



The Unseen Lifecycle: The Role of Design in Preventing Unutilised Household Products

Master's thesis in Industrial Design Engineering

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Vera Isaksson
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Gothenburg, 2024

Abstract

The United Nations has highlighted the urgent need for a sustainable lifestyle to address environmental degradation and resource depletion. Households play a critical role in achieving these goals by adopting more sustainable consumption behaviours.

By researching the different parts of a product's journey, we can begin to understand how products become unutilised. This thesis explores the personal relationship people have with their products, aiming to find the underlying factors that contribute to products becoming unutilised. Through user studies, the research examined the trajectories of products moving within the household and how people's actions may lead to unutilised items.

The project seeks to provide knowledge about why and how products become unutilised and will highlight different ways design can prevent products from becoming unutilised and contribute to creating sustainable consumption patterns. We present an activity system that focuses on how people, products and environment, i.e. the house, interact together. Within the system, tensions are formed between contradicting motives, activities, goals and outcomes.

The result of the project is a concept portfolio with seven concepts that address different tensions within the system and illustrate how design can prevent products from becoming unutilised. Ultimately, this research contributes to the ongoing discourse on sustainable consumption and offers practical insights for designers seeking to promote the recirculation of products.

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1. Introduction

According to the United Nations (UN), the economic and social advancements witnessed in the past century have consequences for environmental deterioration. It has been indicated that if the global population reaches 9.8 billion by 2050, nearly three times the Earth's resources will be needed to sustain current lifestyles (United Nations, 2023). This emphasises the urgent need for sustainable behaviours to mitigate the current negative impact of existing consumption behaviours. Shifting towards circular economy (CE) strategies can contribute to reducing environmental degradation and resource consumption, all the while enhancing the management of waste. CE describes a system in which resources are reused, recycled, and regenerated rather than being disposed of as waste (European Parliament, 2023). Both companies and users have a crucial role in reducing waste. Companies fulfil their social responsibility for sustainable development by extending product life cycles and enabling the recirculation and recycling of their products. This cannot be accomplished without the understanding of users' consumption behaviours. By making recirculation and recycling accessible for users they can form sustainable behaviours.

Retention is the act of keeping products in ownership rather than disposing of them. In Sweden, it is common for products that are not in use to be kept rather than being brought into recirculation. According to Myrorna (2018), 72% of Swedes use only half or even less of their stored products more than once a year. The behaviour and actions that lead to products being unutilised can be considered invisible (Poppelaars et al, 2020). There has been some previous research regarding retained products in people's households and the reasons people feel attached to their products. The development of product attachment and perceived value represents a psychological process that evolves over time. The amount and form of attachment can change over time, affecting how people interact with their products. Kowalski and Yoon (2022) could see that there are many aspects a person considers when reviewing their unutilised products. This creates a complex inner dialogue where the user considers the physical aspects of the products and the emotional and psychological aspects within the user. Products that people feel highly attached to are usually retained for longer periods of time, but that does not mean that they are in active use which can cause unnecessary consumption.

Nilsson et al. (2023) have classified some of the reasons unutilised products are retained in people's households into emotional value, good to have and products to dispose of. Products with high emotional value often include products that were received as gifts or inherited, evoke nostalgic memories or make the user envision personal growth or positive lifestyle changes. Exercise equipment is an example of a product that is likely to fall under the last category with the hope of future use. Many products fall under the

“good to have” category and differ from person to person but the products seem to be to be valued for their physical functions. Spare parts, raw materials, backups or products with potential future need of use fall into the “good to have” products. Other products can only be used on the right occasion. These categories contain products that the user to some extent still wants to keep but there are other products that the user keeps after they have decided to get rid of it. Some retained products the user actually wants to get rid of, but they might not know how to dispose of the product, or they are awaiting the right person who is worthy of the product.

People purchase products for different reasons, usually for the intention of using the products although sometimes it can be purely entertainment or a social activity. Research on consumer behaviour has focused on buying habits and what makes people purchase products and neglecting behaviours that happen after purchase (Boyd & McConocha, 1996). This has created a research gap in current studies that lack an explanation about how people interact with their products resulting in products being unutilised and the user’s perception of their products during the transition. This creates space for exploration that can give meaningful insights into how a product goes from being actively used to becoming unutilised and user behaviours during the process.

1.2 Aim

Given the low utilisation of products stored at home in Sweden (Linder, 2018), this project aims to contribute knowledge about the transition where a product goes from being used to being unutilised. This project aims to explore how and why products became unutilised by examining the product's journey and the psychological processes experienced by the user during the product's transition. The project's outcome is the findings from user research and a concept portfolio with solutions aimed at exemplifying how design can prevent products from becoming unutilised.

1.3 Research Questions

Based on the aim, this project will study and answer the following research questions:

- Why do products become unutilised in households?
- How do products become unutilised in households?
- How can design prevent products from becoming unutilised?

1.4 Objectives

The project will explore the user's psychological processes, including their emotions, perceptions, thinking, values, memories, and behaviours in connection to their products

becoming unutilised. This is to understand the reasons why people stop using their products. The goal is to discover both conscious and unconscious decisions that lead to a decrease in the use of a product. Additionally, the stages of unutilised products will be deconstructed by identifying the physical journey and users' perceptions of the product and their experiences during the process. The thesis will investigate the different stages of unutilised products and how they might influence people's retention and divestment habits.

These objectives will be achieved by conducting a literature review and user research to fill the knowledge gap about unutilised products and why they end up unutilised. The knowledge gained from the user research will go into creating a concept portfolio aimed at illustrating how design can prevent products from becoming unutilised.

1.5 Demarcations

This master's thesis is a part of the Mining Garage Gold (MGG) research project and focuses on the liminal stage between used and unutilised products. The literature review consisted of international articles and the participants of the user study were Swedish residents. To be specific, the interviews and sensitising activity for the user research were conducted in Sweden. Both multiple- and single-person households were target participants for the user study, examining both the household as a system and the individual as a user. The scenario of this project focused on household and individual behaviours.

2. Related Work

This chapter presents the findings from the literature review. It combines different previous research to get an understanding of the topic for the project. This chapter introduces a consumption model that contextualises how people interact with their products. Additionally, it describes how people can form relationships and attachments to products that affect how they interact with their products.

2.1 Consumption Model

A consumption model can be used as a framework to understand the different actions people take when consuming products and the product's role in the household. Boyd and McConocha (1996) describe their model with three parts: Acquisition, ownership and disposition. *Acquisition* is the first part of the consumption model. It covers the part when the user first gets the product by purchase, receiving a gift or borrowing. The way a person is planning to use the product can influence how and why they acquire the product. A product that is destined for short-term- use might not be going through the same considerations as a gift to a loved one.

