taart

surprise element

invoicing experience
→ zeer en cool uit

code manier van verpakken in leaf inpakken



to the point of what is expected from designers. The texts and description of the process could be more visual because the participants still didn't read it even though the current texts are not that long. Lastly, there should be an explanation of the four different circular cycles, because designers without that knowledge should be able to understand and use it as well.



TAKEAWAYS

- 1) Combination of analysis and ideation works well
- 2) Ask both for why does and why doesn't the consumer want to separate
- 3) Visualize the process the participants will follow
- 4) Visualize the use of different tools (cards, framework of detachment) in the process
- 5) Describe the goal for each step briefly
- 6) Describe the goal of the tool
- 7) Make a clearer visual distinction between consumer perspective and designer perspective
- 8) Explain the different circular cycles

5 Reflection

How did the process help you understand the current end-of-use experience? Did you learn something new?

onder scheid tussen designer & consumer perspective.
mental vs. physical separation → meerdere stappen

Looking at step 4, how well do you think your ideas for an end-of-use experience for a circular economy fit with the contents of all the previous steps? Why?

past wel, spreekt elkaar niet tegen

What is still unclear or missing in order for you to understand and design for the end-of-use experience?

waaron niet separeren
↳ wel!

Figure 6.20: Filled out reflection form

6.6.2 CONCEPT REFLECTION

Breaking up the detachment process, where the students go through the process step by step helps them to link them together in the end. By starting to think about when something is considered to be end-of-use helps them getting insights into the consumer perspective.

Using clear visual cues to distinguish the consumer from the designer in the process helps the students to switch between their perspective as a consumer and as a designer. It gives them more sense of what they should be doing and in what way they have to look at the process and problems.

Filling out the reflection made the students relate all the steps in the process to each other, and make them think of what they have actually learned.

Finally, the association flower helped them to think of different touch points with consumer where they could create an experience for. However, it is important to have a problem definition for which a solution space can be chosen and a flower can be filled out.

6.7 CONCEPT 6 - TEMPLATE V3

Building on the previous concept, this concept is the next edition, but the structure of the framework of detachment is left intact and different layout is used. The design students work through the detachment process step by step (figure 6.21). **All of the main design questions are tried to be answered with this concept.**

Through leaving the order of framework intact in the steps, it will be examined if this would help the students to understand the detachment process better. Examples are given with each step to make it more clear what the intention is of the steps and what the students are supposed to do. Using customer journeys and product lifecycles, they are stimulated to view the problems in a context and relate the consequences of the behaviours to the lifecycle of the products. Furthermore, they are asked to set-up a design goal that requires them to define the problems they want to tackle. To make a clear distinction between the part where they have to look from their consumer perspective or from their designer perspective, the parts in the tool have different colours. The customer journey is also used as a form of inspiration, where they have to define what kind of journey they want their consumer to have in the future.

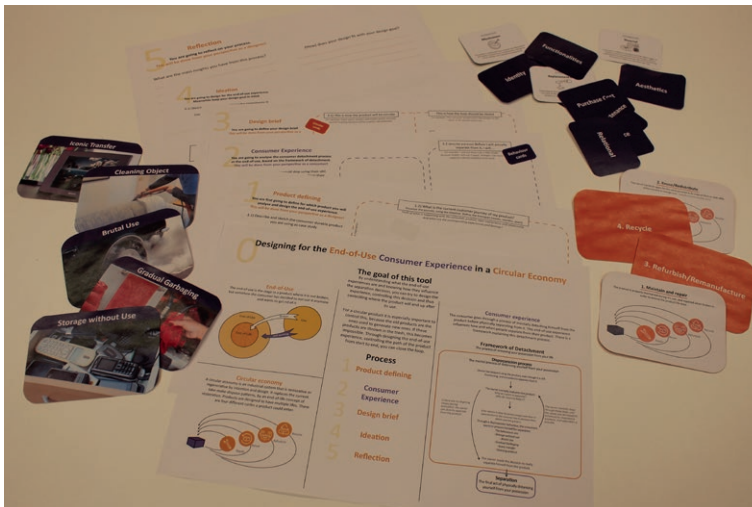


Figure 6.21: The different sheets of the complete template

Use

In the first step, the design students have to map out the current customer journey and product lifecycle of the product. This is to get an idea of the current problems for the consumer, and what the consequences are for the product. In the second step, they dive deeper into the detachment process, looking at it from the consumer side. The template is an adaptation of the framework, where they have to fill out all the steps. Afterwards, they have to look at the values and behaviours and decide which ones they want to tackle and write this down in the Design Goal. In this design goal, they define how they are wanting to close the loop. Then they are drawing their desired customer journey, where they should write down the things the consumer does, and the experiences with that. When this is defined, they can start ideating for ideas to create achieve their goal. Afterwards, they reflect on their process, what they have learned, and how well their design idea fits with their design goal.

6.7.1 TEST 6

Aim

The aim of this test is to see if the tool has a continuous storyline and the relation between the different steps is understandable. Furthermore, a new form of stimulation is tested, which is using customer journeys. There is a general introduction into the tool and the process. Each separate step has its own process description, to see if this makes the overall goal clearer. Finally, examples are given to direct the students more in their process.

Participants

The test will be done with three master design students, one from a combination of Strategic Product Design and Integrated Product Design (P1), and two from Design for Interaction (P2 and P3). P1 is doing a project on circular lighting.



Figure 6.22: Participants reading the value cards and filling out the template

Procedure

The participants will be introduced very briefly to the graduation topic, and the goal of the tool will be explained. They will be given all the sheets and materials right away, and they will start with the tool. The students will not be intervened or given suggestions when it seems they

are going in 'wrong' direction since in the future it will not always be possible to have facilitator present.

They will take a lamp as a subject when using this tool because P1 has done her project about lighting, which means there is some knowledge on that topic. Afterwards, the participants can ask questions and they will be asked what they would recommend to adapt or change for a next iteration.

Results (figure 6.23)

The participants thoroughly read the introduction page before starting with the tool. They already had a discussion in the beginning whether repair fits within the end-of-use. The product defining was quite straightforward. However, later on in the process they found it necessary to define more what the user group is, and for what kind of company they do this. In the end they did it for a ceiling lamp from IKEA. It was nice to see that the second step evoked a lot of examples of personal experiences from the participants. This gave a large number of reasons to either keep or separate from the product. Both value and behaviour cards were very helpful. However, they didn't really specify how these exactly apply to this specific case of the lamp, despite the examples given.

During step 3, where they should define the design goal, they started already with ideation. This made the fourth step of ideation extra. However, they didn't define what kind of experience they wanted and didn't really come up with how to achieve an experience. They just generated a lot of ideas on how to make the product circular.

In the reflection, they mentioned this as well. They also wondered if this tool would work for a complete new product category, for which the experience is not yet known. Additionally, they thought that maybe you should rethink the whole idea of the product, so not start with a lamp, but start with the function of illumination, and create a new product with that.

Discussion

The shape of the tool is steadily coming together, however, the latest test showed still some flaws that need to be fixed. What is still found to be lacking is the understanding of the consumer experience and how to use that in the design. The students shouldn't mindlessly fill that out, but should really grasp what is happening and the psychological experiences the consumers have.

This reflects in the idea generation, where the participants came up with very nice ideas on how to make the product circular. But again, the consumer experience was kind of forgotten.

Maybe it would be more logical if they design the product and how it is circular, and define the product lifecycle first before they define what they want their consumers to do with the product after use and how they want to design an experience for that. In the first step, setting out the product life cycle was really helpful in giving the students more feeling on how to make it more circular. Finally, the first sheet with the explanation is an information overload, that takes too long to read, and the participants didn't find it necessary to know to be able to use the tool.

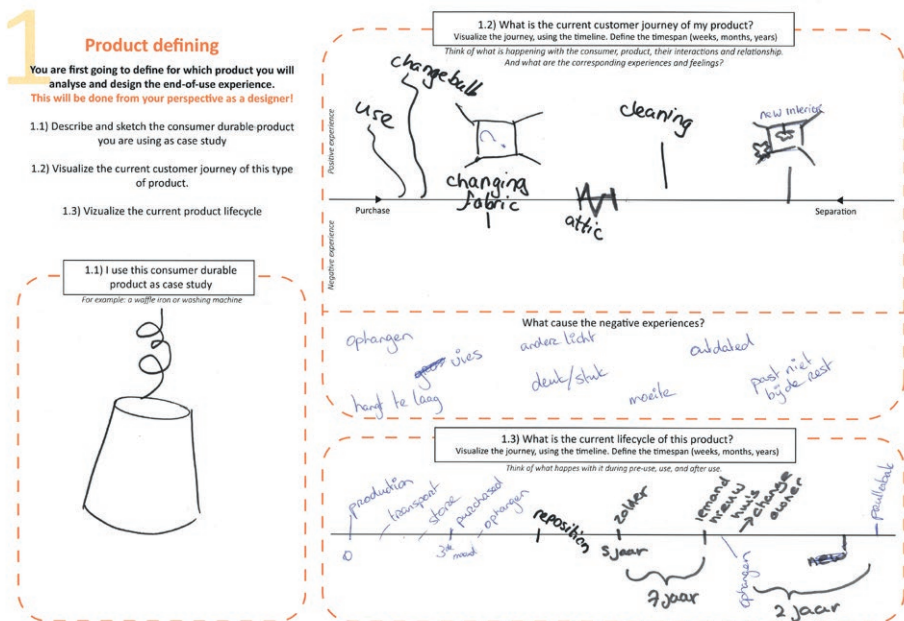


Figure 6.23: Filled out sheets of the template by the participants (continues on next pages)

2 Consumer Experience

You are going to analyse the consumer detachment process at the end-of-use, based on the framework of detachment. This will be done from your perspective as a consumer!

- 2.1) Think of why someone would stop using their still functioning product, and want to separate from their product.
- 2.2) Look step 2.1, and find a dispossession behaviour the consumer will most likely show to enable himself to separate from his/her possession.
- 2.3) Think where the product will most likely end up after its use, considering that behaviour.

2.1 Why do I decide to stop using my product, even though it is still working?

For example: I always used to make waffles on Sunday morning with my children, but now they are grown up and we don't do that anymore.

* veruleurd / vies
* small / made veranderd

* lets nieuws moois gezien

* behoefte aan iets nieuws



Aesthetics
Material
~~Purchase costs~~
Effectiveness
Identity

For example: Material: It looks very used, the coating is a little worn off

Why do I want to separate?

Why do you want to keep it?

For example: Emotional: It reminds me of good times with my children

Emotional
Purchase costs
Identity
Moral

Value cards

2.2 (describe and draw) Before I will actually separate from it, I will....

For example: I will just keep it for a little longer, because maybe I will use it again. Perhaps I can try to organize a family breakfast once more.

Storage without use
Cleaning

What is the consequence of this type of behaviour for the product?
For example: It will be forgotten, to be found years later, when it completely died, and will be thrown out.

+ wordt uitage
- wordt vies

2.3 In the end, this is how I would leave my product

For example: I will bring it to a municipal waste collection place. It is a very old device that no one wants and will not have the same special experience with it as I had.

Prillebak

Behaviour cards

3 Design brief

You are going to define your design brief. This will be done from your perspective as a designer!

- 3.1) Define the circularity of your product
- 3.2) Define you design goal
- 3.3) Describe and draw your desired customer journey, focussed on the end-of-use experience

Design goal

3.2 Finish the sentences

I want to design an end-of-use experience

1) where the consumer is stimulated to (how to separate)

For example: return the product to the retail store

to refurbish their own product

2) where he/she feels (experience)

For example: associated, assured, happy

motivationally exited

3) and change the current behaviour of Business / Storage without use / Good use / Embroidering and/or stimulate location transfer / Cleaning

Cross away the ones you are not focusing on

4) by designing for the value(s)

For example: emotional, functional

Aesthetics, Material, Effectiveness, Identity

3.1) This is how the product will be circular

For example: taken apart, plastics and metals will be recycled, and the heating element will be used for refurbishment.

refurbish fabric to fit new styles + korting bij inkopen

This is how the loop should be closed

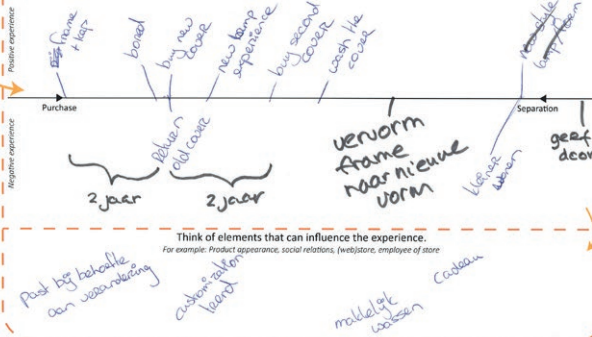
For example: The consumer should return the product to the store, or he should resell it etc.



should go to the store to buy a new cover

3.3) Describe and draw your wanted customer journey and focus on the end-of-use experience

Visualize the journey, using the timeline. Define the timespan (weeks, months, years)
Think of what is happening with the consumer, product, their interactions and relationship. And what are the corresponding experiences and feelings?



Think of elements that can influence the experience.

For example: Product appearance, social relations, (waste)store, employee of store

4

Ideation

You are going to design for the end-of-use experience. Meanwhile keep your design goal in mind.

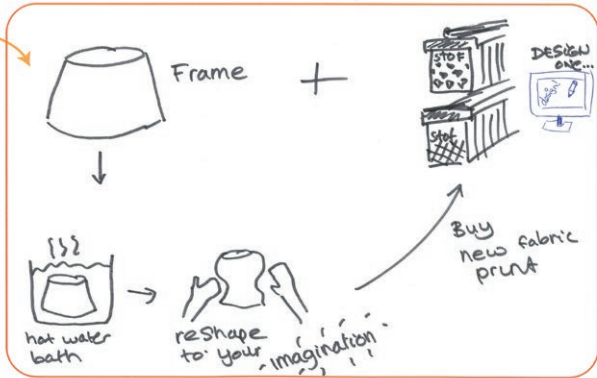
4.1) Sketch ideas of how to achieve the experiences in your new customer journey. Use the different elements as inspiration...

+ extra paper

4.2) Draw your final concept

Final concept
4.2 Draw your concept in the box
You can add extra information below

Handwritten notes on lined paper, mostly blank.



5

Reflection

You are going to reflect on your process.

This will be done from your perspective as a designer!

What are the main insights you have from this process?

* supports to think about circularity
* it felt as an easy process
also because of the cards.

* How would it be with a new product category? Do you know the journey?
* It did not make us rethink the whole idea of the product. Do we need a lamp?

How did the process help you understand the end-of-use experience?

Handwritten notes on lined paper, mostly blank.

(How) does your design fit with your design goal?

We first made the design and the design goal after wards. So it fitted perfectly. (because of the order on the page)

What is still unclear or missing in order for you to understand and design for the end-of-use experience better?

Handwritten notes on lined paper, mostly blank.



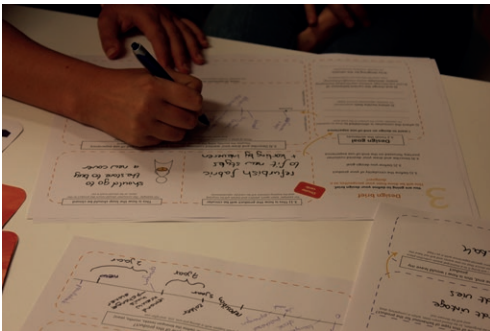
Conclusion

All in all, most of the components to achieve the goal of understanding and designing for the consumer experience are present in this concept. However, the participants stayed on a superficial level of understanding of the end-of-use experience. The students focussed more on the product side of the story, instead of the consumer side. This could be due to the order of the steps, or still not giving them sufficient means to fully explore this consumer experience. Maybe giving the students a fully defined circular product to discourage them from thinking about that aspect and fully focus on the consumer side. The next concept should enable the participants to dive really into the end-of-use experience.

6.7.2 CONCEPT REFLECTION

Keeping the framework in a similar shape in the tool helped the students to keep an overview. They could see the flow of the steps. A design goal is a good way to conclude the analysis of the detachment process. However, they first need to define the problems that they found that they want to tackle.

The customer journeys and product lifecycles did give more sense about the two being related, and thus what influence the consumer has on the product. Seeing how the dispossession behaviour influences the product lifecycle made the consequences of the detachment process more visible. Furthermore, using it to define what kind of customer journey and what kind of experience they want their consumers to have would have been helpful. However, due to the misinterpretation by the students, they used this for product ideation and not for experience development.



TAKEAWAYS

- 1) Smaller and clearer introduction
- 2) Focus more on the consumer side with the experiences
- 3) First define new circular product before making a design goal
- 4) Define and provide product lifecycle of a case study of a circular product beforehand

6.8 CONCEPT 7 - TIMELINES

In the previous concept, the process and chosen methods were sufficient. However, the relation between all the steps was not always clear, and sometimes the participants didn't do the steps in the right order. Therefore, the main question that will be focussed on with this concept is:

How can the students gain insights into the consequences of the detachment process for consumers, product, and companies?

The tool consists of four sheets that together form one overall template. The methods in this concept are the same as in the one before, such as the customer journeys, product lifecycles, and design goal. However, the relation between the customer journey and product lifecycle is made clearer by putting them together and explicitly asking how the dispossession behaviour influences the product lifecycle. Furthermore, they look at the lifecycles twice, once for a linear product, and once for a circular product for which they close the loop. In this way, both cycles can be compared and the differences will be distinguished easier.

Use

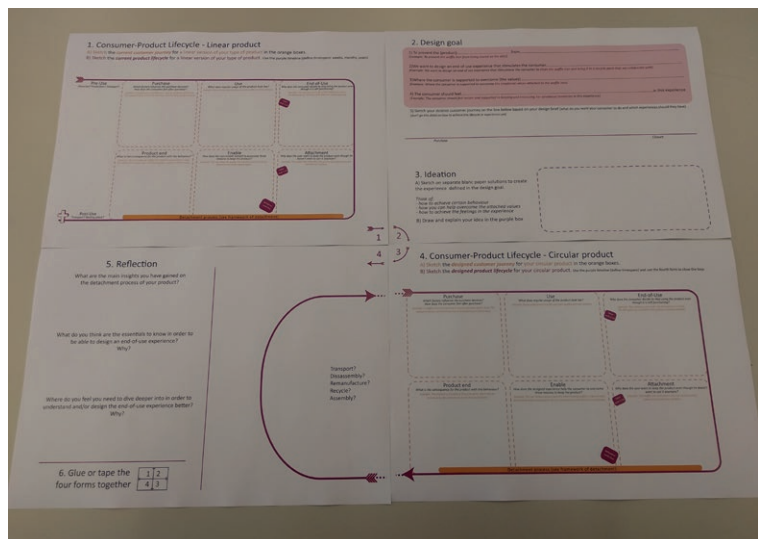


Figure 6.24: The four sheets together forming one template

This concept has more structure and relates the steps to each other clearer. In the first step is asked to define the customer journey in 6 steps: First time use, Use, Consider End-of-Use, Why not separate yet, Dispossession behaviour(s), Separation. Here they have to think about options to answer the questions that come with the steps, to make one story in the end. They can use the provided cards to help them with the parts about separation and dispossession behaviours.

Then the designers have to draw the product lifecycle, connected to customer journey. In this way, they can see how this journey influences the product lifecycle. This combination shows where things could be improved to keep the product at a higher level in the loop, and where an opportunity lies for creating an end-of-life experience. They will write this down in their design goal, where they define what they want to achieve, and what kind of experience they want to create. Then it is time for ideation, where they think of ideas to achieve their goal. Suggestions are given for which aspects they could think of, such as: how to achieve a certain behaviour, how to help overcome attached values, and how to achieve the feelings in the experience.

Their idea will be put into a new customer journey, where they draw the journey with their solution in use. This will show how their solution will help the consumer and create the experience. The product lifecycle will be sketched as well, but this time the loop will be closed. To have them visually close the loop, it will become more clear what their idea does for the product cycle.

Finally, they have to write down the insights they have gained during the process, and what they would still like to research further to make the customer journeys and product lifecycles more complete.

This concept will be tested in a workshop with 16 master students from the different master tracks. To make sure this concept is achieving the goal, it was tested beforehand to make some final tweaks to make it suitable for the workshop.

After the trial test, small alterations are made, such as sharper phrasing of questions. And one step, where they have to draw their desired customer journey according to their design goal has been removed since it felt very repetitive.

6.8.1 TEST 7 - TRIAL TEST

Aim

The aim of this test is to see if this concept guides the participants through the process of detachment better than the previous concepts, and that the participants focus more on the consumer experience than on the product. The different steps of the process should feel more coherent with each other. Furthermore, the tool is to explore how to apply knowledge about the end-of-use phase and dive into this subject. The topic of end-of-use and the detachment process will be explained verbally to the participants, to give them a basis which they can work from using the tool.

Finally, this test is a trial for a workshop that will be given to first-year master students. The tool will be part of the workshop, with the aim to test it on a larger scale with participants that aren't biased because of the (friendship) relation with me.

Participants

The test will be done with three participants, two students from the master track Design for Interaction, and one graduated student from the same master track.



Figure 6.25: Participants working on the tool

Procedure

The students are introduced to the topic and the framework. They are walked through- and are explained each step. Furthermore, they are provided cards with the explanation of the tool, the relevance, ways of separation, end-of-use, and circular economy. These can be used as a back-up to search back something if needed.

They are given a case study of a baby stroller by Greentom© (Appendix 8), which is a circular product. For this product, they will fill out the sheets, analyse the end-of-use experience, and design a new one.

Results (figure 6.26)

When filling out the customer journey, the participants wrote down all the different options and situations that could occur in the customer journey. They didn't make it a cohesive story.

One participant related their answers for 'consider end-of-use' to the cards: "Yeah, so the child became too big for the stroller would be effectiveness". But in general, they didn't really look at the value cards and link them to their options. With the question of "what could the consumer do to overcome this separation anxiety?" they already started to think about what they could do.

In step 2, the design goal, they spent a lot of time deciding on the behaviours and which ones to change or stimulate. Because they didn't create a cohesive story in the first step, they had trouble to fill out the design goal, since there wasn't one problem/situation they should focus on. Furthermore, creating the desired customer journey was unnecessary

because they already filled out the design goal, and started to think about solutions even though they weren't at the ideation step. It felt very repetitive for the participants.

During the ideation, the participants sketched their ideas individually and discussed them together. They combined some elements of the different ideas and created one final concept.

In step 4, the first four boxes of the customer journey are the same. They went quickly through it. Because they already drew their concept in step 3, they found it repetitive to draw it again.

Closing the loop was a nice final moment of thinking what happens with the product, and how their idea influences that.

In the reflection, they mentioned that it is important to lower the barriers for consumers and make it more easy for them. But the participants said they would like to talk with the consumers and verify their assumptions.

Discussion

Overall, the results show that the tool guides the participants through the process. Each step has a good (and short) introduction. However, on detail level, the participants sometimes had trouble to interpret the questions. This required some discussion on what they had to do before they could focus back on the content. The explanations weren't always read by the participants. Furthermore, to have them to be able to create a solution, they first have to have a clear problem. Because the left all the options open, they hadn't really one problem to focus on. They only made decisions about which

problems to tackle when filling out the final customer journey.

What was positive is that they did only focus on the consumer, when designing the experience. That they were given a real case really has helped with that, since the product and its circularity is already defined so they don't have to think about that.

Finally, at the end, when the sheets were put together, the participants saw the story of the process. They liked that they 'closed the loop' with the final sheet, and see how it comes together with their idea.

Conclusion

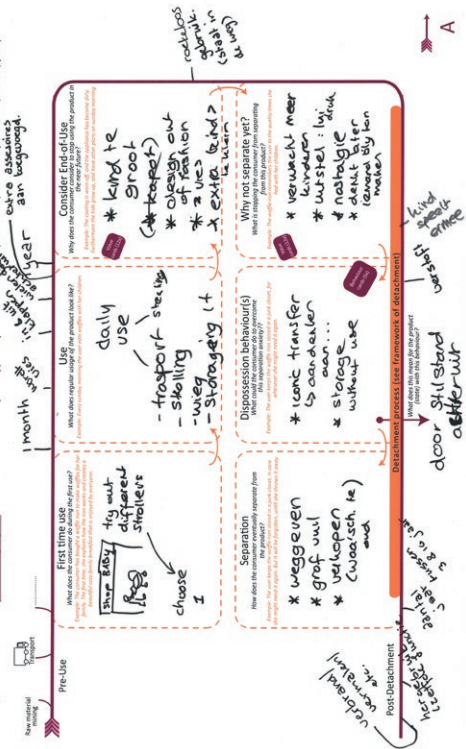
All things considered, the students walked through the process as intended. However, sometimes there needs to be more explicit phrasing of the different questions and guiding what the participants had to do. Additionally, the students did dive into the different factors and values contributing to the experience. The solution consisted of changes in the product, but they did this to create an experience, and not think of how they could make the product better or circular.

'Closing the loop' and putting all the sheets together made the difference of a customer journey for a linear product and their new journey for a circular product more visible, but the steps felt a little repetitive.

Next, to the main goal of this test, this test also functioned as a trial for a workshop that will be given to first-year master students. With some slight alterations and a good introduction, this tool can be used in the workshop.

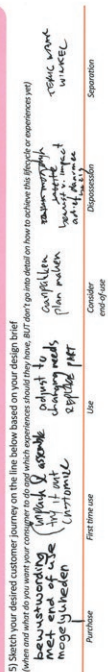
1. Consumer-Product Lifecycle - Linear product

- 1.1) Sketch the **current customer journey** for a linear version of your type of product. In the orange boxes.
- 1.2) Sketch the **current product lifecycle** for a linear version of your type of product. Use the purple timeline (define time spans: weeks, months, years)



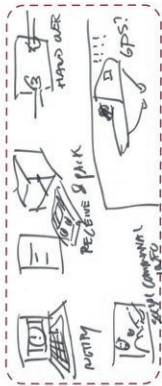
2. Design goal

- 1) To change the disposition behaviour of **Storage without use / Forward Gaining / Exchange** and/or stimulate **Manufacture / Re-use** subject (Cross away the ones you are not focusing on)
- 2) We want to design an end-of-use experience that stimulates the consumer to **return their stroller to the manufacturer** (Example: We want to design an end-of-use experience that stimulates the consumer to return their stroller to the manufacturer)
- 3) Where the consumer is supported to overcome (the values) **REGRESSIVE / INACTIVE** in this experience (Example: Where the consumer is supported to overcome the emotional value associated with the stroller)
- 4) The consumer should feel **RESPONSIBLE / APPRECIATED** (Example: The consumer should feel secure and supported in keeping and returning the equipment in the experience)



3. Ideation

- 3.1) Sketch on separate blank paper solutions to create the experience defined in the design goal.
- Think of:
- how you can help overcome the attached values
 - how to achieve the feelings in the experience
- 3.2) Draw and explain your idea in the purple box



5. Reflection

What are the main insights you have gained on the detachment process of your product?

- * *barriere weggeven, in-zakken bewaren, niet weggeven, niet weggeven, niet weggeven*

What do you think are the essentials to know in order to be able to design an end-of-use experience for your product? Why?

- *analyse v. gebreken*
- *analyse v. gebreken*

Where do you feel you need to dig deeper into in order to understand and/or design the end-of-use experience better for your product? Why?

- *de gebruiker*

6. Glue or tape the four forms together

A	B
C	D

4. Consumer-Product Lifecycle - Circular product

- 4.1) Sketch the **designed customer journey** for your circular product in the orange boxes.
- 4.2) Sketch the **designed product lifecycle** for your circular product. Use the purple timeline (define time spans) and use sheet D to close the loop.

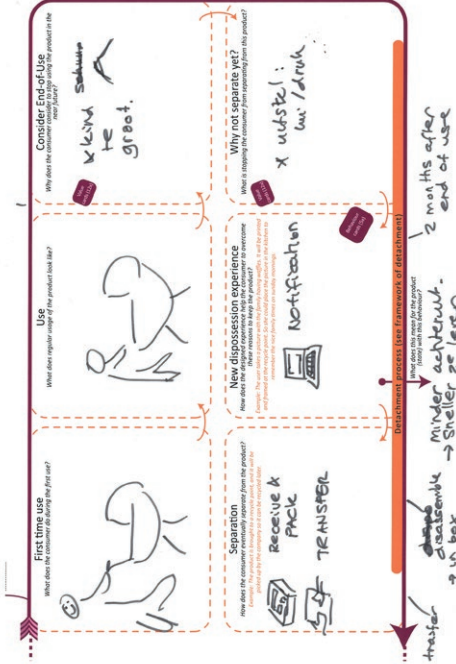


Figure 6.26: Filled out forms by the participants during test

6.9 WORKSHOP



TAKEAWAYS

- 1) Clearer phrasing of some questions
- 2) Putting the sheets together at the end helps in making the story complete
- 3) Customer journeys and product lifecycles make the problems more visual
- 4) The introduction of the tool should be more structured and visual.

Aim

The aim of this workshop is to:

1) test whether or not the tool helps the design students to create a better fitting end-of-use experience.

2) During the workshop will be observed if the students will be more aware about the mental part of the detachment process, gain insights in how this detachment process goes and which factors influence that, and how they apply this knowledge into a design.

3) Furthermore, to finetune the tool, attention will be paid to how the students use the tool, if they understand what they should do, and if they interpret the questions in the way they are meant.

Participants

The workshop will be done with 16 design students, mixed from the three different master tracks. They will be split into 4 groups of 4 students. The workshop is given in the context of the master course IDE Academy, a course that provides a series of skill-based workshops, where students are introduced to a topic and work with it for a day to develop their skill set in this field. Students need no prior knowledge to sign up for a workshop they are interested in. Therefore the topic and tool would fit really well within this context.

Procedure

First, the students are welcomed to the workshop, are told what they are going to learn this day and the relevance of the topic. To be aware that products have more feelings and emotions attached than

they would assume, they are asked to write a break-up letter to a product they have detached themselves from recently. After this, they are introduced to the context of the project: Circular economy and are made aware that detachment is more than the only separation. They are asked an exercise two times, the first time without the tool, and the second time with the tool. In this way, can be seen if the tool supports the design students in creating a better fitting experience than without the tool.

Round 1 (45 minutes):

The students get the assignment:

“How can you stimulate your consumer to bring back their product after use by designing an end-of-use experience?”

They are given a case study (Appendix 8), for which they have to create an end-of-use experience. Two groups have the case study of the Greentom© baby stroller, and two groups have the case of the Apple© iPhone. They try to design the experience without any prior knowledge. The decision to have one case done by two groups, instead of each group having a different case, was made with the intention to see if the tool could still lead to different solutions for the same type of product.

The first round is the baseline measurement. The results from this round will be compared to the results from the second round.

Figure 6.28: Me (writer of this report) giving a presentation on detachment before the students go work with the tool



Round 2 (1h15min):

After the first round, the students get a lecture on the detachment process, and which values and behaviours are involved. They will get introduced to the process of the tool, and then start using the tool. They use the same case study as in the first round.

At the end of the day, they are asked to present their results from both round 1 and round 2 and reflect on the tool with a reflection form (figure 6.33).



Figure 6.29: Students working on the tool during the workshop

Results (Appendix 9)

Here the results of the second round will be described, how the students used the tool. The first round is set up purely as a baseline measurement for test, and will normally not be part of the tool.

General results:

First will be started with the general results of the noticeable things that happened to two or more groups. Group results will be discussed after this per group (appendix 9).

1) The first issue the students had was to understand the difference between linear

and circular, and how this difference is used in the first step. The intention of using this difference is to see how the detachment process and corresponding behaviours impact a linear product and step 4 should show the impact of their designed experience and behaviour on the circular product. However, this was not clear to the students.

2) During the process of creating the customer journey, two groups didn't use the card sets that were provided. Only after mentioning they should use them, they looked at them.

3) Furthermore, because a lot of knowledge about their consumer and company isn't known to them, they had to make a lot of assumptions. Which was difficult for them, because they are trained to first go out and explore their target group and context. They didn't feel that what they were doing was accurate because of all the assumptions they made.

4) What was seen in the previous test, was that the participants provided many possible options in the different boxes of the customer journey. Therefore, post-its were placed on those boxes. The participants can put down all the options on the post-its, and then choose one to create a story that they draw in the orange boxes. However, the groups all had different ways of doing this. Some already directly choose 1 story, and others left all the options open.

5) When finished with the customer journey, the students forgot to do the product lifecycle. When pointed out

participants quickly filled it out.

6) Time Pressure made the participants feel rushed, and shortened some essential discussions.

7) When overhearing the participants while they were working, it was noticeable they are quickly adapting to the vocabulary used in the presentations. They started to use words as separation anxiety, saying goodbye, new beginnings, and detachment.

8) Generally, the ideas generated in the second round were less creative but more realistic. Some students mentioned that they did not feel stimulated creatively.

Discussion

When looking at the results, it can be established that the students became aware of the existing of the end-of-use phase and the relevance and importance of the values and behaviours in this phase. They understood that these values resulted in certain dispossession behaviours and that these influence how and where products end up after their lives.

However, how exactly these relate to each other, and how to apply this knowledge to designing an experience is still difficult.

By having the students fill in the customer journey that was already broken down into separate steps, was tried to make it easier for them to understand the where the values play a role, and how the behaviour comes into it. They did the steps and the sheets show answers that are fitting and logical. However, some groups didn't look at the provided cards, before we pointed out to them that they



Figure 6.30: Students working on the tool during the workshop

can use it. Some groups came with other reasons or values that they saw on the cards, but when diving deeper into those reasons, they can be put under one of the existing given values. One example was that a group came up with the reason of 'product dependency', which could belong to identity and functionalities. However, this was a step too far for the students. A positive thing of the cards was that they did evoke discussion among the group members, and made them think about which values could play a role, and select which ones were relevant for their case.

Post-its on the boxes were put there for the students to first write down all options, choose one, remove the post-its and create a complete story in the orange boxes. However, only one group did this as was intended. The three other groups mostly kept all the options open. An effect of this is that the students didn't go into depth about how the values are embodied by their specific customer and product.

What also played a role in this, was that people found it difficult to base everything on assumptions. Even though it was made clear that it was needed to



Figure 6.31: Students working on the tool during the workshop

do the assignment based on assumptions, because there is no time to research the context. But it was nice to see that people already thought of how they can use their own skills and learned methods to fill in the blanks of customer experiences and company policies and logistics.

After the first customer journey, the students skipped the product lifecycle. This was put in, to link and see how the behaviour of the consumer affects the product and how and where it will end up. In a future concept, this would still be helpful for students to realize that the consumer behaviour affects the product, but the focus should be really on the end, and the other side business could be left out.

They had trouble translating their findings into the design goal. Especially the question of how they want the consumer to feel came out of the blue. This is probably because there isn't a question where they define the consumers' feelings in the process.

Finally, the tool isn't really perceived as dynamic. Which made the students feel limited in their creativity. In a future

concept, the tool could look more dynamic and creative, to stimulate the designers more. Also, what was noticed to be missing was the visualization of the consumer. Even though the whole process is about the consumer experience, there isn't a 'personification' of their consumer. This would maybe add more depth of the tool. Furthermore, on all parts of the customer journey is the same amount of attention. However, in this tool, the focus should be more on the end-of-use experience. This should more be amplified.