Ownership refers to the stage where the user owns the product, and it is available for them to use. A product is used when it is enhancing the welfare of the household. A product can contribute to daily life either by functional or aesthetic qualities (Boyd & McConocha, 1996). Some products are used every day while others are used based on context such as season and activity. Storage of products can occur alongside usage and the product can move in between the two activities.

Disposition is the last part of the consumption model and refers to removing products from the household. Poppelaars (2020) expands the disposition and describes divestment to include both the physical separation, and disposal of a product, and the psychological separation, and detachment. Divestment ends the use cycle for the specific individual, but the product could be recirculated to another person. The act of disposing of a product is a conscious decision to physically remove the product from one's household. Jakoby et al. (1977) present three possible options for the user to take when considering divestment: Keep, temporarily dispose and permanently dispose. It is important to recognise that these decisions lead to further choices regarding the appropriate disposal method. This can create reluctance in users to make decisions because of all the work.

The detachment process is usually more unconscious and happens over time instead of one specific event such as disposal. Poppelaars et al. (2020) mention three types of divestment rituals that can be performed to alleviate the detachment process. One is a type of trial disposal where the user stores the product in a hidden place to create some space between the user and the product so they can detach. The others are frequent

interaction and clearing the product from ourselves. Frequent interaction could make the user realise that they do not like or need the product anymore. When clearing the product of its meanings from the possession the person can detach themselves because they can feel that it is no longer personal to them. This also gives the next person a clean slate to make the product personal to them (Assima et al., 2023). These rituals can happen consciously or unconsciously, and the user might not be aware that their actions lead to detachment.

2.2 Purgatory

To expand on the consumption model Boyd and McConocha (1996) present, one can look at Suarez et al. (2016) who introduce the term purgatory which is an additional product state situated in the ownership stage in between using and unutilised used to describe locations or routines where unutilised products are stored. Purgatories are a result of non-reflective behaviour that leads to unutilised products. Understanding the role of purgatories is important to understand users' actions in connection to unutilised products. When the product goes from being used to unutilised it transforms and takes on a different role in the household and the user's perception of it can change. Products in this liminal stage in the consumption model are identified to have erratic and infrequent usage patterns, whereas still retained in people's households. It is suggested that the emergence of this liminal stage is unintentional and non-reflective since the behaviours of people who place products into this space are unconscious. Moreover, a majority of products in this limbo are rarely used again once stored. It is worth mentioning that products that exist in this abstract liminal stage are different from products that are marginalised in their daily use.

Marginalised products are typically stored in attics, barns, basements, and other infrequently accessed storage spaces. Products in purgatories may occupy the place where individuals interact with other products in this physical space, whereas often overlook the existence of products within purgatories. Products in the purgatories usually have little chance to be used again and this is usually a result of unconscious choice. Their fate is usually not decided before being forgotten by users (Suarez et al., 2016). The difference between marginalised products or products in purgatory is whether the using stage of the product is an unconscious or a conscious decision.

2.3 Perceived Product Value

A user's perception of products influences how they interact with products so it can affect all parts of the consumption model. Product value is shaped by how the user perceives and uses the product. It is important to understand how interaction and perception change the product's perceived value. There are different types of values a user can assign to their products. Functional value is formed when the user is getting

pleasure from using the product and is connected to the product's tangible functions and qualities. Emotional value is fostered through memories and feelings about the product. Social or relational values are derived from the user feeling closer to other people and belonging in a social setting. Monetary value is the financial value that the product has, but a user can also assign their own financial value to the product that they think it deserves (van den Berge et al., 2021, Türe, 2014). By exploring the different types of values, we can begin to understand that there are different reasons for using, retaining and disposing of products and that there are both functional and emotional aspects. To understand why products become unutilised we believe that people's perception of the products is an important factor.

The value assigned to a product is complex and can change over time and one product has multiple types of values. The context where a product is used or acquired can affect the perceived value, e.g. cutlery only used for special occasions with financial and emotional value compared to cutlery used every day with functional value. According to research (van den Berge et al., 2020, Baxter et al., 2017), signs of usage such as wear, and tear could decrease the visual appeal of a product and the emotional value attached by the user. Social and relational value is dependent on the user's relationships, but also product trends and society's values. Monetary value changes over time, but the perceived monetary value made by the user can stay the same and is usually higher than the market value. Furthermore, repetitive use of a product could also lead to feelings of satiation, thus diminishing the perceived value by users (Hou et al., 2020) and decreasing their interest in using it. Given that emotional value can be connected to memories and emotions that go beyond pleasure in use, it is an important factor for retainment. A person can retain a product with no functional value because of its high emotional value. This gives us some idea of how value can change and how it affects how people use their products.

2.4 Product Attachment

Product attachment refers to the emotional bond or connection a person can form towards a product. According to Kowalski and Yoon (2022), people can form strong bonds of attachment to their products. The bonds can simulate person-person relationships (Neto & Ferreira, 2021). Product attachment shapes the user's perception of the product and is a psychological process.

People tend to form product attachments when they interact with their product, thus creating memories and emotions in connection to the product. If a product is received as a gift from a loved one, memories of that moment and the giver can give higher levels of attachment. Some acts can strengthen the bond between object and user that can be described as rituals. Assima et al. (2023) describe rituals as symbolic activities that cultivate the relationship between user and product by incorporating social and cultural aspects. The relationship between a product and user is not only created by the pleasure

of use but can form in other ways, e.g. by talking and displaying possession to others, a user can feel a heightened sense of ownership, attachment and perceived value.

Much like human relationships, product and user relationships can suffer from conflict and incongruencies. Neto and Ferreira (2021) explain how the relationship and product attachment can be shaped by changes in the product, person or context. Changes to the product can be holes, damage, visible marks, decline in quality etc. Personal changes can be changes in body, taste, priorities etc. Contextual changes can be a divorce, move, work change, family death or broader societal shifts that impact the lives of individuals. These changes that can affect product attachment, also affect how and to what extent people interact with their products and These changes can sometimes be the reasons for a product becoming unutilised. Maintenance and care can heal the conflicts that happen in relation to the product. Compromise can also be a solution where the product only is used for certain activities e.g. a shirt that shows signs of wear is only used at home. It seems to be easier to fix the product than change behaviour. Like person-person relationships, a user is more willing to look past mishaps and solve conflicts with a product they are attached to. They are more likely to wear a garment that they love until it cannot be worn anymore, while the clothes that they do not feel as attached to can be in good condition but not worn as often.

People who form high levels of product attachment tend to retain their products for a longer period (van den Berge et al., 2021, Dommer & Winterich, 2021). A person is more likely to take care of their product with maintenance, repair and cleanses if they are attached (Kowalski & Yoon, 2022). This can create a positive spiral, the act of caring for products creates a stronger bond between user and product therefore making them take care of it more and so on. When a person has a strong attachment to a product, they are more likely to not only retain it for longer but also use it for a longer period.

There are conflicting claims that in some cases a high level of product attachment does not lead to a longer time of use. This can depend on how the product attachment was developed. If the relationship is built on memories, instead of pleasure of use, there tends to be a longer retention time that does not lead to longer use (Kowalski & Yoon, 2022). Higher attachment makes it harder for people to dispose of products because they have positive memories and emotions toward the product.

2.5 Summary

This chapter introduces a consumption model where our topic is situated and gives an understanding of how products move within people's households and how users interact with their products. The consumption model (Boyd & McConocha, 1996) lacks a stage for products transitioning into unutilisation. Suarez et al. (2016) describe purgatories and give a deeper understanding of how people manage their products in the household

and an additional state but there is still more to explore. How products accumulate in purgatories and people's behaviour are areas of further interest. Product value and attachment are connected to people's perception of the product and can influence how they accumulate, use, retain and dispose of it. This gives us the knowledge to start to understand the aspects that go into users' psychological process when their product transitions into unutilisation.

3. Method and Process

This chapter describes the methods used in this project. Each method is introduced with a description followed by how it was implemented and for what purpose it was chosen. The chapter follows the timeline of the process and addresses how the different phases are connected.

3.1 Project Outline

The project started with an initial study of related work to understand the topic and set the aim, research questions, and objectives. After the first phase, which included a primary literature review, a more in-depth review was conducted. The initial topics were identified during the pre-discovery phase and were refined as the literature review progressed. The findings from the background research and literature review were used to develop a questionnaire. The questionnaire responses were reviewed, and the findings were used to formulate the second discovery phase, which included sensitising activities and interviews. A comprehensive analysis was conducted, considering all the findings from the discovery phases. These findings were used to ideate design solutions that were developed into seven concepts. Lastly, the concepts were evaluated by inviting participants to assess and discuss the concepts. This input was used to make final adjustments to how the concepts were communicated.

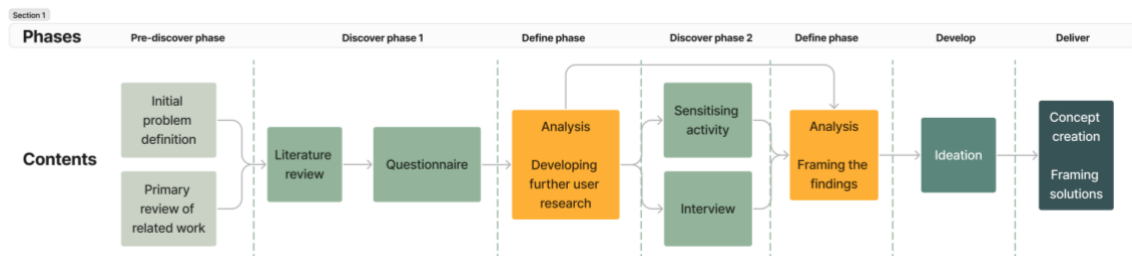


Figure 1: Flowchart of the process

3.2 Research Approach

This chapter presents the theoretical framework connected to the research approach of this project. Four levels of knowledge are introduced as they influenced the selection of methods for the user research. Additionally, activity theory is presented as a design theory used for understanding the findings from the user research.

3.2.1 Four Levels of Knowledge

According to Sanders & Stappers (2012), there are four levels of knowledge: Explicit, observable, tacit and latent. Explicit knowledge is usually easy to explain in words and

share with other people. Observable knowledge is obtained by looking at people's behaviour and actions. People might not be aware of this type of knowledge and can therefore not express it with words. People might also say that they do a task in one way, but they do it in a different way that they are not aware of. Tacit knowledge is not easily communicated to others, it can be feelings or how you do certain tasks. Latent knowledge is things that have not yet been experienced but we might be able to understand how it would be based on past experiences. It is usually not easy to express this kind of knowledge because the user might not yet be aware of their future needs.

Since we are studying underlying psychological processes and behaviours that cannot be easily observed, this approach has the purpose of uncovering insights that are not easily expressed. The user research in this project needed to explore the knowledge below the surface, tacit and latent knowledge. Furthermore, when studying habitual behaviour, the user might not be aware of their actions. To be able to get this knowledge, say, do and make techniques have been used, see Figure 2 to see how it relates to the four levels of knowledge (Sanders & Stappers, 2012). Say-techniques explore what people know and what they say, in this project questionnaires and interviews have been used. Do-techniques refer to observations and exploring people's actions and behaviour. In this project, self-observation was used during the user study. The participants in the sensitising activity were asked to do self-reflection and observation. Make-techniques are used to have people create something to express their feelings and opinions. The participants in the sensitising activity were asked to make use of their unutilised products and create contexts for usage. By having participants say, do and make things the knowledge from all four levels can be explored.

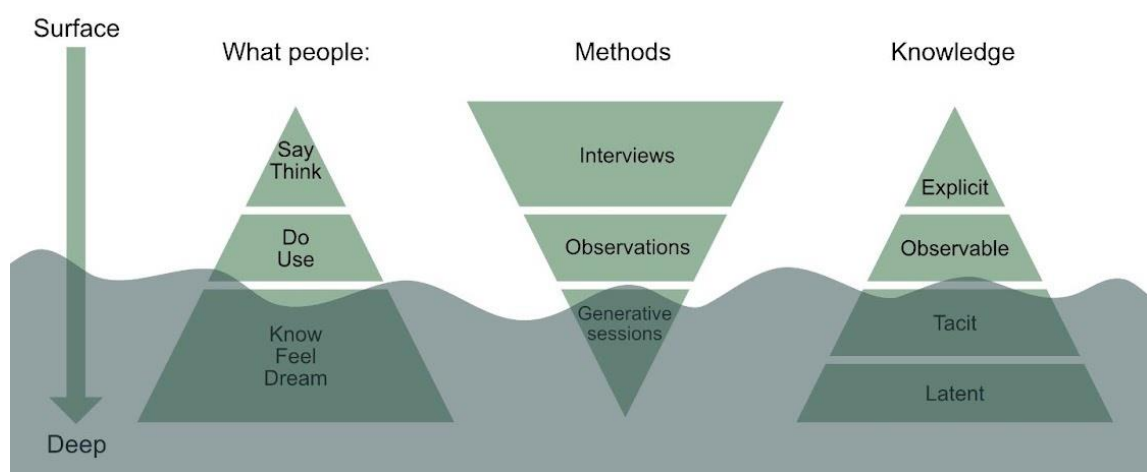


Figure 2: Four levels of knowledge, adapted from Sanders & Stappers (2012).