Conclusion

All in all, the main aim of this test is achieved. In the end, the participants became more aware of the end-of-use phase, and the relevance to design for it. The students were able to make a more fitting experience solution with the tool. It forced them to look at the detachment process step by step, and grasp what happens and what contributes to the situation. Even though the ideas were less creative as in the first round, they were better justified and more realistic.



Figure 6.32: Students working on the tool during the workshop

To a certain extent, they comprehend how values could play a role in the detachment process and its experience. However, how this applies to a specific type of consumer with a specific product was still difficult for the students. This could be because they didn't define their type of user very clearly. What the students mentioned that they found missing in the tool, was how the different steps follow each other, and other steps felt repetitive.

Even though the main purpose of the tool, to create awareness and understanding, is accomplished, there are many points of improvement to be made.

Firstly, the students felt they were restricted in their creativity. This could be caused by the static layout and graphics of the sheets. This also made it harder to understand the storyline of what they were doing.

What also was noticed during the workshop and afterwards, is that this tool revolves around consumers, however, there is no image of a consumer, and how she/he responds to certain situations. Humanization of the tool could stimulate the imagination of the designers more, and show them what they are doing it for. Secondly, they kept things open, such as having many different options in the different steps of the customer journey. Because of this they could not focus on one aspect and got swallowed up by all the problems they had to solve. Since this is an introduction to the theory and people are not trained to think about this phase, focussing on only one problem should be enough to set-up their thoughts about designing for the end-of-use without making it overly complicated.

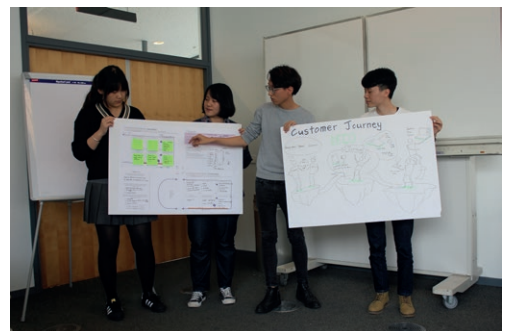
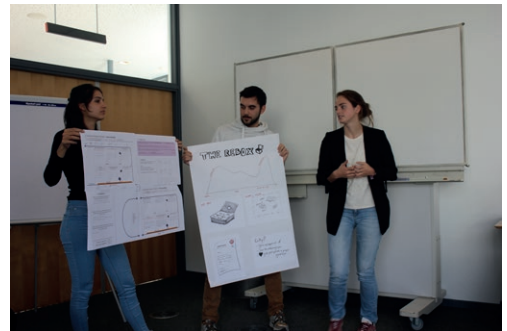
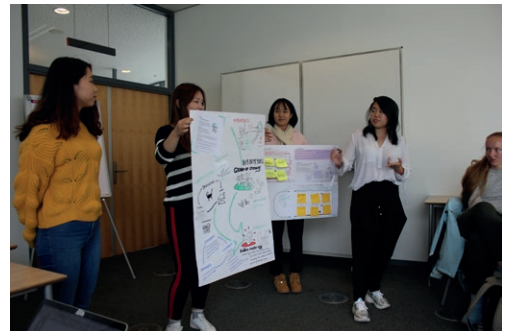
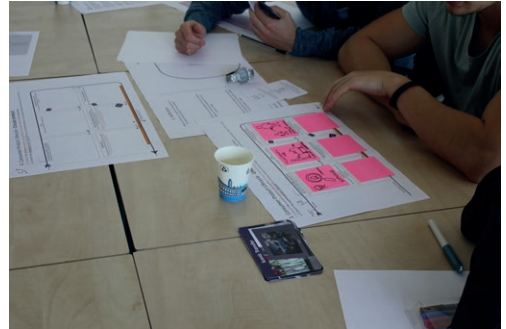


Figure 6.33: The groups presenting their results at the end of the day. (from top to bottom group 1 to 4)

Thirdly, in the tool, the students have to fill out a customer journey twice. For the students this felt repetitive and boring. Furthermore, the focus of the tool lies on the end-of-use phase and detachment. However, this is not clear, and the students focus on all aspects of the customer journey equally, which leaves less time to fully dive into the detachment process and to comprehend the values and behaviours.

Finally, the goal of the tool is to have design students understand the end-of-use consumer experience. However, due to the static layout, the focus on the consumer side has become blurred. What is missing is the humanization of the tool, using visuals of consumers to make it more concrete that the students should be working on the consumer experience, and how that affects their consumers



TAKEAWAYS

- 1) Customer journey is a sufficient method to explain the end-of-use phase
- 2) The experience ideas were based on the findings from the analysis
- 3) The tool did not inspire creativity
- 4) The students could have even more support in the analysis of the detachment process
- 5) The human part of the consumer is missing in the tool

6.9.1 CONCEPT REFLECTION

Overall, the chosen methods such as the customer journey and the product lifecycle are a good visual way for the students to link them to each other. They can relate the consequences of the dispossession behaviours for the quality of the product and where it will end up after use. Having explicitly asked them to write down what their chosen dispossession behaviour means for the product makes them aware of the relation between behaviour and the products' end.

However, in this concept, they are asked to make the complete lifecycle of the product from gathering the raw materials to, in the end, the landfill. To have them

think of all these phases in the products' life takes away the focus on the end-of-use. Having them close the loop on the second journey which they designed does help in seeing the differences between the linear and circular cycles and what the goal was of this tool. However, this could be clearer from the beginning and only at the end. Furthermore, the way in which the consumer lifecycle is shaped leaves room for many different possibilities. Therefore, there is not one clear storyline for the customer journey, which makes it difficult for the students to see one problem. Without a clear problem, it is hard to define a design goal, and there is no direction for which a solution could be provided.

6.10 CONCLUSION

Through the testing of the different concept, iterations of the tool were explored using different methods and techniques that could answer the five design questions at the beginning of this chapter. Some concepts only tackled one of the questions while others try to tackle more. With each new concept, the difficulty was increased and other methods were explored. Findings from the tests were the basis of building the next iteration, to, in the end, come up with a concept that could satisfy all the design questions.

How can the detachment process be explained?

The detachment process consists of different steps, and the values and dispossession behaviours. This is a lot of information that has to be explained and conveyed to the students. The first step in trying to answer this question was explaining the values on cards. These cards deemed to be helpful but required a bigger context of where they should be used. Through iterations of these cards and providing a context in the form of templates the detachment process and the elements involved were explained.

How can the students be enabled to identify the problems in the current situation?

However, explaining the detachment process is the first step in achieving the design goal. When the students understand how the detachment process works they can identify the problems within, such which values make it difficult for a consumer to separate and whether or not (bad) dispossession behaviours will be shown because of these values. Having the students visualize the customer journey with the focus on the end-of-use where the consumer has to make the decision whether or not to separate, which values and dispossession behaviour are involved helps them to see where the problems lie for on the consumer side.

How can the students look at it from both the consumer side and designer side?

Industrial design students are trained to think from their design perspective. However, this tool focuses on the consumer experiences which requires the students to empathize with the consumers at certain moments to understand what is happening in the detachment process. Through clear use of colour, layout and consumer/designers visualisations this will help them to change between the two roles. Furthermore, having the students

set up a design goal clearly transitions them from their consumer perspective to their design perspective because it clearly defines a problem that needs to be solved with their skillset.

How can the students gain insights into the consequences of the detachment process for consumers, product, and companies?

Understanding the detachment process is step one for the designers. They also should be able to apply this knowledge into an experience design. In order to do this, they have to understand what the consequences are for the product lifecycle due to the dispossession behaviours of the consumer. This is important to know for a circular product because they should be able to loop through the circular cycles at their highest possible quality level. Through relating the product lifecycle with the customer journey gives the students insights in how they influence each other over a period of time. Furthermore, an explicit question about what the dispossession behaviour means for the product state forces them to think about this. Finally, defining what they want their consumer to do at the end-of-use in the design goal helps them to conclude their findings from the analysis of the detachment process.

How can creativity be stimulated to help the students design an end-of-use experience fitting to the identified problems?

With the students understanding the detachment process, the problems within and the consequences for the product and its circularity it is time to apply those in a design for an end-of-use experience. To help them in their ideation, they could be stimulated with different methods to help give them a direction in which their solution could fit. Multiple methods were tested, such as a game, association flower, design goal, and customer journey. The design goal helped the students to give direction to what they wanted to solve and what kind of experience they want to create. The customer journey was found to be more useful to analyse the detachment process than using it of inspiration. Furthermore, the association flower helped them to zoom in on touch points between the company and consumer where they could intervene with their ideas and create an experience. In the end, the design goal was chosen to use since it clearly stated what the students want to achieve, and they can then choose an approach familiar to them that they feel comfortable to use when ideating.

Use

The easy of use of the tool still has some issues. On the one hand, the process of the tool is clear. The students understand the order of the steps and what to do next. However, the theoretical aspect where they dive into the detachment process is found to be hard. The students get a lot of information at once which they have to apply immediately. Examples are given to help them fill out the sheets, but this was not always enough support.

Furthermore, the students found it difficult to base their answers solely on their assumptions. They do not feel that what they are describing on their sheets would be a reality. This is making it hard for them to really believe the detachment process they defined and do not feel secure in their idea generation.

Moreover, even though the latest concept does satisfy the design goal, the process and look of the tool are quite straightforward and clean. The students did not feel inspired by the tool. Even though this was not a requirement, it would be nice to have the students be enthusiastic about what they are doing, what they learn, see the relevance and convey that to other students.

Finally, what was noticed during the final test is that the tool focusses on consumers and their experiences. However, there is no visual representation of the consumer present in the tool. Adding a consumer would humanize the tool more. This could also help the students seeing the detachment process in a more believable context.

CHAPTER 7

Final concept



7.1 INTRODUCTION

Even though the last concept from the previous chapter achieved the design goal, there is still room for improvement. The main problems with the tool that were discovered during the workshop showed that it was not always easy to use, and it did not encourage creativity, with the result that the students were not inspired. The latest can be ascribed to the static layout of the sheets. The sheets are using geometrical shapes and boxes, and look very clean, making the process look boring. The students could feel hesitant to draw or write freely because they felt restricted by the boxes.

Furthermore, the theories on detachment still perceived difficult to grasp within this tool. It could be a result of the first customer journey being in the form of 6 panels instead of a type of timeline. The cohesion between the 6 panels is not visibly present. Moreover, the product lifecycle shows the complete cycle from beginning to end. The focus lies on the end-of-use, which makes the rest of the cycle a little distracting from the main goal. Finally, the students had to fill out the customer journey twice, and have the exact same layout which makes it repetitive and boring. Because of these existing problems with the latest concept the decision is made to make one more iteration. This final concept tries to tackle these problems of being uninspiring and explaining the detachment process better. This chapter will demonstrate the final concept and discusses the final test. In the end, recommendations will be made for further future improvements of the tool, but will not be implemented in this report anymore.

7.2 FINAL CONCEPT - POSTER

The main goal of this iteration is to explore how the process can feel more inspiring and attractive. The setting of use remains the same. It will be used in a workshop context, where the students first get a presentation explaining the theory and the assignment before they start working with the tool.

The first main change is the layout of the tool. The previous concept uses four sheets that form one tool. The new concept is one poster and does not exist of different sheets creating one whole (figure 7.3). The choice of making it a poster instead of different sheets was based on the findings in the workshop. At the end of the workshop day, the students presented their findings to each other. This was actually a very interesting part of the day. Their original posters from the first round were creative and showed big arrows and drawings to show the flow of the story. In comparison, the narrative of the process of the tool seemed missing. Therefore, the decision was made to make the tool in such a way, that when presenting it, it will be visually supporting the narrative. A big arrow on the background of the poster will show the order of the steps, and guides the reader through the story.

The second improvement consists of adding the consumer to the whole process. Because the tool is about analysing the end-of-use consumer experience it would be more convincing if the consumer was given a more present role in the tool. Through making the concepts iterations, the consumer became a little lost. This was noticed when helping the students during the workshop. There was no visual representation of the consumer in the tool. Moreover, the students mentioned at the end that they would like to have defined who their consumer was before analysing the customer journey. In this concept, the first step in the process is to define the consumer. An image of a consumer is placed on the poster. The students can give him/her a name, add characteristics next to him/her and draw clothes. This will help the students to create a persona and humanizes the process and tool. Furthermore, at the end of the customer journey, the consumer says: "I feel..... because...." which should be completed by the students according to their findings. This is intended as concluding the first customer journey and can be used for inspiration defining the design goal. The beginning of the process starts with the consumer, and the process ends with the consumer as well. At the end, the consumer says how he/she feels with the new experience, closing off the process.



Figure 7.1: Value cards

Having the product-customer lifecycle on a timeline and using the same vocabulary from the framework on the poster has the purpose of making it more cohesive with the theory, and therefore more understandable for the students to see how they relate. The value cards and behaviour cards are still used to support the framework and explain the values and behaviours (figures 7.1 and 7.2). A larger images of the value and behaviour cards can be found in appendix 10.

The third major change in this version is the use of different styles of the customer journey. In the previous concept, the students had to fill out the customer journey and product lifecycle twice in the exact same layout, once for a linear product and once for a circular product. In the new concept, this is altered. In the poster are still two customer journeys, but now in the form of consumer-product lifecycles, but are different in shape. The first one is a timeline, and the second one is using the six panels again. This time, the consumer-product lifecycle focuses on the end-of-use and uses the vocabulary from the framework of detachment. Furthermore, the product lifecycle is removed, and instead, at the end of both customer journeys is asked 'where does the product end up?'. Moreover, it results in fewer steps the students have to do. Now there are only 3 main steps, which feel as less work for the students than the previous models' 6 steps. Furthermore, it will support the students in keeping an overview of their process.



Figure 7.2: Behaviour cards

The design goal has remained and is used again in this version. It was found to be a great way of concluding the analysis phase and opening the possibilities for ideation. It gives the students a certain direction for which they create solutions.

Figure 7.4 shows an example what the results could look like when the poster has been filled out.

- 1 It starts with defining the consumer
- 2 The customer journey on a timeline will be analysed and the findings will be written down
- 3 Only at the end will be asked what the behaviour will mean for the product
- 4 The analysis is concluded by reflecting on the detachment process
- 5 The findings are translated into a design goal
- 6 Then new consumer-product lifecycle with the designed experience will be drawn
- 7 The process is concluded by reflecting on their new experience
- 8 At the end will be asked again what happens with the product

DESIGNING FOR PRODUCT DETACHMENT

saying goodbye to a(n)

Our consumer

1



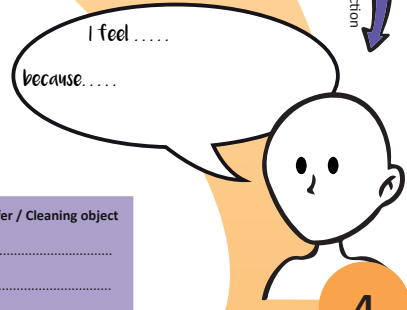
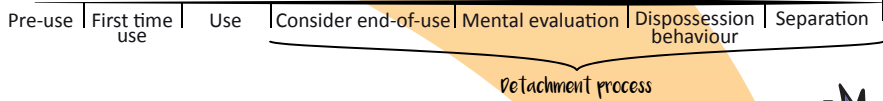
1. CURRENT CONSUMER-PRODUCT LIFECYCLE

Sketch the lifecycle and describe what happens per step

3

Where does the product end up?
and in what quality?