3.2.2 Activity Theory

According to Selvfors et al. (2023) with activity theory, we can understand people's behaviours by examining their overall activities. People's actions can be seen as part of

a bigger activity that fulfils their needs and goals. An activity consists of actions done by people to accomplish a certain outcome by using various tools to pursue a goal driven by motives, an object. These different factors can be seen as an activity system where the different components intervene with each other. By using the activity system triangle (see Figure 3) one can break down the activity and understand what influences the subject. This thesis explores how different activities influence a product's trajectory. The breakdown of activities, facilitated by the activity system triangle, can support our process of understanding how conflicting actions and motives can lead to tensions and harmonies that impact how the users behave.

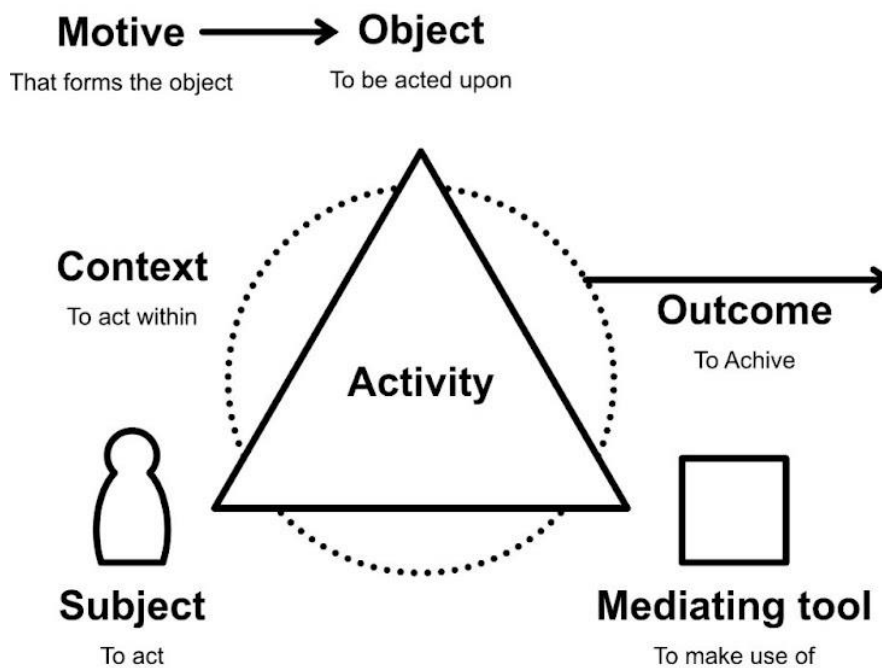


Figure 3: Activity system triangle, adapted from Selvfors et al. (2023).

When looking at multiple actions in a household there can be tensions or harmonies between the motives, objects, goals or pre-existing conditions for each action (Selvfors et al., 2023). Tensions can be seen as conflicts that cause a mismatch between or within the activities which can hinder the subject from achieving their desired outcome. Harmonies are the opposite of tensions and are where components of activities align and an opportunity for a happy outcome arises. When there is tension, the people will have to prioritise between the activity and actions, if they cannot find an alternative activity where they can reach a common desired outcome.

In this project activity theory was used when interpreting the data from the user study. The activity system triangle was used to help break down the different activities in a household related to the unutilised products. The activities were seen in a system of activities, consisting of different actions, where they all were intertwined and affected each other. The tensions and harmonies were found in the activity system by looking at the different motives, objectives and outcomes.

3.3 Literature Review

A literature review is used to evaluate existing published information that can be useful in the project. The review collects and gathers information about topics around the research area for the project. The information is summarised into a review that connects topics from different resources to create credible insights and findings (Martin & Hanington, 2012, p 112). In this project, the literature review had the purpose of gathering information about the topic to get an understanding of the subject and be the groundwork for developing the user study and the project.

Initial research to gain a base knowledge of the subject involved conducting a literature review of articles. The articles reviewed addressed topics in relation to the research area of this project of unutilised products. To get a background knowledge of the research area topics like circular economy, product consumption and product recirculation were studied. Later more narrow topics were explored such as product attachment, retention, divestment, product value, design for sustainability etc. The articles were found using Google Scholar, Chalmers Library and connected papers. The selection was based on keywords, related papers and abstracts of the articles. At the beginning of the project, additional articles were provided by the supervisor from their research on the topic. The literature review contained 18 articles.

The gathered information was sorted using a mind map. Mind mapping provides a visual representation of data to see how they connect and understand it better. It is a method that sorts data into flows that can highlight the relationships between information (Martin & Hanington, 2012, p 118). Our mind map helped us in extracting the important findings while being able to see the whole picture. The initial categories were connected to the keywords and topics used when finding the articles. The extensions got more specific as they branched out and addressed different opinions, theories and methods for the initial categories. The finished mind map was used as a base when writing the background and related work for the report but ultimately gave us the knowledge needed to develop the user study.

3.4 Questionnaire

At the start of the user research phase, a questionnaire was used to provide qualitative insights about unutilised products and using behaviour from a broader scale of participants. A questionnaire is a tool to collect information from people. It is an efficient tool that can gather information from the respondents that does not require a sufficient amount of time. (Martin & Hanington, 2012, p 172). We used this to gather people's reflections on why their products become unutilised. The questions were developed by using the findings from the literature review as a base as it allows us to

identify user behaviours that have already been studied in the relevant research and what we needed to explore further (See appendix A, for the whole questionnaire).

The questionnaire explored the topics of unutilised products and their trajectory in the household as well as the participants' general feelings about their products and consisted of two parts. The first part contained questions that were aimed at gathering information about the person, age, occupation, living situation, storage space etc. In the second part, the participants were asked to find a product that they do not use anymore. They were prompted to investigate certain places in their house that were mentioned in the literature as places where unutilised products may gather. They were asked to look into their bathroom cabinet, the back of their closet, junk drawer and a cupboard in their kitchen. These places are within people's living spaces and can contain both actively used and unutilised products. We wanted them to look in different places in their home to get a spread in type of products. These are places that they usually have in their home and have some understanding of what they store in there. This made them good examples of places to look at because of their familiarity and availability to be easily explored. They were asked to describe their chosen product, how it entered their household and their feelings and thoughts about the product. Lastly, they had to reflect on what the future plans for the product were and how they felt about their amount of product in general. By encouraging the participants to explore and seek out an unutilised product we believe that it allowed them to use the chosen item as a mediating tool and foster reflection in the process. The product could help the respondents in telling the story of the product and describing their relationship to it.