2



5

2. DESIGN GOAL

Complete the design goal and finish the sentences

- 1) To change the dispossession behaviour of **Storage without use / Gradual Garbaging / Brutal use** and/or stimulate **Iconic Transfer / Cleaning object**
- 2) We want to design an end-of-use experience that stimulates the consumer to
- 3) Where the consumer is supported to overcome (the values)
- 4) The consumer should feel.....in this experience

3. NEW END-OF-USE CONSUMER EXPERIENCE

Sketch the new lifecycle with the designed experience

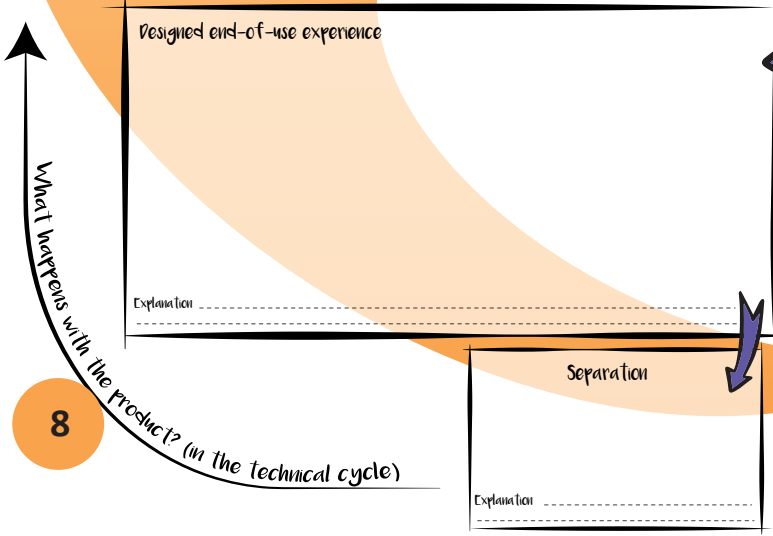
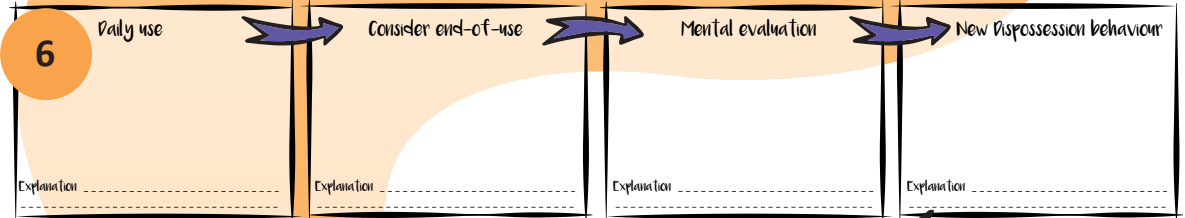


Figure 7.3: The poster

DESIGNING FOR PRODUCT DETACHMENT

saying goodbye to a(n) Baby Stroller

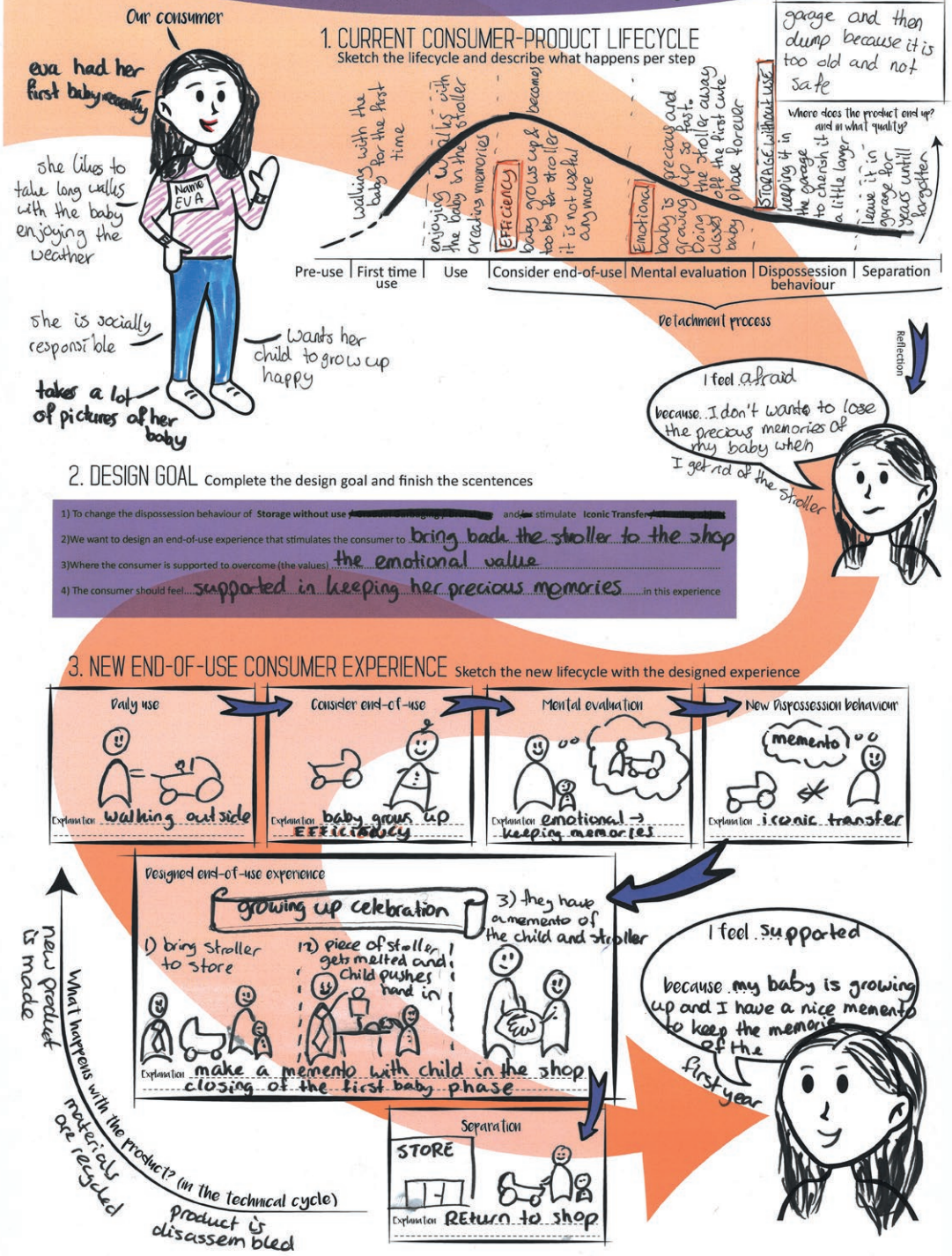


Figure 7.4: Example of filled out poster (this is not a test result)

7.3 FINAL TEST

Aim

The aim of this final test is to see whether the tool, in the form of a poster, will inspire the students working on them and allow them to feel they could write and draw freely on the poster. Furthermore, the chosen methods of the consumer-product lifecycle will be assessed on their effectiveness.

Participants

The test will be done with three participants. Two students are from the track Design for Interaction, and one is from Integrated product design.

Procedure

The students will be introduced to the topic via a presentation (Appendix 11). This presentation explains the project assignment, circular economy, and the detachment process. They are shown a consumer-product lifecycle with the four main phases of pre-use, starting, use, and closing (figure 3.1). At the end of the presentation, they will be given their assignment of analysing the detachment process. Some final notes are given to help them on their way, such as: make assumptions, think of somewhat extreme situations and consumer characteristics, and that they are a design team working for a problem of a company that needs their products back. Then they are given the poster, a print explaining (figure 7.5) the steps in the process, the cards, and a print of the framework they could use as a reference. In their process they were allowed to ask questions if they did not understand something. The product they will be analysing the end-of-use experience for is an iPhone.

DESIGNING FOR THE END-OF-USE EXPERIENCE

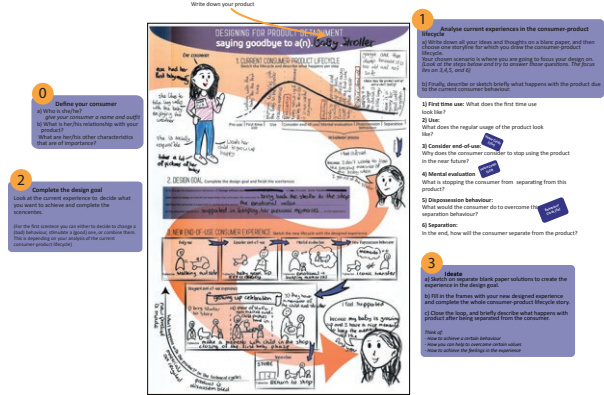


Figure 7.5: Explanation of the process with examples

Results (figure 7.6)

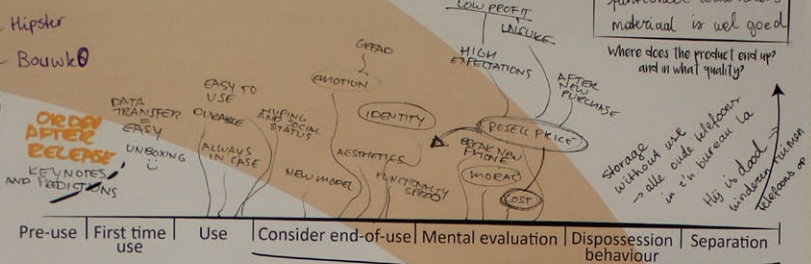
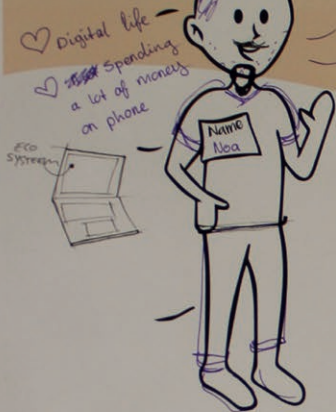
The participants started with defining the consumer. The persona they defined was a hipster, which they endorsed by giving the persona an artsy moustache and name. Giving the persona physical attributes helped with defining personality characteristics, and those characteristics gave inspiration for the physical attributes. They seemed to have fun drawing the physical aspects of the persona.

The start of the lifecycle was quite easy for the students to get into. They could imagine the pre-use and use phase quite easily from personal experiences. The detachment process was found to be more difficult. With the consider end-of-use one participant explained she was thinking of replacing her phone because it has become a little slow. This example helped them to understand how the values play a role in why the consumer might consider the product to be end-of-use. However, the reasons why the consumer might not want to separate from it was more difficult for the participants to understand. They kept returning to values and reasons why the consumer might want to detach. They referred back to their persona multiple

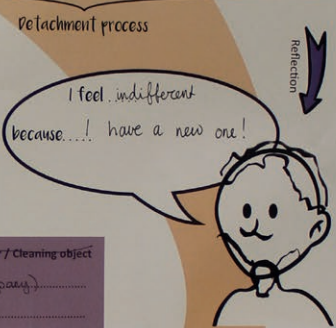
DESIGNING FOR PRODUCT DETACHMENT saying goodbye to a(n).....

Our consumer

1. CURRENT CONSUMER-PRODUCT LIFECYCLE Sketch the lifecycle and describe what happens per step



electronica
inleverpunt
functioneel waardeboos
materiaal is wel goed
Where does the product end up?
and in what quality?
Storage
without use
→ alle oude telefoons la
in 24 uur eraan la
Hij is dood
wonderbaar
Reclames op



2. DESIGN GOAL Complete the design goal and finish the sentences

- 1) To change the disposition behaviour of Storage without use / Gradual Garbaging / Brutal use —and/or stimulate Iconic Transfer / Cleaning object
- 2) We want to design an end-of-use experience that stimulates the consumer to ^{buy} sell the product back to us (company).....
- 3) Where the consumer is supported to overcome (the values) ... cost
- 4) The consumer should feel Special

3. NEW END-OF-USE CONSUMER EXPERIENCE Sketch the new lifecycle with the designed experience

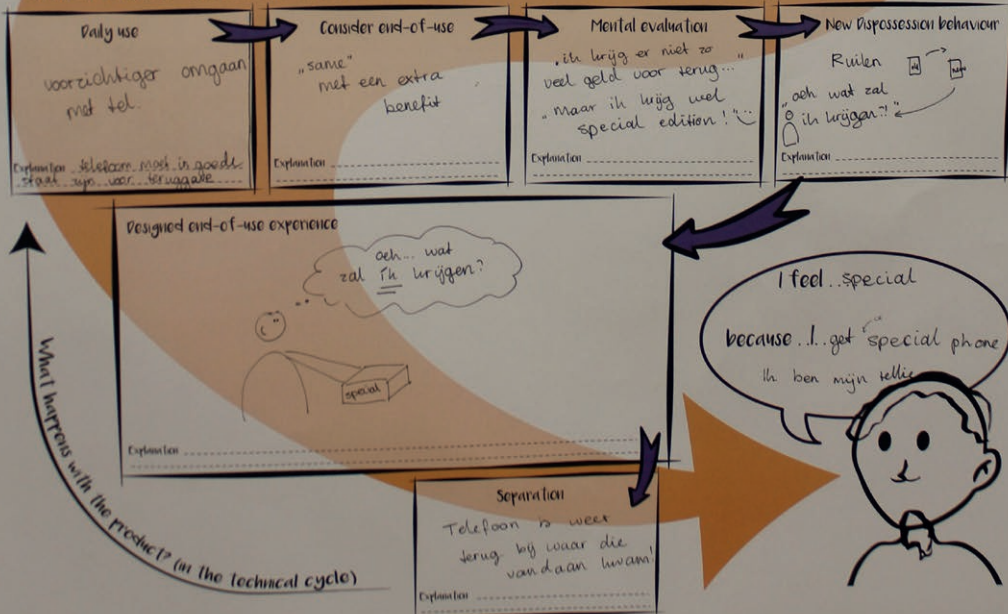


Figure 7.6: Filled in poster by the participants

times, to find the right values. The persona they created was always buying the newest phone when it was released and the value they fit to that was 'identity'. The consumer would not mind paying the highest price to keep maintain his feeling of identity. Therefore, the participants found it difficult to see how the old phone could still pull their persona back when the new phone pushes him away from the old phone. With some help, they finally understood what they had to do and figured it out. Therefore, choosing the dispossession behaviour became easier. However, the participants described multiple values in the phase of mental evaluation, which made it confusing what they had to focus on. The tip was given that they had to choose one kind of storyline, with one value in 'consider end-of-use' and 'mental evaluation'. This gave more direction in finishing the lifecycle. The reflection, where the consumer describes how he feels was a good way to close off this analysis.

The design goal was quite easy to complete for the students. The only problem they had was to define how the consumer should feel in the new experience. They already started coming up with ideas which influenced what they wrote down for the experience they wanted to achieve. They wanted their consumer feel special in the experience. It was not clear that the reflection of the consumer could be the inspiration for what kind of experience they wanted their consumer to have. At the end of the test, they mentioned they had a problem with this but when explained they could see how they unconsciously did relate it to their

finding that identity was highly valued for their consumer.

The final step, where they had to design the new experience went quite fluent and they did not need help. They generated some ideas together, realistic ones such as a limited edition of the phone, but also some more crazy ones such as 'adopt a poor Apple user'. The design goal functioned well to bring back the focus of what they wanted to achieve. In the end, the consumer could get a special edition phone for the first 300.000 of people who returned their old phone to the store when buying the newest release.

Drawing the new consumer-product lifecycle in the panels made the participants rethink all the phases in the detachment process again and how their new experience influenced the complete lifecycle. When it felt repetitive in the previous concept, this time it triggered the students to think what influence their designed experience has on the rest of the lifecycle.

What they still had doubts about is whether they tackled the problem in the right way. The purchase cost was found to be the reason why the consumer would



Figure 7.7: Participants starting on the lifecycle

not want to separate, and identify the reason why he would want to separate. With their idea, they increased the feeling of identity even more, and nothing was actively done about the purchase cost. This felt not completely right to the students. After a small discussion, they concluded that the weight of the value of expressing identity which is increased by the special edition was worth more than the purchase cost for their consumer. In the end, the goal of getting back old phones was achieved with their idea. And the participants closed of the new lifecycle with the consumer saying how he feels with the new experience.

Discussion

At the end of the test, the participants were asked their opinion on the tool. Generally they liked it, but all three students agreed that the detachment process was difficult to understand on their own. They liked that they were facilitated and could ask questions to get back into the right direction. Especially choosing values for why people consider their product to be at the end of use and why they would not want to separate even though the product is not used anymore. This was observed during the test as well. During the test, they wrote down different values that could play a role. Even though they were asked to use a blank paper to write down their thoughts and choosing one narrative of the consumer lifecycle to put on the poster, the students wrote down their thoughts on the poster. This is not that bad, but it created confusion. One participant even said that it would have helped them make decisions if they did it in the intended way and used a

blank piece of paper. Furthermore, the poster could maybe contain a little more description and explanation of those two phases in the detachment process to help the students further along.

The link between the experience described in the consumer reflection and the design goal was not yet clear enough for the students. But what was remarkable, that even though they did not see the relation, their design goal did relate to their findings. The ideation and designing the new experience went well, and the students kept referring back to their findings in the consumer-product lifecycle and design goal when forming their final idea.



Figure 7.8: Participants working on the poster

The students were aware that the normal context of use would be in the setting of a workshop. They suggested to explain the process of the tool verbally in a presentation instead of giving it on paper. It would help to understand more of what is expected from them.

Conclusion

The main aim of this test was to see if the students felt more inspired by the tool and felt allowed to write and sketch

7.4 CONCLUSION

their thought process. During the test, the participants seemed to enjoy the process and tool more than the participants in the previous tests. They liked the images and layout because it made flow of the process clear and the figures of the consumer makes it human. This image of the consumer supported the participants in identifying their consumer and was used to refer back to when they were doubting something in the analysis of the consumer-product lifecycle. Moreover, defining the consumer is a good method to start the process. The students can start getting in a creative mood by making a character and drawing physical features such as hair and clothing. And at the end of the tool, they reflect on their idea by completing the sentences of the consumer on how he feels with the newly designed experience. This signals the end of the poster closed off the process.

The consumer lifecycle helped them to see the relation between the product and consumer change over a time period and is remains a good method to explain the detachment process. However, it is still the most difficult part of the tool. More explanation in the form of a presentation would greatly support the students in exploring the detachment process and knowing what is expected from them. At the end of the test, the participants were shown the previous concept and all agreed that this final concept is certainly more fluent and inspirational, because it is more aesthetically appealing.

The final concept was made with the intention to explore if the students could feel more inspired when using the tool and do not feel restricted when writing and sketching on the tool. The test showed that the participants enjoyed the tool. The first interaction they have is defining the consumer, which starts their thought process and gets them in a creative mindset because they are allowed to draw on the consumer. This sets the tone for the rest of the use and lets the students express their thoughts in their preferred (creative) way, without feeling restricted.

The second issue that kept recurring was that the detachment process stayed difficult for the student to understand. Throughout the testing was decided that the use context of the tool would be during an educational workshop in which the whole topic of detachment is introduced and the process of detachment is explained. During the test the participants got a presentation explaining this, a paper print of the framework and a paper explanation of the process. However, it still appeared not be enough support for the students to be able to work on it alone without too much facilitation.

7.5 RECOMMENDATIONS

The findings from the final test are translated to some recommendations for a next version of the tool.

1) Explaining the detachment process

The biggest issue that stayed throughout all the concept iterations, and in the final tool, is still how the detachment process can be explained to the students. Various methods and techniques are used to explore how this could be done in the best way. In this concept, the students will be explained the process of detachment through a presentation and analyse it according to the consumer-product lifecycle. However, this was still not enough support. Therefore, the recommendation is made to explain the theory of the detachment process, using an example case. In this way, the students go through the process once together and see what is expected from them when they analyse the detachment process for their case.