The questionnaire was distributed primarily through social media. Both by asking acquaintances directly and posting it on Facebook. It was also posted in some groups with a focus on cleaning, sustainability and clearing out products. There were 25 respondents to the questionnaire resulting in 25 chosen products.

3.4.1 KJ Analysis

KJ-Analysis is a method that sorts qualitative data such as ideas, concerns and quotes into themes. The information is written down on sticky notes and placed together. The notes are then sorted into themes, this should be done in silence, so everybody has an equal chance to contribute. It is an effective way to sort information and get a visualisation of the data (Martin & Hanington, 2012, p 104). The answers gathered from the questionnaire were divided into what questions they answered. This method provided convenience for integrating and categorising responses from different participants based on varied questions. Due to its simplicity and high efficiency, it has been utilised multiple times by the project group in previous projects, hence adopted as the analysis method for the questionnaire in this project.

The KJ analysis was done digitally using Figma rather than on sticky notes because it was more accessible for us. To sort the notes and have traceability of the answers, the notes had different colours depending on which participant they belonged to. This made it easy to connect the answers and get a better understanding of the participants' descriptions of the product. The KJ analysis helped to structure the data into topics while being able to connect the answers to the respondent's personal story.

The KJ analysis gave us some understanding as to why products become unutilised and the trajectory a product might take in the household. The information gathered was used as a base to develop the interview study and fill the knowledge gap. Insights from the questionnaire were used in combination with the findings from the interview study for the final analysis.

3.5 Interview Study

Based on the results from the questionnaire, a semi-structured interview guide was designed to gain a further understanding of user behaviours and unutilised products in households. This interview guide was tested with two pilot interviews which led to the development of a sensitising activity. The sensitising activity prepared the participants for their interview. Coding via NVivo was used to analyse qualitative data from the transcribed interviews. In the end, the insights from the coding were analysed using activity theory and an activity system was developed.

3.5.1 Sensitising Activity

Sensitising is the process of preparing participants for a user study session by making them involved in the situation and allowing them some time to reflect on their behaviour. This can be done in multiple ways, but it requires that the participants have some time, ideally at least a week, before they take part in other user study sessions for the project (Sanders & Stappers, 2012). The sensitising activity in this project aimed to prepare the participants for their interview and get time to reflect on their unutilised product and their behaviour. A sensitising activity usually consists of some kind of self-documentation of the participant's feelings and thoughts during the process. It was important to include these parts in our activity to access the participant's observable and tacit knowledge.

One way to sensitise the participants is to create a toolkit that the participants receive. A toolkit can consist of a wide array of materials, but it must consider the research area and what information is desired. The participants in this project received a sensitising toolkit designed to engage them with their unutilised products. The activity was designed so that the user could explore and reflect on their unutilised products in their own time and at home. Considering the research area the activity was treasure hunt themed, a fun activity for participants to find hidden treasure in their home. The toolkit

consisted of an instructional pamphlet that resembled a treasure map to fit the theme and described the different steps and had space for documentation of the process (See Appendix B, for the whole pamphlet), a bag of material and notes with the concept of the activity and contact information. During the course of 5-7 days, the participants were asked to do the following steps:

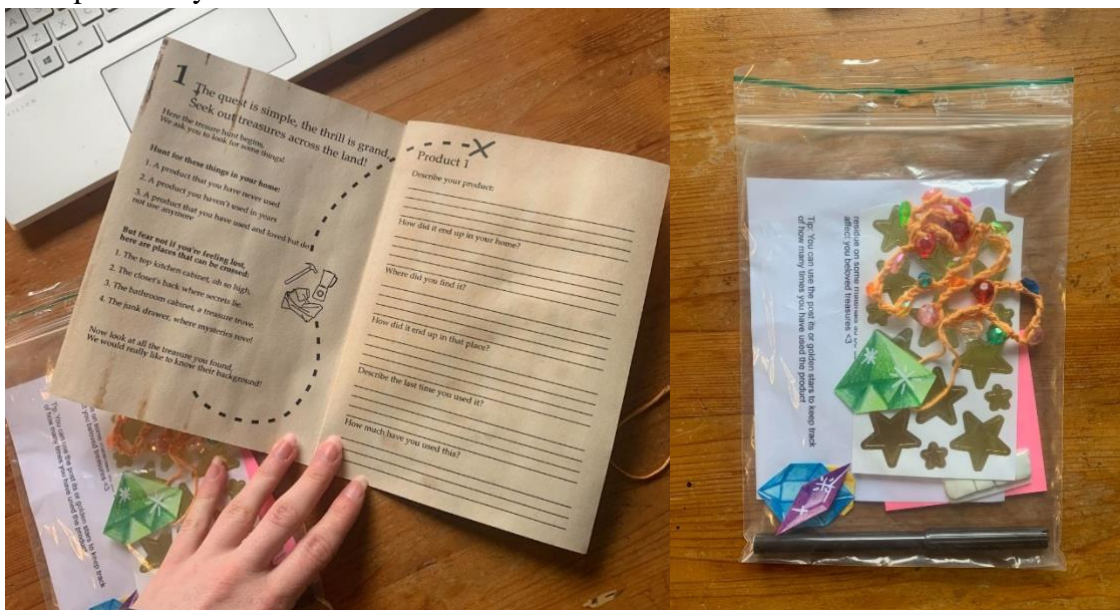
Step 1. Find 3 unutilised products, one that has never been used, one that has not been used in years and one that they have used a lot but stopped using.

Step 2. Decorate the products to make them visually stand out and display the product in a visible space in your home.

Step 3. Start using the products again in your daily life.

Step 4. Reflect on the future of the product

They were asked to find products that had previously been used to various degrees. The findings from the literature review indicated that the amount of use might influence the development of product attachment. By instructing the participants to locate products with different amounts of interaction we believe that it gives a bigger chance of products with different amounts of attachment. We wanted to see if there was a difference in the reasons for never using a product and to stop using a product that they have previously used.



Figures 4 and 5: Toolkit of sensitising activity

The participants were guided to look in different places in their homes. In the instructions, they were asked to describe the products they found and share their stories. By engaging the participants with their storage spaces and unused products, we hoped to facilitate valuable reflections on their actions and opinions. The products acted as mediating tools for describing the relationship between the user and the product. By decorating the products as treasures, they would become more visible in the participants' homes and serve as reminders to use them more often. This was not an essential step in the process, but rather an opportunity for the participants to have fun

and change their perception of the products. After using their products, the participants were asked to describe their interactions and thoughts. Encouraging them to use their products was intended to trigger reflections on their perception of the items. We believe that by reintroducing the products into their lives, participants might realise why they stopped using them in the first place.

There was a total of seven participants in the sensitising activity and interviews, see Table 1 for the participants. Six of the participants were previously known to the project group and asked to participate. One person was recruited through another person known to the project group.

Table 1: Participants for the sensitising activity and interviews

Participant	Age	Gender	Accommodation	Size	People	Products	Note
1	25	Male	Apartment	26 m ²	1	Glass mug Nintendo 3DS Bookstand	
2	27	Female	Apartment	45 m ²	2	Bottle of vodka Calligraphy set Mug	Lives with Participant 3
3	31	Male	Apartment	45 m ²	2	Web camera Headset Football	Lives with Participant 2
4	26	Female	Apartment	67 m ²	2	Teapot Sport shoes Water floss	Lives with Participant 5
5	27	Male	Apartment	67 m ²	2	Speaker Jacket Scarf	Lives with Participant 4
6	25	Female	Apartment	97 m ²	1	Mixer Camera Powerbank	
7	26	Female	Apartment	50 m ²	1	Small bag Glass flasks Bathroom mat	

3.5.2 Interviews

Interviews are a research method usually used with the intent to collect qualitative data. The structure of an interview can vary from structured with a strict set of questions to a more loosely formed interview that can diverge into other subjects and topics. The researcher usually follows an interview guide with topics to discuss or questions to ask (Martin & Hanington, 2012). In this project, a semi-structured interview guideline was used as an approach to investigate in-depth insights from participants about their opinions and behaviour related to unutilised products at home. The reason for using semi-structured interviews was so the interviewer could follow a guideline to discuss needed information, such as the chosen unutilised products, using behaviours and their reflection about the topic. Meanwhile, the interviewer could introduce follow-up questions according to their conversation, which can stimulate participants' thinking. This approach may elicit insights related to the topic that the interviewer had not previously considered.

Two pilot interviews were done to evaluate the questions and duration of the interview. The participants of the pilot interview did not participate in the sensitising activity as it was developed after they were held. The two participants lived in the same household but had their interviews separately. The interview covered the topics of their household storage, unutilised products, feelings about their products in general and rituals for caring for products. Lastly, they performed an activity in which they were asked to find products that they do not use and do a product journey map with the physical journey of the product as well as their feelings and context changes surrounding the product. The interview was conducted in the participants' homes and their storage space and products were used as a mediating object to spur reflection. When reviewing the pilot interview guide, we realised that it was not giving the participants the time they needed to be able to express and reflect on how products become unutilised. This prompted us to develop the sensitising activity for the later interviews.

Table 2: Participants of the pilot study.

Participant	Age	Gender	Accommodation	Size	People	Products	Note
1	54	Male	House in the countryside	140 m ²	2	Poker game Handheld sewing machine Row of hooks	Lives with Participant 2

2	27	Female	House in the countryside	140 m ²	2	Saw Cast iron seat	Lives with Participant 1
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After the pilot interviews a second round of interviews were done with the seven participants from the sensitising activity (see table 1). The interview was done with the intent of collecting qualitative data to understand how products become unutilised. The questions were derived from the topics discovered in the analysis of the questionnaire and tried to fill the gaps of knowledge, focusing on how products become unutilised by examining the participant activities and behaviour through their description of their products and their story (see Appendix C, for the interview guide). All the interviews were performed in the participants' households and took about 40 minutes. It was important to conduct the interviews in the participants' homes because it allowed them to be surrounded by their storage spaces and their products. It provided the right context, for us and the participant, and could be used as a mediating tool. We believe that by being in their household we could gain a bigger understanding of their behaviour because we could ask questions specific to their living space.

At the beginning of the interview, the participant was asked to discuss a bit about themselves and their household. In the next part of the interview, the participants were asked about the sensitising activity. The discussion focused on the three products that they had picked and the storage space, behaviour, history and use surrounding the products. The purpose of focusing on their products was to help them reflect on their relationship with their products more tangibly. In this stage, we encourage them to express explicit and observable information and details about the product. User-product relationships can be a bit abstract, but by bringing the attention to the story of the product the users could express it in an understandable way. The interview lastly explored the topics of their overall feelings about products they own, storage and clearing out products. Throughout the interview, we progressively gain insights into participants' actions, psychological processes and feelings about their products, guided by the framework of the four levels of knowledge.

3.5.3 Analysis

The analysis of the user research was done to break down the qualitative data collected. Utilising analysis methods can enhance the effectiveness of the analytical process and organise information in a comprehensible manner. In analysis, the focus is to find patterns and themes in the data with the intention of understanding the data in a way that can be facilitated during the design process.

Coding

Coding is a method to systematically organise and categorise data collected from qualitative studies to process it. It allows researchers to process and comprehend intricate qualitative data collections. It involves identifying the key concepts, themes and patterns in the data by labelling and categorising quotes. From the interviews, we had a lot of qualitative dialogues that needed sorting to analyse it. Coding facilitated a systematic breakdown of the information and helped us to interpret it to develop insights and theories. There are different approaches when taking on a coding process (Williams & Moser, 2019). The process can start with pre-existing codes where the researchers try to find quotes that fit those categories. From the information gathered via the questionnaire, we started with some subjects and codes. The codes were dynamic and changed, updated, moved, merged or deleted as more information was analysed and more themes and codes were created. The next step was to do axial coding where we organised the initial coding into more structured and detailed codes. This stage focused on finding relationships between the codes and a framework to understand the data. The final step involved selective coding, focusing on identifying the most significant and central codes to construct a more detailed and coherent framework and story, thereby capturing the essence of the data. NVivo was used to code the results of interview transcription. This helped us in the process of creating traceability and hierarchy with the quotes and codes.

Activity Theory Analysis

The activity theory triangle (Selvefors et al., 2023) was used to break down the different activities in the consumption model (Boyd & McConocha, 1996) by implementing our findings from the user research. The coding of the interviews provided meaningful insights into people's behaviour, but it needed some structure to use it as input for our design phase. By combining previous research on consumption models and our research we could expand the previously presented one by Boyd and McConocha (1996).

When the activities had been identified and examined through the activity theory triangle they were looked at as an activity system where the different activities can influence each other. By seeing it as an activity system, complex information and data could be interpreted understandably. Looking at the activities together, tensions and harmonies could be identified. The tensions and harmonies were important findings for understanding the people's behaviour. Additionally, it helped to address some conflicting answers from the users that can stem from incompatible motives and outcomes between the activities. The tensions were used as the base of the design process and were topics to ideate around.