2) Walkthrough tool

The process that the students will walk through with the tool can be explained in the presentation. It can show how the different steps relate by using examples, and the necessities for each step such as the cards (figure 7.9). This could help the students to focus more on the content of their process instead of figuring out themselves what they have to do. Urgent questions can be asked generally, to make it clearer for other groups as well. The sheets can be given out digitally, so the students can look them up afterwards. The cards keep their function as a way of providing extra detailed explanations of the values and behaviours.

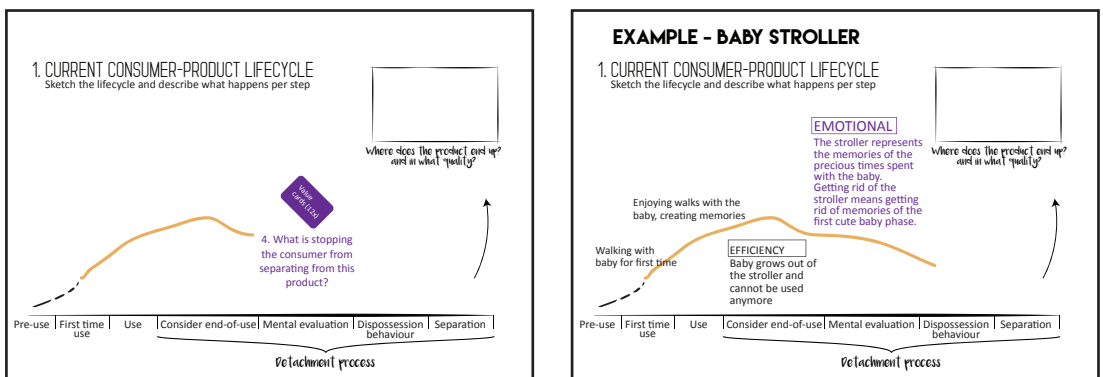


Figure 7.9: Examples of a presentation sheet explaining the steps

3) Case studies

What would greatly improve the sense of what the goal of the tool is, is to have a clear case study. In the end, the goal for the designer is to get the consumer products back when they are done using it. The tool should support them in designing a fitting experience that stimulates the consumer to return their product. Having a clear case study will give more direction and conditions the students should abide by. For instance, the students are a design team working on a problem for a company. To give more context of the company, what they do with returned products, and what is (not) possible for that company will give the students more support to make certain decisions. The context of the company and what their role as designers is in this assignment should be made more evident to the students.

4) Time

Finally, the testing of this final concept was done in a smaller timeframe (1,5 hours) than the timeframe in which the tool would be used in reality (4 hours). Therefore, there was less time to give a presentation that fully explains every aspect of the assignment, and the students had to make quick decisions based on their assumptions. It would be recommended, that when the advice given above is implemented in the new version, a test is done in a setting with enough time. In this way, the facilitator can take more time for the presentation, paying attention to all the steps of the detachment process and the tool. Moreover, the students will be given more space and time to discuss their thoughts, and analyse and design the experiences.

CHAPTER 8

Evaluation



8.1 INTRODUCTION

At the beginning of this project, three questions were defined that functioned as the basis of the research executed in the project. These were:

1) How does a consumer detach himself from an owned possession?

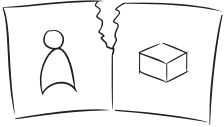
2) What are the current end-of-use experiences in this detachment process?

3) How can these findings be translated into a design tool?

This chapter will conclude this report by summarizing the main insights from the research to answer these questions and by reflecting on the process that has led to these insights. Different aspects of the process, such as the methods and approaches that were used to investigate the research questions will be evaluated. They will be evaluated on their fit within this project and the limitations that could have influenced the results. Finally, recommendations will be made for future research on product detachment and end-of-use experiences.

8.2 EVALUATION

1) How does a consumer detach himself from an owned possession?



This project set out to investigate how and when consumers decide to separate from their product. The approach for the research on this product detachment was investigating studies in literature on topics such as product detachment, dispossession, disposition, and end-of-use. Different theories and findings from these studies formed the basis for the framework of detachment developed in this project (chapter 4). This framework shows the process of product detachment and this consists of two parts: 1) the dispossession and 2) the separation. Dispossession is the process of mentally removing the product from your life followed by separation, the physical act of removing the product from your life.

Different values attached to the product influence the way consumers will detach and separate from it. These values are grouped into three different categories: technical, economic and psychological, and they could make the consumer hesitant to separate. Through dispossession behaviours, the consumer tries to overcome this separation anxiety and enable himself for separation.

This framework is purely based on the insights gained from literature. One of the limitations of this approach is that there are still aspects of product detachment that have not been researched because it has not received that much attention yet. Therefore, relevant information could be missing in this study and in the framework. Furthermore, this framework has not been evaluated and verified with a separate study. It has been established through a questionnaire on physical separation from with consumers, that the values and ways of separation were congruent with the findings from literature. However, the main dispossession behaviour that came forward from this questionnaire was storage without use. Interviews with consumers might have helped to gain more insights into the behaviours and motivations. Questions could be asked building on the answers of the interviewees to get more in-depth knowledge in the detachment process and their decision making.

2) What are the current end-of-use experiences in this detachment process?

The project has explored how theoretical insights into the process of product detachment influence the consumer experience at the end-of-use. The reason for this is that end-of-use experiences could be relevant to for maintaining a circular economy. A good end-of-use experience might stimulate consumers to keep products in the circular loop. The exploration of the consumer experiences over the complete product-lifecycle with special attention for the end-of-use phase is been done through literature and studies. Again, because the end-of-use phase has not received that much attention in research, it could be that some essential insights are missing. Moreover, it has been more common to think of onboarding and offboarding for services, digital products, and processes. These are rather different than physical products. An app or website can be closed and forgotten, but physical products remain in sight and take up space. For future research will be recommended to investigate this difference further, and especially how this influences the end-of-use experience for physical products. A benchmark research that compares the current end-of-use consumer experiences from various companies, products, and services could give insights into situations and circumstances why some experiences are negative or indifferent, and others positive.

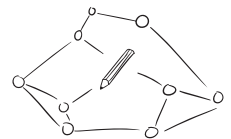


3) How can these findings be translated into a design tool?

Finally, the insights gained from the literature are translated into a tool. The shape and form of the tool were not yet defined but were explored through concept iterations. The result is a poster that students can fill out that guides them through the process of analysing the detachment process, defining what they want to design, and creating an idea for an experience.

The process of creating iterations and testing them with students was efficient in rapidly investigating which techniques and methods could be used to get the best result. Findings from each test were implemented in the next concept iteration. The tool was gradually built up with each new iteration. A total of eight iterations have been developed and tested.

Even though this iterative process allowed for many experiments,



the approach taken to this process could have been more structured. The process started directly with developing concepts to explore the design questions. However, a conversation with the user group, industrial design students, could have been useful to find out what they think they would need from the tool. This could have formed the basis from which the iterative process could have started. The process would have had a more specific focus from the beginning, which could have saved time.

8.3 REFLECTION

The process of this project has been sufficient within the time scope. The separate pieces of information about product detachment have been pieced together to form one overview of the detachment process that can be used by designers. The three main research questions have been answered, but there are still opportunities for improvement.

During the process, new suggestions to complement the research were made. They were very interesting, but due to the time constraint of this project were not taken into consideration. For example, a different situation where people say goodbye is in the case of someones' passing and the mourning process, or a divorce. Another example is a marriage, where a relationship is put in contract out of love in which agreements are made on how to behave in this relationship and what would happen if it ends. Could this also work for products? The psychology of these circumstances could be used to research product detachment further as well. These type of analogies and metaphors could help to explore product detachment from a new perspective, give new insights, and add knowledge on the detachment process and end-of-use consumer experience.

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Picture sources Iconic Transfer:

Car: http://blog.jameswoodleyphotography.com/ngg_tag/muscle-car/

Frame: <https://www.sonyinsider.com/2008/08/25/sony-beta-tests-digital-darkroom/>

Picture sources Cleaning object:

<https://dutchdrycleaners.nl/wp-content/uploads/2017/10/kleding-wassen.jpg>

Picture sources Gradual garbaging:

Red towel: <http://moneygreenlife.com/awesome-5-coral-colored-towels/coral-colored-towels-coral-towels-kohls-red-bath-towels-hanging-on-the-silver-metal-towel-rack-beside-of-a-stack-bath-towels-on-the-brown-wooden-table/>

Red cloth: <https://www.vehicleservicepros.com/in-the-bay/tools-equipment/shop-equipment/towels/article/12030100/are-reusable-shop-towels-dangerous-to-workers#&gid=1&pid=2>

Picture sources Brutal use:

[https://www.lifewire.com/reasons-your-car-stinks-534676\)article/12030100/are-reusable-shop-towels-dangerous-to-workers#&gid=1&pid=2](https://www.lifewire.com/reasons-your-car-stinks-534676)article/12030100/are-reusable-shop-towels-dangerous-to-workers#&gid=1&pid=2)

Picture sources Storage without use:

Own photo

Appendix

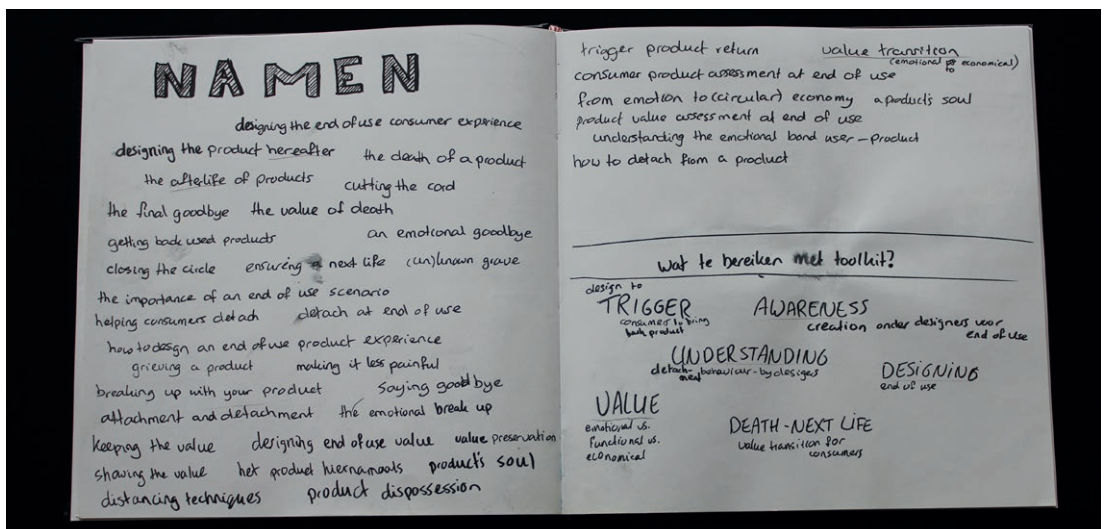
APPENDIX 1: FIRST IDEA GENERATION

To start with the concept generation, I first explored some ideas for forms and shapes the tool could have. Through this I wanted to find out what I want to achieve with my final tool.

These concepts are quick prototyped, and not fully worked out content wise.

I started with thinking of possible names that the tool could have. Six different goals came forward of what the tool could do. Before designers can design for end-of-use or triggering consumers to bring back their product, they should be aware of

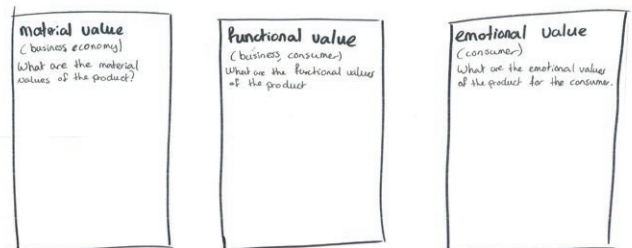
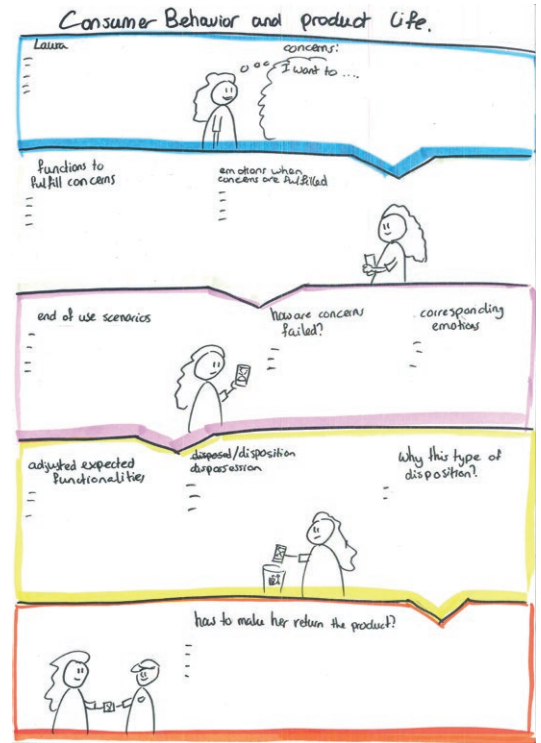
the existence of the end-of-use phase and understand what is going on. Therefore I chose to create ideas for awareness and understanding. Furthermore I chose to look into values as well, because I found that interesting and wanted to see what ideas I came up with.



Taking the framework of experience as a starting point, I tried to think of how these concerns could be used to get insight into the consumer experience at a products end-of life.

A persona could function as a way for the user of the tool to understand why the consumer wants certain things, and which concerns they have. Then the designer can go through the customer journey at the end of use: which concerns are failed when the product is at its end of use, and which (negative) emotions they evoke. In the end the designer could think of how these negative emotions can be turned into something positive while persuading the consumer to bring back their product.

Another idea was to make an overview which values there are for each aspect: material value, functional value, and emotional value. And how the emotional value that a consumer has could be removed, and that the importance of the materials of a end of use product is still valuable.



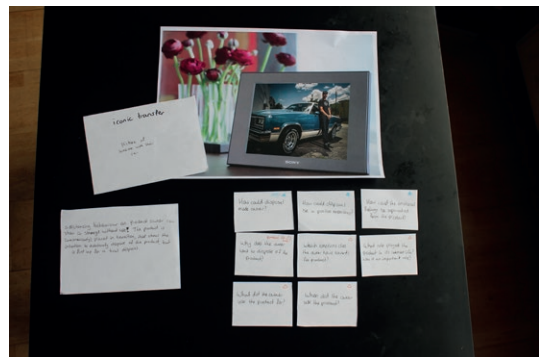
Transitioning Product value

Separating from emotional to purely material value. transition.
How can you (as a designer) separate/remove emotional value from the product?
Make it purely material value.

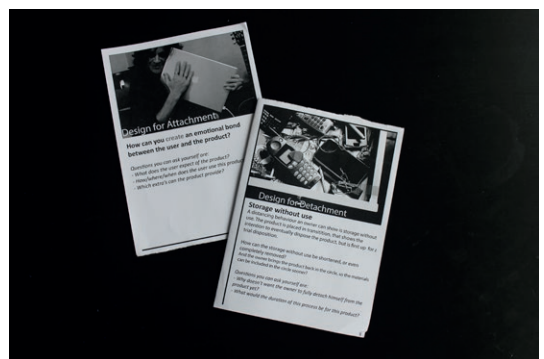
Continuing on the idea of value transition, I made some chips, on which different values can be written. The yellow side represents the perspective of the consumer and the blue side the perspective of the company. The chips are different in size, so more important values are on the bigger chips, and the less important are on the smaller chips. This raises the question if different values are indeed of different weight. With the chips, a group of designers can discuss on what they think are important values.



Furthermore I made some different concepts with cards about the different distancing behaviours and divestment rituals. One was a card with one of the divestment rituals, with on the front side the title and picture of an example, and on the backside an explanation. Then there are small cards the designer can pick with questions he finds interesting or relating to the chosen card.



During a short talk with Emma Fromberg, I realised that for a designer to be able to design for detachment, the designer also should design attachment, in order to realize and control what the consumer-product relation is. So I tried to make cards that have on the one side an attachment strategie, and on the back side a detachment strategie. However, some could maybe fit with each other, but not all.