3.6 Design Process

The purpose of the design process was to propose design solutions that exemplify how design can be used to prevent products from becoming unutilised by using the findings

from the literature review and user studies. The initial part of the design process aimed at initiating many ideas that could later be developed into more detailed concepts. This chapter introduces the methods used and the process to develop a concept portfolio. The reason for developing a portfolio of concepts instead of a single solution was to address different problems found in the activity system. By delivering multiple solutions it creates a diverse portfolio and shows how design can be used to address the tensions in the activity system. Besides, multiple solutions and the result of evaluation provide insights for further study in the *Mining Garage Gold* project.

3.6.1 Brainstorming

The ideation phase started with brainstorming sessions. Brainstorming is used as an ideation method to produce many ideas. The purpose of this activity was to propose different ideas to tackle problems identified in previous studies, with the aim of preventing products from becoming unutilised or persuading people to make decisions regarding unutilised products. The sessions were focused on ideating around different themes discovered in the earlier parts of the project. The specific themes were preventing unutilisation, encouraging organised storage, trigger reflection over behaviour to name a few examples. When using the method, the participants are stimulated by the other's ideas and should promote creativity. The focus is not on creating great and feasible ideas but rather on creating many ideas and promoting creativity. It was important to start with an open mindset to get all ideas out instead of focusing on the final solution. Critique is usually not discussed during the session, but the participants can evolve and build on each other's ideas to create new ones. The sessions in this project were unstructured where the ideas were discussed freely. Ongoing discussion was chosen over only discussing after the ideas were presented. As we were only two people it still allowed for both of us to express our ideas fairly and develop them further together. The point is to get a large number of ideas that can be further developed and get the creative juices flowing (Wikberg-Nilsson et al., 2015).

3.6.2 Brainwriting and Drawing

Brainwriting is a form of brainstorming method to create ideas and solutions in a group. Each participant writes their ideas on a piece of paper. Brain drawing has the same principles, but the ideas are drawn instead. The ideas are then given to the next person to evolve and build on. All the participants are contributing to all the ideas, creating a group-based solution that belongs to the whole group. In this project brain writing and brain drawing were used in combination so we could effectively communicate the ideas. The method aims to create many ideas and lets the creativity be stimulated by each other's ideas rather than creating feasible design proposals. The duration, ideas and number of participants are adjusted to the needs of the group and project (Wikberg-Nilsson et al., 2015).

There were multiple sessions that focused on different topics discovered in the analysis. It started with the general areas of preventing products from becoming unutilised and motivating people to start using their products again. The topics covered different approaches as well as ideation on specific behaviours such as putting products in the junk drawer. Later, the ideation focused on specific problems stemming from the tensions in the activity system, e.g. people have trouble with evaluating products.

The sessions lasted for 5-8 minutes where the group members ideated privately then, rather than switching paper and building on ideas privately again, the ideas evolved by discussing them together. This was done due to the group being only two people, so discussing the ideas was deemed more beneficial. The ideas were written down into a document to keep track of the proposals and save them in one place. This phase resulted in 18 ideas that were placed into the activity system according to what tensions they were addressing.

3.6.3 Concept Creation

The analysis showed a system of activities and behaviours that impact how the user interacts with a product. To address the complexity, a design portfolio with multiple concepts was chosen. It addresses multiple aspects of the activity system and highlights the different considerations that need to be made when designing to prevent products from becoming unutilised. The focus of the designs was to exemplify how design can prevent products from becoming unutilised by presenting design solutions and to draw attention to the parts of the activity system where appropriate design interventions are needed in the most critical aspects.

The ideas created during the ideation phase were placed in the activity system to see what areas were covered. We wanted ideas that addressed various tensions in the activity system. While selecting the ideas for further development purposes, the feasibility and scope of the activity were considered. It was important that the purpose of the idea was to alleviate the tension and that the idea could be further developed. We chose seven ideas to develop into concepts with a focus on articulating the concepts and presenting how problems were addressed, rather than fully developing each concept to a detailed level. The emphasis was on reflecting on how the concepts impact the activity system and the role they could play in the household rather than the specific technology of the concepts.

3.7 Evaluation

The evaluation of the concepts was done to gain feedback from potential users about the clarity, effectiveness, usefulness, feasibility, and willingness to use these products. Clearness was chosen because it was important to evaluate how the participants understood the concept and the purpose of it. The other factors were chosen to make the

participants reflect on how they can see the concept working in daily life and consider the problems it could solve. The focus was to evaluate how the designs were communicated and people's general attitude toward the concepts. The evaluation used semantic differential scales to collect quantitative data on the participants' perceptions of the concepts. The scales are set up with one word on either side of the scale. The two words are two opposite adjectives that are chosen to fit the research area. The semantic differential scale was chosen because it uses two words to convey expected features of design solutions and the participants can easily fill them in. The words were chosen with their meaning and understandability in mind. The scale can consist of a single line where the participants are free to place themselves wherever they want or it can be a set number of points (Themistocleous et al., 2019). Our scale was from 1-6 to eliminate a middle option and force people to take a side.



Figure 6: Set-up for evaluation

The participants were first presented with the project to get a context for why the concepts were developed and how they theoretically would be implemented, see Figure 6 for the set-up for evaluation. Following the project description, the participants were introduced to the concepts by being presented with a picture and a short description. For each concept, they were asked to fill in a semantic differential scale that reflected the topics we wanted to evaluate (see Appendix D, for the semantic scales and Appendix E, for the description posters). During the evaluation, the participants were asked to speak out loud and comments about the concepts were noted. The evaluation was done with one, three or five participants at the time, this was due to the availability of the participants, and it was found that groups with multiple people could discuss and trigger reflection about the topics between different participants. The multiple-people group of evaluation is similar to a small focus group and people expressed more of their

opinions. The participants filled in the scales themselves but could ask questions and discuss openly if they wanted to.

Lastly, they were asked to reflect on how they would consider implementing the concept in their life and their arguments behind their reasons. There were 12 participants who all were studying the Industrial design engineer master program. These were seen as a fit user group because they have a background working with design and bring meaningful insights about the evaluation of the design. The data was summarised to calculate the mean for each criterion for every concept. The mean was used to understand how the participants perceived the concepts. The comments about whether they would use the concepts and the discussions around the evaluation were also taken into consideration. The discussion gave a better understanding of what the participants thought about the concepts and their purpose. The findings from the evaluation were used to further develop the concepts, mostly with a focus on clear communication of purpose.