APPENDIX 3: RESULTS QUESTIONNAIRE

Welk product (dat niet kapot is) heb je	Waarom vind je dat je het weg moet doen?	En waarom heb je dat nog niet gedaan?
Niets	-	-
Lattenbodem van bed.	Het is over. Heb een ander gekregen.	Twijfel of we het toch gaan herbruiken.
Eetstoelen en eettafel	De stoelen zijn van mijn schoonouders en de tafel van mijn ouders. We lenen het nu al twee jaar en het ziet er niet uit.	Ik heb een hele dure smaak wat betreft meubels. Ik spaar nog steeds voor een nieuwe eethoek, maar gaat het geld toch weer uit aan andere verbouwingen in mijn huis. Nu staat toch echt de eethoek op mijn lijst, als de eerst volgende aankoop.
Audio apparatuur van mijn man	Hij gebruikt het niet	Hij wil het bewaren voor als hij het wel wilt gaan gebruiken
Printer, kleding Ijismachine	Ik gebruik ze eigenlijk toch niet en iemand anders kan het misschien nog gebruiken. Ook hou ik van zo min mogelijk zool in huis. Dat geeft rust Gebruik het nooit	Luiheid en soms denk ik misschien kan ik het toch nog een keer gebruiken Wil het een goede bestemming geven
Nog een sjaal	Omdat mijn vriendje vindt dat ik niet te veel sjaals mag hebben	Omdat ik eigenwijs ben
Oude opladers van telefoons	We hebben er veel te veel	Ze zijn niet stuk
Computer	Verouderd	Heb er het geld niet voor over
Vouwwagen	Gebruiken hem niet meer	Is te oud wie wil hem nog
En duur dieet boek over veganisme Ik heb een aantal mooie boeken die ik zelf nooit lees. Ik heb gevraagd aan vrienden maar die hadden geen interesse.	Ik gebruik heb niet, en ik weet dat ik hem ook nooit ga gebruiken.	Omdat ik bang ben dat ik hem alsnog wil gebruiken als ik hem niet meer heb. En hij ligt niet in de weg.
Boeken oude tv	Het staat in de kast als decoratie, wordt niet gebruikt Kopen telkens nieuwe en de boekenbaar is al overvol. heb een grotere	Omdat het wel mooie boeken zijn maar zonde om zo naar oud papier te brengen Het laatste boek kon ik er toch nog in krijgen. niemand wil hem op marktplaats kopen
Tv	Wordt niet gebruikt	Geen geschikte manier gevonden (geen belangstelling op marktplaats) te lui om naar kringloop te gaan
Boeken	Niet gebruiken	Geen zin om op te ruimen
Bed	Staat in de weg en wordt niet gebruikt	Te veel moeite
Een extra bank die op een slaapkamer staat	Het neemt te veel ruimte in en we gebruiken het bijna niet	Te veel moeite
Een paar schoenen	Ik heb een paar paren met schoenen die ik weinig tot niet draag. En ik heb gewoon, vind ik zelf, te veel schoenen. Ik denk dat het niet nodig is zoveel schoenen te hebben.	Ik vind het ergens zonde. Wat als ik toch ze nog 's aan wil. Of dat toch het moment komt dat ze handig zijn?
Verschillende kledingstukken	Ik draag ze niet meer	Ik denk dat ik ze ooit misschien nog wil dragen
Boeken	Na 1x lezen gebruik je het toch niet meer, zonde vd ruimte & bomen	Moeite
Oude make up	Was van een vorige huisgenoot, maar wordt door niemand gebruikt en is niet gewenst	Het ligt ergens in een la en niet in de weg. Kom het niet dagelijks tegen
Een bureaulamp ik heb een sombrero dat ik nooit gebruikt	ik gebruik hij nooit	Weggooien is zonde, maar hem weggeven kost moeite.
Een stuk stof waarvan ik nog iets wil maken maar het komt er niet van.	Het ligt nu al een tijd niks te doen.	het ziet mooi uit in mijn kamer
Pet	Gebruik het nooit	Ik wacht op inspiratie om er wat van te maken.
Broodmachine	We gebruiken hem niet.	Emotionele waarde
Boeken, studieboeken	Volg het vak niet meer en kan het dan aan iemand Anders geven.	We hebben genoeg ruimte daarom staat ie niet in de weg en misschien gaan we m nog wel weer gebruiken.

Wat is het laatste product	Waarom heb je ervoor gekozen het weg te doen?	Op welke manier heb je het weggedaan, en waarom op deze manier?	Op welke manier was het product waardevol voor jou? En is dat in de loop van tijd
Kleding	Ik droeg het niet meer of paste niet meer	In een grote zak die achterin mijn auto slaat, zodat ik vrienden en familie kan laten kijken of er nog wat leuks voor ze bij zit. Dit omdat ik nog goede kleren zijn	Het zijn mijn zelf uitgekozen kleren, wat ik graag droeg totdat ik ze niet meer aantrok
Ladenkastje	Niet mooi meer en stond in de weg	Kringloop. Omdat het verder nog goed was.	De stijl is nodig gehad en gekocht in kringloop.
Kussen hoes	Was niet de juiste kleur voor mijn huiskamer.	Via verkoopboek op Facebook, omdat het een kussen hoes was die nog in de verpakking zat. En dit sneller gaat dan marktplaats.	Ik vond het eerst zonde om het weg te doen, omdat ik er een bedrag voor heb betaald en wist dat ik dat bedrag niet weer terug zou krijgen. Maar nu lag het ook maar te verstoffen in de kast.
Grasmaaier	Werkte niet naar toebehoren	Naar de stort	Verouderd
Lamp, laptop houder	Ik gebruikte het zelf niet meer	Naar de kringloop gebracht	Nutteloze producten, maar toen ik ging samenwonen hadden we dingen dubbel en waren deze minder mooi/functioneel
Biertap	Geen fusten meer leverbaar	Stort	Het werd waardeeloos
Sjaal	Omdat ik van mijn vriendje niet te veel sjaals mag hebben	Kringloop, omdat het anders zonde is	Niet zo dus, daarom kon het weg
Oud scheerapparaat	Er is een andere zonder snoer eraan	Gearraagd wie er belang bij had niemand en daarna in de apparatenbak bij de kringloop.	Was van mijn ouders geweest
Modem	Vervangen vanwege ander abonnement waar een andere modem bij hoort	Ingeleverd bij afvalstation. Provider wil het terug, maar dat is lastig	Zorg voor internet. Omdat het aanbod is veranderd (on demand, ziggo horizon) dus, ja dit is veranderd (tv erbij)
Toest apparaat	Anti aanbaklaag werd minder	Grof vuil makkelijk	Wilde grotere
Muziek oordopjes	Niet fijn in gebruik	Weggegeven aan familielid. Gratis bij een ander product gekregen, dus ga er dan zelf ook geen geld voor vragen.	Het waren wel goede kwaliteit oordopjes maar als ze blijven liggen en je ze dus niet gebruikt en uiteindelijk niet zo duur waren heb ik er geen moeite mee om weg te doen
Wafelijzer	Het wordt niet meer gebruikt	Naar de kringloop, er zijn vast mensen die ook even wafels willen maken	Het is in een studentenhuus, maar er was een tijd dat we vaak wafels als toeje aten. Maar op een bepaald moment aten we het minder en op die manier heeft het product minder waarde
Denk (waardeloze) teenslippers.	Voorstuk klapte zomaar weg Slecht materiaal	Los in de vuilrestcontainer.	Wou nog teenslippers hebben voor makkelijk en warme dagen
Kleding	oud	inzamelpunt	nieuwe kleren
Bed	Samenwonen	Marktplaats, deels voor geld, deels omdat weg gooien meer moeite kost, deels omdat het bed nog goed is dus zonde om weg te doen	Eigenlijk niet echt, nooit echt gehad. Misschien toen het nieuw was nog maar is lang gelopen
Kluis	Opruimen kamer. Niet meer nodig	Bij grof vuil stort gemeente	Laatste tijd niet zoveel gebruikt.
Koelbox	Werd niet langer gebruikt	Via een markt	Er kwam geluid uit en hield drinken koel
Hamsterkool	Ik gebruikte het niet meer en verwachtte het in de toekomst ook niet meer te gebruiken. Een ander kon ik er nog bij mee maken.	Ik heb het weggegeven om een ander er niet zo veel plezier aan te laten beleven als ik ooit er van gehad heb.	Ik heb het van mijn ouders gekregen voor mijn verjaardag toen ik jong was. Ik wou graag een hamster. Na twee hamsters was ik er op uitgekeken en heeft de kool op zolder gestaan.
Verschiende kledingstukken	Of ik paste het niet meer goed, of ik droeg het nooit meer of ik vond het niet zo mooi meer	Ik heb het in een leger des hels container gestopt. Ik weet dat er genoeg mensen ze nog wel kunnen gebruiken, en dan kapotte kleding ook nog gebruikt word om andere dingen van te maken soms	Het uitte voor een korte periode mijn persoonlijkheid, maar deed dat nu niet meer.
Telefoonhouder voor in de auto	Schoonvader wil het gebruiken en ik gebruik het niet aangezien ik geen auto heb.	Ik heb het aan mijn vriend meegegeven toen hij bij zijn ouders op bezoek ging	Niet echt waardevol aangezien ik het gekregen had in een kerspakket, door de loop van de tijd is dat ook niet veranderd omdat ik het niet gebruikt heb
Babykleding	Ze hands gekregen, maar vond het niet leuk genoeg	Kringloopwinkel	Lief dat we het kregen, bij nader inzien niet leuk genoeg.)
Kleding	Was te klein geworden	Naar de kringloopwinkel gebracht. Het was nog goed te dragen door iemand anders.	Vond het mooie kleding. Veranderde omdat het er steeds minder mooi uit zag omdat ik het minder goed paste
Een kom	Het was van niemand in het huis en moest opgeruimd worden	Weggegeven aan een vreemde via Facebook, zodat het hergebruikt kan worden	Niet, het was van niemand in het huis (geen enkele persoonlijke waarde)
sokken	ze hadden gaten erin	in de normale uitschot	ik heb sokken nodig voor mijn schone, zij heeft geen waarde voor mij toen het gaten was erin
Schoenen	Ze piepten tijdens het lopen.	Naar de kringloop, miss kan iemand anders er wat mee.	Ik heb ze niet lang gedragen omdat ik erachter kwam dat ze niet de functie volbrachten die ik had gehoopt.
Kussen	Er waren genoeg kussens na verhuizing	Bij restafval, want dat was makkelijk.	Het kussen lag minder lekker dan de nieuwe kussens
Kleding	Ik gebruikte/draag het niet meer.	Kringloop. Omdat iemand anders er misschien nog veel draagplezier van heeft.	Het was een leuk kledingstuk maar ik vond het na jaren niet leuk meer.
Kleding	Ik droeg het nooit meer en zag het mijzelf ook niet meer dragen.	Gedoneerd	Kleding dat ik vroeger graag droeg maar tegenwoordig niet meer leuk vindt.

APPENDIX 4: VALUE CARDS V1

Emotional	Relational
<p>Emotional values are when the owner has used the product for a long period of time and has grown attached to it. Or it has as symbolic meaning attached to it, such as a family heirloom.</p> <p>This emotional bond could make disposition difficult.</p> <ul style="list-style-type: none"> - When/where/how was the product used? - How is the emotional value embedded in the product? 	<p>A product used with other people could stimulate relational values.</p> <p>Furthermore, when giving away a product to an acquaintance could also stimulate a relationship.</p> <ul style="list-style-type: none"> - When/where/how was the product used? - For what kind of relationships is this product used? - How does it stimulate relationships?
Aesthetics	Moral
<p>Through the aesthetics of a product, a consumer can express his style, status, and identity.</p> <p>However, this is very susceptible to obsolescence, because aesthetics are very trend sensitive, that change rapidly, resulting in a mismatch between wanted expression of identity and expressed identity. Detachment would then be quite easy and fast.</p> <ul style="list-style-type: none"> - How (fast) are the trends changing? - How are the aesthetics representing someone? - And to what extent? 	<p>By giving a still functional product away to someone who needs it more, or appreciates it more gives the original owner the feeling of doing a morally good thing.</p> <ul style="list-style-type: none"> - Why does the owner want to dispose of a functional product? - How can the owner realize that the product could have a second life with someone else?
Replacement cost	Resell price
<p>When a product isn't functioning as desired, the consumer could decide to replace the product. Depending on the replacement cost and the state of the old product, the consumer decides whether to replace it or not.</p> <ul style="list-style-type: none"> - Is the product in his current state still usable? - What is the price of the replacement product? - Is the replacement product more advanced compared to old product? 	<p>If the owner of a product decides to dispose of it, he could decide resell it to someone else.</p> <ul style="list-style-type: none"> - In what state is the product? - What was the initial price, and how much use did the owner get out of it? - What is the product now worth?

<h2 style="text-align: center;">Functionalities</h2>	<h2 style="text-align: center;">Quality</h2>
<p>For the consumer it is important which functionalities a product has, and do they conform to the needs of the user.</p> <ul style="list-style-type: none"> - Which functionalities does the product have? - How many functionalities does it have? - Is the cost price worth it? 	<p>The quality of how the functionalities are executed, and the overall quality of the product, the materials, and the assembly.</p> <ul style="list-style-type: none"> - Does it function properly? - Is the product sturdy?
<h2 style="text-align: center;">Effectiveness</h2>	<h2 style="text-align: center;">Materials</h2>
<p>For a consumer it is important that the product works well, and that he can get the results he wants without extra effort.</p> <ul style="list-style-type: none"> - Is the product quick and easy to use? - Does the product execute its functions properly? 	<p>The material quality is a factor that influences a purchasing decision. However, when the functional use is over, the materials itself could still be valuable.</p> <ul style="list-style-type: none"> - Are the materials still valuable for other purposes?
<h2 style="text-align: center;">Purchase cost</h2>	<h2 style="text-align: center;">Repair&maintenance costs</h2>
<p>When making a purchasing decision, one of the main factors is the cost price that consumers consider.</p> <p>At the end of use, the consumer has to decide whether the usage period has justified its purchase price, and that the product could be disposed of.</p> <ul style="list-style-type: none"> - What is the price of the new product? - Is it worth the technological values? 	<p>Future costs can be estimated by the consumer, influencing his purchasing decision.</p> <p>When the product breaks down, the user should decide whether it is worth to repair the product.</p> <ul style="list-style-type: none"> - Will it break soon? - Is it worth to repair the product, or just buy a new one?

APPENDIX 5 - PERSONA



This is Coen (22 years old)

Coen is a design student, and he owns different products from Apple: a macbook, an Ipad, a mouse, a separate computer keyboard, and an Iphone. He really likes Apple products and is loyal to the brand.


He often replaces his old product with new releases. He replaces his macbook every 2 to 3 years. And he always buys the newest release of the Iphone. He finds it important to keep his phone up to date and really likes new technological inventions.

He uses his phone mostly for everyday stuff, such as texting, watching videos, browsing apps and listening to music.

- Which values are applicable to Coen considering his Iphone.
- What and why does he find certain values important and less important?
- Which ones are important during the end of use?

APPENDIX 6: BEHAVIOUR CARDS

Brutal Use




Brutal Use

A person wants to have optimally used a product before disposing of it. With brutal use, the owner is becomes less careful when using the product, making it break down faster, and justifying disposal and possible replacement. Even though it is a deliberate sabotage of the product, resulting in a shortened lifespan, there is no lingering value when the product is discarded.

How could you avoid this behaviour? Or could you plan how the product will break, thus knowing the state and value of the product when it is disposed, and knowing how to give it a second life?

Storage without use



Storage without use

With storage without use, the product is (unconsciously) placed in transition, that shows the intention to eventually dispose of the product. However, there are still some lingering values, so it is first up for a trial disposal. If this trial goes right, then it becomes available for a real disposal.

By understanding why the owner doesn't want to dispose of the product, you can try to shorten or remove the trial period at all.

Iconic Transfer



Iconic Transfer

With an iconic transfer the private personal meaning of the disposed product is transferred to another object: the icon. The products are seen as vessels that carry the meaning but that meaning can be detached from the first product and attached to the icon. The original product is 'relieved' of the meaning, making it easier to dispose of.

How can you facilitate a fitting iconic transfer for your product, so that the old product can be considered for disposal by the owner?

Gradual Garbaging



Gradual Garbaging

Gradual Garbaging contains downgrading a product step by step, in order to optimally use a product. The product can be used for different purposes throughout its life. Firstly it serves its main purpose, the purpose for which it is bought. But when the product is not applicable for the intended use anymore, it could serve other purposes. This can be continued until the product can't serve any purposes anymore, and becomes available for disposal. For this behaviour the owner should be able to see the possible new purposes.

Can you think of a secondary (and maybe even tertiary) purpose for the product? How can you make the owner realise the potential secondary purposes of the product?

Cleaning Object



Cleaning Object

Cleaning objects serves as a way to rid them of 'contamination' and restoring them to their natural state. It removes the personal meaning attached to the product. Now that this meaning has been erased, it will be easier for the owner to dispose of the product. Furthermore, those personal memories are now protected from corruption by unknown future use by an unknown new owner. Or it serves as giving the product and new owner a fresh start if the product transfers owners.

How can you facilitate a fitting cleaning process, so that the old product can be considered for disposal by the owner?

APPENDIX 7: VALUE CARDS V2

<p>Moral</p> <p>If an owner of a product decided to dispose of a still functioning product, he can give it away. He understands that the product could still be of value with someone else.</p> <p>By giving it to someone who might need it more, for example a charity, or to someone he know would appreciate the product more than he currently does, he get the feeling of doing a morally good thing.</p> <p>He gives it a second life, what also boosts the feeling of keeping the product longer out of the waste stream.</p> <p>He should be aware of others that might want it.</p>	<p>Resell price</p> <p>At the end of use, and the product is considered for disposal, the owner could estimate how much it would still be worth if he were to sell it. Different aspects of the product are considered to make an estimation, such as aesthetics, effectiveness, quality, frequency of use, and enjoyment of use. But also emotional values play are role, because they could make it worth more to him, than to a stranger.</p> <p>The owner wants to have a feeling of getting the right price according to his estimation, and otherwise he might prefer to keep it but not use it anyway.</p>	<p>Quality</p> <p>The quality of the product represents how well the functions are executed, the materials, and the assembly. When the quality of performance is not satisfactory anymore, the owner might decide to dispose of it. However, it could also be that the performance is still meeting the requirements of the user, but the aesthetics are outdated. Then it is important for the owner to think which he finds more important.</p>
<p>Emotional</p> <p>During use the owner may grow attached to the product. Especially if the product was used over a longer period of time, and shared/provided in the life experiences of the owner. The product has a special meaning to the owner, which makes it hard to replace with a new 'normal' product.</p> <p>Or it has a symbolic meaning attached to it, such as a family heirloom.</p> <p>This emotional attachment could make disposal difficult, because of the unreplaceable feeling.</p>	<p>Repair and maintenance costs</p> <p>When product is broken, the owner can decide he wants to repair it, instead of disposing and replacing it. But the costs and effort necessary for repair should be quite low. If these are too high, it might be easier to just buy a replacement and dispose of the old one, even though repair might extend the product life considerably.</p>	<p>Effectiveness</p> <p>For a consumer it is important that his product works as it should work. It should be easy to handle, quick to use, not unnessecary complicated, and get the right results without extra effort.</p> <p>A product could be already too complicated by design, which makes the owner regret purchase.</p> <p>Or, the effectiveness could decrease due to use, wear and tear, dirt, and age. Then the owner should decide what the threshold is of acceptable effectiveness and when it is time to dispose/replace the product.</p>
<p>Relational</p> <p>A product used with other people could stimulate relational values. Furthermore, it represents the good/bad times the owner had with family and/or friends. The owner might want to keep the product because it reminds him of special times with his family/friends.</p> <p>But it could also be that he received it as a gift. Or he could give it away as a gift. This is adding to the relational values as well.</p>	<p>Purchase cost</p> <p>Understandibly, the purchase price is one of the main factors that consumer consider when buying a new product.</p> <p>However; at the end of use, this is still a factor that could influence the disposal decision. When the use frequency and enjoyment justified the cost, it makes it easier to dispose, because then the owner has the feeling of having gotten his moneys worth.</p> <p>But, when the use was unsatisfactory, the owner doesn't get this feeling. In order to try to breakeven with the purchase cost, he might decide to sell it for a price or keep it longer, to avoid a too negative feeling.</p>	<p>Materials</p> <p>The materials and the material quality are things that are considered while purchasing a product. Materials of the casing of a product is one of representers of the value of a product. When there are scratches or cracks in the casing material, the value decreases considerably. However, damaged materials might not be valuable for consumers, it is still valuable for remanufacturers and recycle companies.</p> <p>If the owner understands the values a product might have for people other than consumers, he could decide to dispose it differently than in the normal trash.</p>
<p>Aesthetics</p> <p>The aesthetics of a product is the best way to visibly represent the style, status, and identity of the owner. Of course, over time the personality of the owners might change, and then the aesthetics might not fit with it anymore. Or the trends change which make it unfitting.</p> <p>At the end of use, the product could either represent a nostalgic feeling towards past times, preventing disposal.</p> <p>Or contrary, if the owner has a aversion to the past times, he wants to dispose of the product, to avoid reminders.</p>	<p>Replacement cost</p> <p>When a product isn't functioning as desired, the owner could decide to replace the product. Depending on the replacement costs and the state of the old product, the owner can decide whether it is time or necessary to replace it or whether he could still use the current product a little longer.</p>	<p>Functionalities</p> <p>Which functionalities, and how many functionalities a product has influences the value estimation of consumers. When the certain functionalities break or do not work properly, the estimated value goes down. The owner should decide which functionalities are more or less important to him. If the prioritised ones are still functioning, then he could use the product a while longer.</p>

Case: Greentom© Baby stroller

You are a project group working on the case of the Greentom© baby stroller. This product is currently 97% recyclable. The stroller costs €400. Greentom© has different types of strollers and buggies, made from the same type of materials.

How is it made?

Plastic consumer waste is separated into piles of different plastics types by the waste collector: PP (polypropylene) such as food packages, and HDPE (high density polyethylene) such as shampoo bottles. The plastics are broken down into granulate pieces by a different company.

Greentom© is a client of this company that take these granulates and uses them to produce their strollers with. Currently the construction of the stroller is made from PP, and the fabrics are made from woven strings of PET. They are working on making the whole product from the same material.

Getting back the products

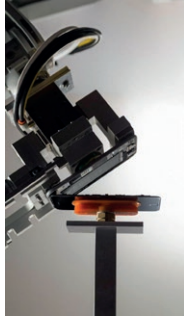
After use, the stroller can be completely recycled to create a new stroller. For this, they need the old strollers back to create new ones. Currently, customers can send back their used stroller.

However, it is quite a big product and therefore people find it a hassle to send it, slowing down or even stopping the whole flow of the use-recycle-use loop.

So how can they get their consumers to actually return their strollers?

Greentom© is not able to give their customers some money in exchange for the used strollers.

Before starting to work on this problem, define who your customer is:



Case: Apple© Iphone

You are a project group working on the case of the Apple© Iphone. Apple is working hard on recycling their devices. They have disassembly lines where robots take apart the phones and separate and filter all the different materials and components. Apple phones are high end models, that are on the high side of the price scale. (Youtube: Daisy disassembly robot or Liam disassembly robot)

Green program Apple

Apple is trying to be more environmentally responsible. They take initiatives of reusing, refurbishing and recycling their devices. They already saved a lot of materials with their program, however, it is very low compared to how much they produce and what is still out there. They want to increase the amount of devices that get returned to save even more materials.

Ideally, Apple customers return their phone back to Apple, so Apple can make sure it gets a second life (in any type of form). However, not many people do that, even though Apple has a take back system, and stores can take back phones as well.

When customers bring their phone directly to Apple, their data will be completely safe and cannot be used by Apple. This is their policy about data, that they keep very high.

Getting back the products

Apple is prepared to give something in exchange for old phones depending on the state of the phone. Most people think they get back a lot of money when they hand in their phone, but are disappointed when it is lower than expected, making them reconsider if they would still want to return it.

So how can they get their consumers to actually return their phones?

Apple can not give a lot of money for phones, because they don't make profit with winning back materials, and they cannot use/sell the data on the phone. Therefore, money (alone) is not enough incentive for consumers.

Before starting to work on this problem, define who your customer is:

APPENDIX 9: GROUP RESULTS WORKSHOP

GROUP 1: GREENTOM

Round 1:

The first idea for creating an experience was to hold a 'green anniversary' party. The case described that a financial reward for consumers that return their stroller wasn't possible due to the limited financial means. Therefore, they upped the original price of €400 to €425 to then be able to give back €25 when the product is returned. The students mentioned that you buy a stroller before the baby is born, and choose this one of moral reasons for the environment. However, after the baby is born, he/she will be top priority, which means that moral reasons and what happens with the stroller fade. With a '6 months old!' ceremony at the shop, the baby is celebrated, and the stroller is returned.

Round 2:

In the second round, the group went deeper into the customer journey and found reasons besides financial ones that could prevent separation. The ones they mentioned were the relational values, where people have received the stroller as a gift from someone else, that you then have to ask the gifter if it is alright to separate from it. This could result in it being stored on the attic for 20 years.

The new design goal focussed on consumers being rewarded and supported.

They created an experience where consumers are socially supported by other parents. The company organizes circular workshops to educate the consumers (because the environmental aspects are moved to the background since the arrival of the baby). Together they remove the first screw in the process of disassembly, en learn about the recycling process. They get something in return, such as money or a memento to feel appreciated.

Difference:

The first solution uses a financial trigger. The second solution involves the consumer more in the processes of the company. Furthermore, touching upon their environmental sense, and showing appreciation, consumers should feel better when returning their product.

What they learned:

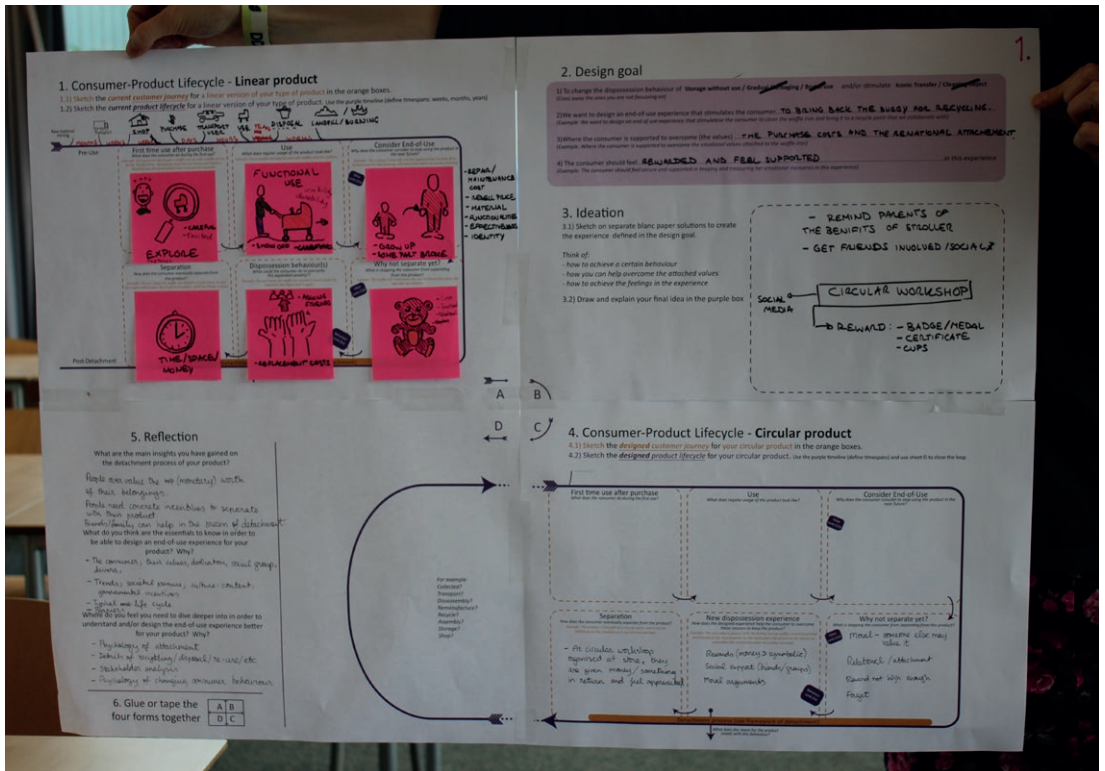
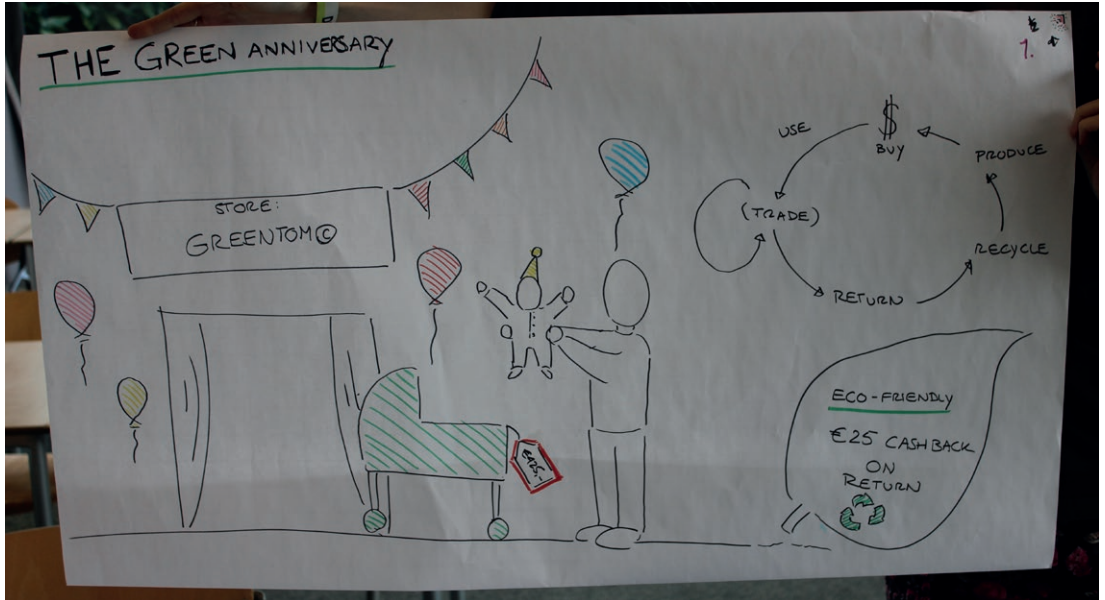
People need more incentives than only money, and more incentives will also create a richer experience.

Many factors play a role in the detachment process, such as values, dedication, societal pressure, trends, culture, context.

What do they miss:

They would like to have more knowledge of attachment, and psychology of changing consumer behaviours.

Furthermore, they would like to know more about the stakeholders, and the processes of circularity.



GROUP 2: GREENTOM

Round 1:

The pain points identified by the students were that the stroller is too big to send back to the store, or bring it back. There are not enough incentives to overcome this hurdle. The students thought of setting up a 'grown-up ceremony'. The customers are sent a letter (after +- 4/5 years) that invites them to the 'big boy/girl ceremony'. A step in the process of growing up to be a big boy/girl, is saying goodbye to the stroller. Therefore the stroller is the 'ticket' for the customer to enter the ceremony. During the ceremony there are missions that the participants can do, such as disassembly of the stroller. In the stroller is a small toy hidden, that they discover and they can keep as a memento. A further development they were thinking of to make it logistically more feasible is to collaborate with schools or supermarkets.

Round 2:

While filling out the first customer journey the students were able to come up with many different options for each step. There were enough problematic situations that they could tackle. In the end they choose to focus on changing the behaviour of 'storage without use' and stimulate 'iconic transfer'. They want to overcome the efforts and cost to bring it back and make it a meaningful experience. The consumer should feel proud and fun of the process of returning it.

Their idea was to have a manual countdown to a special event with your child. Everytime you use it, the calendar counts down. With an app that people can download, the stroller is turned into a treasure map with an indication where you can bring it back. The assumption is made that the stroller is kept until the child is about 4 years old. The child can push the stroller to the place it can be collected where it starts to make sound when it has found its 'stroller friends' and other children. The child feels proud to have brought the stroller back to its friends, and can also play with other children. This could also be applied for toys exchange. Children are motivated and urge their parents to bring it back.

Difference:

The first idea was more focussed on parents, while the second one approaching the children instead of the parents. The second one incorporates the upcoming end-of-use phase already in the normal usage phase. In a way you count down to that phase.

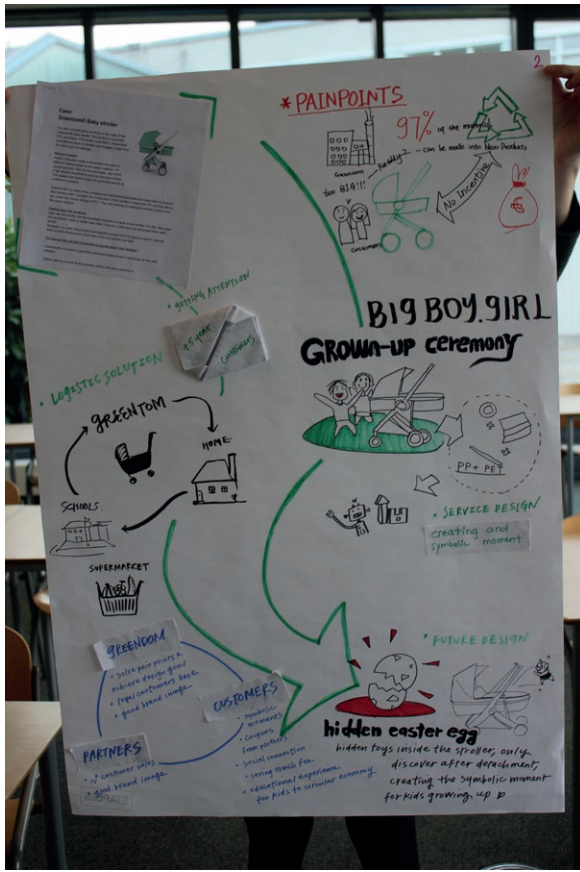
What they learned:

Understanding your customer not only of the demographic segment, but also their values. It is important to know that you can create benefits from them.

They find the behaviours and values interesting to know in the current economy. They wonder how these can be applied into business models.

What do they miss:

It is purely based on assumptions and the ideal scenario. They would like to talk with real customers and explore the real context.



1. Consumer-Product Lifecycle - Linear product

1.1 Sketch the current customer journey for a linear version of your type of product in the orange boxes.
1.2 Sketch the current product lifecycle for a linear version of your type of product in the purple boxes (before, weekly, monthly, yearly)

PROBLEMS POINTS
A MONTH BEFORE EARLY COMES OUT
4-5 YEARS FOR BABY
FOR MOMENTS STOP USING

Use
Consider End of Use

LEAVE IT FEW DAYS LET THE MUSIC & SWEET GO AWAY!
ARRIVING FOR THE EARLY! (MUSIC...)
OUT OF DATE FASHIONS!

SEPARATION
Why not separate yet?

FINAL NO SPACE IN HOME SO JUST THROW IT!
U BECOMES A STRETCHABLE SPACE (EX-LIKE A BASKET...)
WAITING FOR SOMEBODY WHO WANT NEED IT?

PROBLEMS POINTS
KIDS ARE HAPPY GROW

2. Design goal

2.1 To change the disposition behaviour of Storage without any Central Garbage / Reusable
2.2 To change the storage behaviour of Storage without any Central Garbage / Reusable
2.3 To change the storage behaviour of Storage without any Central Garbage / Reusable

3. Ideation

3.1 Sketch on separate blank paper solutions to create the experience defined in the design goal.

4. Consumer-Product Lifecycle - Circular product

4.1 Sketch the designed product lifecycle for your circular product in the orange boxes.
4.2 Sketch the designed product lifecycle for your circular product in the purple boxes

PROBLEMS POINTS
AFTER END-OF-USE
BEFORE EARLY BORN
AFTER EARLY BORN
START THE AGE TO UNDERSTAND FRIENDS NEED FRIENDS

Use
Consider End of Use

Get A MANUAL WITH
TAKE BACK THE STROLLER

5. Reflect

What are the main insights you have gained on the deconstruction process of your product?

AS A DESIGNER, IT'S INTERESTING TO KNOW MORE BEHAVIOURS OF DISPOSSESSION IN CURRENT ECONOMY. AS AN ENTREPRENEUR, IT WOULD BE INTERESTING OPPORTUNITIES TO DEVELOP MORE BUSINESS MODELS.

UNDERSTAND YOUR CUSTOMERS NOT ONLY OF THE BENEFICIAL SEGMENT BUT ALSO THE VALUES IMPORTANT TO KNOW YOU CAN CREATE BENEFITS FROM IT.

IN OUR CASE, WE WOULD LIKE TO TEST IT OUT, IT'S ONLY IDEAL ASSUMPTIONS. ALSO GET INTO REAL CONTEXT AND TASK

TO REAL
- 6. Glue or tape the users - four forms together

GROUP 3: APPLE

Round 1:

In the first round, this group focussed on emotional experiences. They thought of a reboxing ritual, opposing the unboxing ritual. They drew a graph of the excitement levels during the complete customer lifecycle.

The reboxing ritual consists of applying for a box on the website of Apple, and Apple will send the box, tools to dismantle the phone and a manual. The comparison is made with a funeral, where the deceased will also be put into a box.

With this ritual, they want to create an experience where the consumer is excited to do something for the product.

At the end, you get a certificate that says to reboxed your phone and returned it. Furthermore, you can keep the tools so you can use them to maintain your new phone. What was nice to see, is that they schematically drew

Round 2:

They first defined the user. The persona they created was a woman that has stopped using her phone because it didn't have the quality of photographing that she needed for her study. She is dependent on her phone so she keeps it as a back-up phone. After a couple of years, when her sister needs a phone, she finally decides that she could separate from it and gives it to her sister.

The design goal describes they want their consumer to bring back the phone to the Apple store, and overcome the emotional and functional values by having a secure and comfortable experience.

Their solution was that people that hand in their old phone when purchasing a new one, get a warranty than ensures them that they get a replacement phone on loan for the time hers is being fixed. This way she doesn't keep her old phone 'just in case'. This reassurement is the incentive.

This group has discussed a lot and had trouble with doing the exercise without having a defined customer. But they are the only group that created a cohesive story.

Difference:

The first design focuses on the emotional values while the second solution focuses on the behaviour of storage without use and the feeling of someone being dependent on their phone.

When asked which idea the group liked best, the group found the first one more creative, but the second one was more realistic and had more potential to work.

It was very noticeable that this group felt quite restricted in their creativity by the tool.

What they learned:

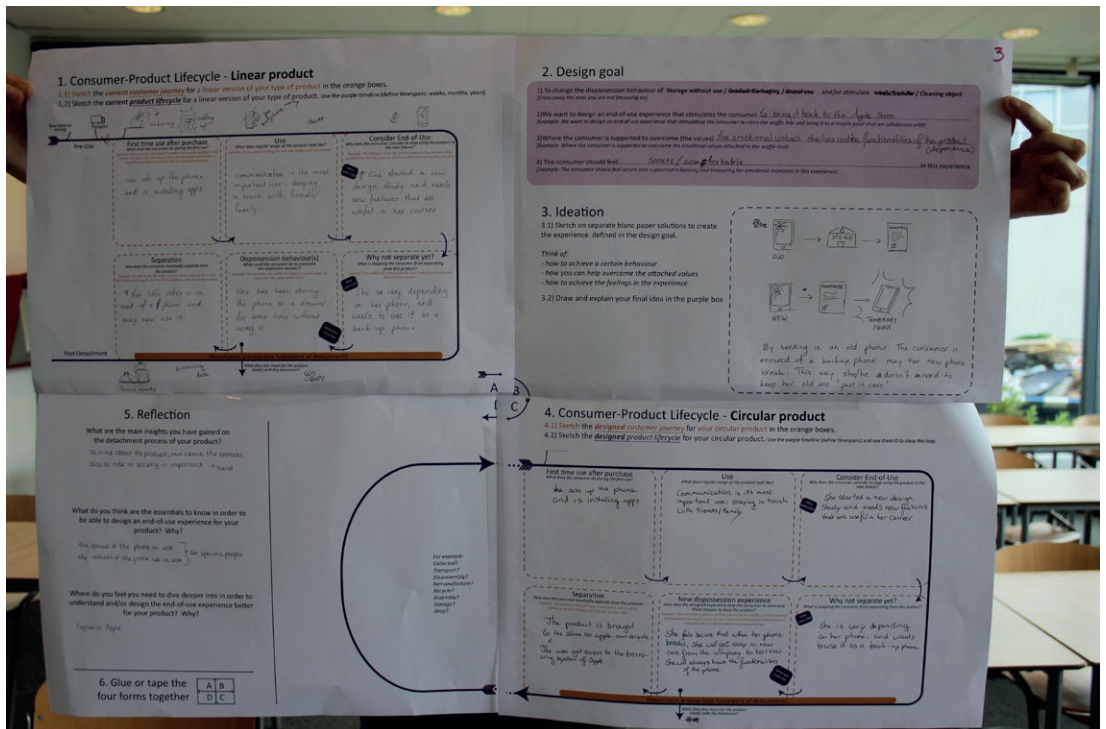
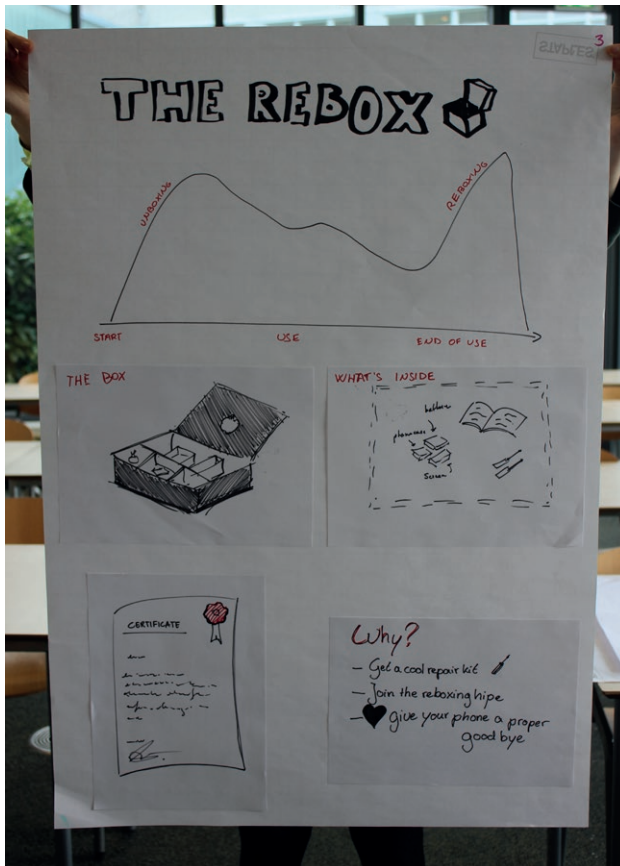
For a phone, it is not about the physical product but about the contents

Also it's role in society is important → trend

the values for deciding when something is at the end-of-use, to separate, or to not separate are very individual. Therefore, you cannot generalize for your consumers.

What do they miss:

Insight in the logistics of Apple



GROUP 4: APPLE

Round 1:

The group started with thinking of reasons why people do not want to return their phone, they established that these are: keeping as back-up, data memory (pictures), and maybe even an collection habit.

Their solution was the iECO, where customers get access to VIP shop with limited edition products, like special earphones with special colors or made from recycled phones, special protection cases with iECO. They can then collect this VIP items instead of the phones. In the Apple Store, the customer is supported by the service employees to transfer their data to an hard disk and the data is removed from their old phone.

The phone will eventually die, and that why the want to create a digital copy of your phone that can be accessed by the computer, and simulate its use.

Round 2:

During the analysis of the first customer journey, the group authenticated certain values and behaviours that stand in the way of separation, such as moral values, purchase cost, replacement cost, emotional and material values. The behaviours would be either Brutal use, Iconic transfer, or Storage without use.

When completing the design goal, the group misunderstood some sentences, and ended up with a goal of prolonging the product life of the old by gradual garbaging.

The solution they provided consisted of using the old phone as a detector on the wall. And it could use its camera for detecting stuff. Furthermore it could be used as a light and a speaker. An old phone case is used as the hanging mechanism.

In the second customer journey, they had written down by the box of 'new experience' gradual garbaging, and by the box of 'separation' recycle it.

In both rounds they moved away the problem. In the first round, they replaced the collection habit of phones with a that of earphones and other attributes. In the second they extended the product life, however they still missed the part of what happens after it's life and how to create an experience and incentives for people to return their products.

Through a discussion with a student of this group after the workshop was finished, it became clear that they understood they had to change one behaviour into another.

Difference:

The first solution was more focussing on experience, by rewarding the customers with exclusive products they can only get if they return their phone.

However, the second solution was purely on product level. They didn't really create an experience for the consumer. Furthermore, because they misunderstood the assignment in the second round, the results are not fitting to the expected results.

What they learned:

People use 'back-up' as an excuse to keep the former phone and never use it again.

It is important to know the different values of the product towards the users and customer behaviour. And also the life cycle of the product.

What do they miss:

Insight into the supply chain, and what the company does with the recycled products.



1. Consumer-Product Lifecycle - Linear product

1.1) Sketch the current customer journey for a linear version of your type of product in the orange boxes.
 1.2) Sketch the current product lifecycle for a linear version of your type of product. Use the purple timeline (define frequency: weeks, months, years).

Pre Use	Use	Consider End of Use
Create the experience - Easy to use - Personalize - Connect with others - Social media	1. Alarm 2. Email 3. Message 4. Social media	1. Alarm 2. Relational 3. Functionality 4. Effectiveness 5. Aesthetics 6. Repair cost
Separate 1. Storage without use 2. Separated with the recycling part.	Disposition (with others) 1. Buyback 2. Lease 3. Storage without use	Why not separate yet? 1. Manual 2. Replace cost 3. Emotional 4. Replacement cost 5. Material

3 - 4 months / 1 - 2 years

2. Design goal

1) To change the disposition behaviour of Storage without use / Consider Relational / Aesthetics and/or stimulate Access Transfer / Changing object (This saves the user you are not following up)

2) We want to design an end-of-use experience that stimulates the consumer to change the behaviour of the old phone.
 Design: We want to design an end-of-use experience that stimulates the consumer to use the old phone.
 Effectiveness, Ideation, Functionality, Aesthetics

3) Where the consumer is supported to overcome the values:
 Effectiveness, Ideation, Functionality, Aesthetics

4) The consumer should feel: satisfied, returned, proud, secure in this experience
 (Example: The consumer should feel secure and supported in storing old phone data in the experience)

3. Ideation

3.1) Sketch an separate blank paper solutions to create the experience defined in the design goal.

Think of:
 - How to achieve a certain behavior
 - How you can help overcome the attached values
 - How to achieve the feelings in the experience

3.2) Draw and explain your final idea in the purple box

Use for Safety

1. Camera
2. Flashlight
3. WiFi
4. Detector
5. Speaker
Connect to electricity

old phone

Alexa.

old cellphone case

4. Consumer-Product Lifecycle - Circular product

4.1) Sketch the designed customer journey for your circular product in the orange boxes.
 4.2) Sketch the designed product lifecycle for your circular product. Use the purple timeline (define frequency) and use the End of Use box.

First time use after purchase	Use	Consider End of Use
1. Examine the appearance 2. Test every functions 3. Connect with others (friends, family, partners)	1. Alarm 2. Email 3. Message 4. Social media	1. Repair/maintenance cost 2. Aesthetics 3. Functionality 4. Emotional 5. Effectiveness
Separate recycle it.	New disposition experiences Gradual Garbageing (Comic Transfer)	Why not separate yet? 1. Functionality 2. Satisfied (point the Cloud) 3. Manual 4. Low cost 5. No money

5. Reflection

What are the main insights you have gained on the detachment process of your product?

People use "back up" as an excuse to keep the phone phone, but actually never use it again.

What do you think are the essentials to know in order to be able to design an end-of-use experience for your product? Why?

- Value of the product remains over
- The product cycle of the product life
- Customer behaviour.

Where do you feel you need to dig deeper into in order to understand and/or design the end-of-use experience better for your product? Why?

- Supply chain
- How the company do with the recycle part
- Customer behaviour.

6. Glue or tape the four forms together

A B
C D

APPENDIX 10: FINAL VERSION

VALUE AND BEHAVIOUR CARDS

Psychological Value

Emotional



The owner has grown attached to the product. It has a special meaning, which makes it harder to separate from.

Psychological Value

Identity



The product represents the style, status, and identity of its owner. When it does not fit to him anymore, he might decide to separate from the product.

Technological Value

Effectiveness



The product is still functioning, however the effectiveness and quality of performance are decreased, making the owner consider it for separation/replacement.

Economic Value

Repair/Maintenance Cost



If the repair/maintenance costs are too high, the owner might decide to just replace the product instead of repairing it. Especially when the replacement cost is low.

Economic Value

Purchase Cost



If the usage amount and enjoyment of use was lower than the mental pain of the purchase cost, the owner might not want to separate yet because he doesn't feel that he has gotten his money's worth.

Psychological Value

Aesthetics



Due to changes in fashion and trends, the product has become outdated.

Technological Value

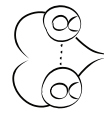
Material



Scratches or cracks on a product (casing) might trigger a product owner to separate from the product, but he understands that these defects are not affecting the performance quality and are purely superficial.

Psychological Value

Relational



The product was used in social settings, with family and/or friends. The product represents the memories of the good/bad times the owner had with his friends/family.

Economic Value

Resell Price



Aspects considered to estimate the economical worth of the product are aesthetics, effectiveness and quality, but also emotional values could play a role. Making the product worth more in the opinion of the owner. He wants to get the right price according to his estimation.

Technological Value

Functionalities



The main function of the product is still working. However, some of the not crucial side functionalities are not working anymore, making the owner consider separation/replacement.

Psychological Value

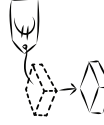
Moral



The owner understands that the product could still be valuable for someone else, and that someone would appreciate it more than he does. He could also be conscious about preventing unnecessary waste.

Economic Value

Replacement Cost



Depending on the costs of a replacement product and the state of the old product, the user could decide whether or not to separate from his product.

Iconic Transfer

With Iconic Transfer, the private personal meaning of the to be separated product is transferred to another object: The icon.

Example

Someone who had an old-timer that was really special to him, but for some reason couldn't maintain it anymore and needed separate from it. The photograph preserves the memories and emotions attached to the car.

Extra explanation

The product is seen as a vessel that carries the meaning, but that special meaning can be detached from the original product and be attached to the icon. The original product is 'relieved' of the meaning, making it easier to separate from.

This behaviour leaves the original product on the same quality level.

Gradual Garbaging

With Gradual Garbaging, the product is downgraded step by step in order to optimally use the product.

Example

A towel that has been used has become old and rough, but can be cut up and used as cleaning cloth.

Extra explanation

The product can be used for different purposes throughout its life. First serving its main intended purpose. Afterwards, it could serve secondary purposes. This can be continued until the product can't serve any purposes anymore, and becomes available for disposal.

This behaviour ensures the end-of-life, and does not keep the product on the same quality level.

Iconic Transfer



Gradual Garbaging



Brutal Use

With Brutal Use, the owner intentionally uses the product less carefully to make it break down faster.

Example

Someone with an old car that wants to buy a new one, knowing their current one is still functioning properly. Through careless use, the car will break down faster.

Extra explanation

The owner wants to have the feeling to have optimally used a product before separating from it. By letting the product break down faster, the owner has the feeling to have gotten everything out of it, and justifying separation/replacement. There are no lingering values at the point of separation.

This behaviour ensures the end-of-life, and does not keep the product on the same quality level.

Cleaning object

With Cleaning Object, the product is rid of 'contamination' and removes personal meaning and memories. This could be both physically and digitally.

Example

Washing your clothes before you donate them, or bring them to a second hand store.

Extra explanation

The product is brought back to its neutral state. Now that the meaning is erased, it will be easier for the owner to separate from the product. The personal memories are protected from future unknown use by a future unknown new owner. The product gets a fresh new start.

This behaviour leaves the original product on the same quality level.

Brutal Use



Cleaning Object



Storage without Use

With Storage without Use, the product is placed somewhere out of sight with the intention of eventually separate from it.

Example

A drawer full of old electronic devices that are initially kept as back-up but are now useless because they died as result of not been used for so long.

Extra explanation

The product is (unconsciously) placed in transition, that shows the intention to eventually separate from it. However, there are still some lingering values, so the owner put it up for a trial separation. If this trial goes right, it might become available for actual separation. But most of the times the product will be forgotten.

This behaviour ensures the end-of-life, and does not keep the product on the same quality level.

Storage without Use



APPENDIX 11: PRESENTATION FINAL TEST

1

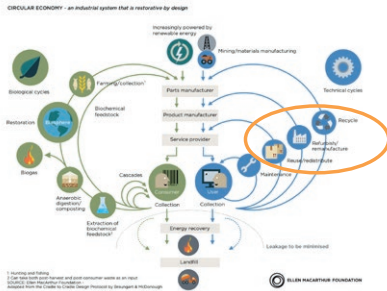
Designing for the end-of-use consumer experience in a circular economy

2

Relevance

- 1) End-of-use experience influences the way consumers get rid of their product
- 2) Designing a good e.o.u. experience could help close the loop
- 3) Understanding the e.o.u. experience is essential in order to design for it

3

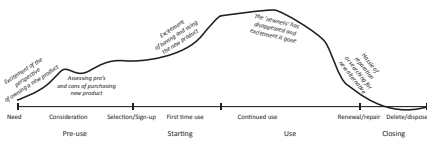


4

Target

- 1) Design students -> educational tool
- 2) Consumer durables that are still working. Broken products (repairable and beyond repair are not taken into consideration)
- 3) Getting back products into the loop

5



6

Framework of Detachment



Detachment

- 1) Disposition (mental detaching)
- 2) Separation (physical detaching)

7

Dispossession

- 1) Considering end-of-use
- 2) Mental evaluation (Value cards)
- 3) Dispossession behaviours (Behaviour cards)
- 4) Decision

8

Separation



9

Assignment with the tool

- 1) Analyse the current consumer experiences at the end-of-use phase
- 2) Define the design goal according to your findings
- 3) Design an experience

10

Notes

- 1) Think of the worst case scenario
- 2) Choose one storyline
- 3) You are a design team working for a company
- 4) Goal is to get back your products
- 5) Make fast decisions