4. Findings from User Research

This chapter presents the findings from the user research. It is a combination of the results from the questionnaire, sensitising activity and interviews. The findings cover the themes of what is an unutilised product, an activity system consisting of activities surrounding the user, product and storage spaces.

4.1 Product selection

During the questionnaire, pilot interviews and sensitising activity people were asked to find unutilised products in their homes. There were 50 products in total, 25 from the interviews and 25 from the questionnaire, see Figure 7 for all the products. There are products from six different categories that were created during the KJ analysis when similar products were grouped. Some products can be considered to fit into multiple ones, e.g. blender is both electronic and kitchen stuff, in these cases, the product was sorted into the category that seemed to describe it the best.

Most of the chosen products had previously been used by the user to some extent, ranging from once to routinely. Some products were described as being used a lot and were seen as a big part of the participants' lives. The selection of products and stories show that products of different categories and previous use can become unutilised. There are only a few seasonal products, e.g. Christmas lamp or scarf. These products have a reason for only being used certain times a year and they still fulfil their function. Most of the products can be considered normal where there is no extravagant interest, time or money needed to be able to use them. These products have the potential to be routinely used in the participant's life.



Figure 7: Overview of the chosen products from the questionnaire and sensitising activity

There are some common features of the storage spaces where the chosen products were stored. 43 products were stored in closed space and 15 of them were also hard to reach. A closed storage space means that the user does not see the products when moving around in their house. Drawers, cupboards or storage rooms are examples of closed spaces. A hard-to-reach space is physically hard to reach. What is hard to reach varies from person to person, but some places seem to be hard to reach for most people. Low cupboards, high shelves or storage not located in the house can be considered hard to reach. If the participants described it as troublesome to reach, it was placed in this category. Seven of the products were stored in the open and one of them was also hard to reach. Examples of open spaces are an open shelf or on top of a desk, any space where the user can see it whilst doing other things. One product was out in the open under a desk but had some things on top, which made it hard to reach. The product was still visible, but the participant had to move some things to use it.

4.2 What is Unutilised?

During the user study, it became clear that the participants had different definitions of what an unutilised product was. In the instructions, where the participants were asked to choose an unutilised product, they were not given an explanation of what an unutilised product is. Our empirical studies suggested that interpretations of the term “unutilised”

by different participants can be varied from their descriptions of the selected products. Some people chose to interpret it based on how much it had been used in a certain amount of time. These people chose products that had never been used or that hadn't been used in a certain amount of time, which could be weeks, months, or years. Many people did not remember when the last time it had been used, declaring that it must be unutilised.

“Probably making a stew, maybe a year ago?”

- A respondent to the questionnaire, when asked about the last time they used their forgotten pot

Other people interpreted it more concerning how much they felt they had used the product. Some felt that they had not used the product as much as they used to, as much as they wanted to, or not as much as the product could be used. They could have used this product in the last few weeks or months, but because they did not use it as much as they wanted to, it was considered unutilised. This is connected to how they could see potential in the products they owned and thought that their use was not enough. Additionally, some used the potential future use as a reason that it was not unutilised. A product that was unutilised, in the sense that it had not been used in years, was not considered a product for the activity because of the potential future use and the possibility that they might use it in the future.

4.3 Activity System– Acquiring, Managing and Divesting



Figure 8: Actions that make up the activities in the system.

Based on the results from the questionnaire and interviews, an activity system was developed to illustrate the process and the interrelationships between different actors in this system by drawing inspiration from Boyd and McConocha (1996). The activity system consists of three phases: acquiring, managing and divestment (see Appendix F, for the whole activity system and connections). It differs from the consumption model that presents acquiring, owning and disposing. Acquiring is the same for the consumption model and the activity system. Managing builds on the ownership stage

but describes a system where people interact with their products in many ways and it is not focused only on owning, see Figure 8 for all actions. The activity system uses the term divestment to also include the psychological process of detachment described by Poppelaars et al. (2020).

Acquiring is the process of how a product enters people's homes, including receiving (as a gift or reward), purchasing, borrowing, inheriting, trading, finding, and making, etc. **Managing** is how people interact with, maintain, and store a product when it belongs to its owner, including organising, tracking, maintaining, using, labelling, planning, optimising, and replenishing, etc. **Divesting** is the act of getting rid of or removing a product from the household, including reselling, lending, recycling, donating, repurposing, trading, and discarding.

The interaction between people, products, and the environment forms an inner structure in this activity system inside people's households. **People**, as the central role in this system, interact with and use products within their living space. They make decisions about what to bring into their home, how to use them, the frequency of use, and how and when to dispose of them. **Products** refer to the physical products present in people's households, ranging from consumables to durable goods such as electronics, furniture, decoration, houseware, etc. Products serve various purposes in the household, fulfilling the functional, emotional, aesthetic, and recreational needs of their owners. **The environment** consists of the physical surroundings created by various household products and interior conditions, including the layout, interior design, and the organisation of spaces. The household environment influences how people make decisions about what kinds of products they should bring into their homes, in what way they use their products, and when and how they manage their products. Together, these three actors formed a dynamic system in which people interacted with products within the context of the environment.

Figure 8 highlights the various actions people take with their products and environment. Some actions are outside the scope of this project or did not surface during the user research phase. The actions that are of interest are part of the same activities. Figure 9 below shows five activities, acquiring, using, hibernating, sorting and divesting, that are based on the research findings. The next subchapters present the findings in relation to each of the activities.

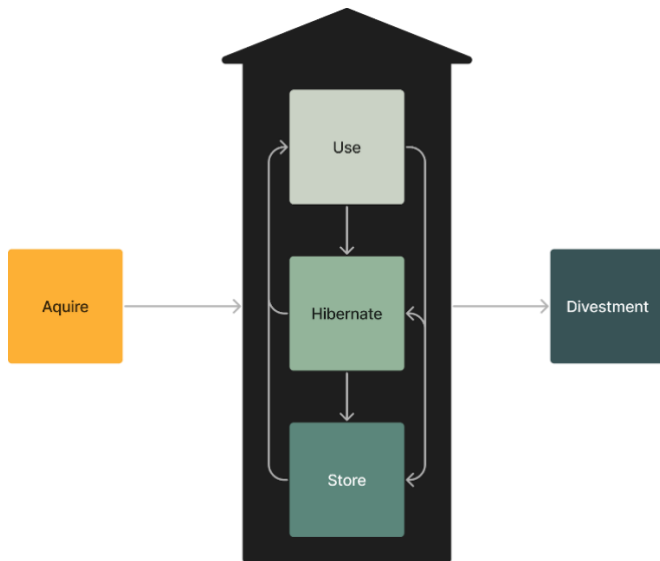


Figure 9: Activity system

4.4 Acquiring Products

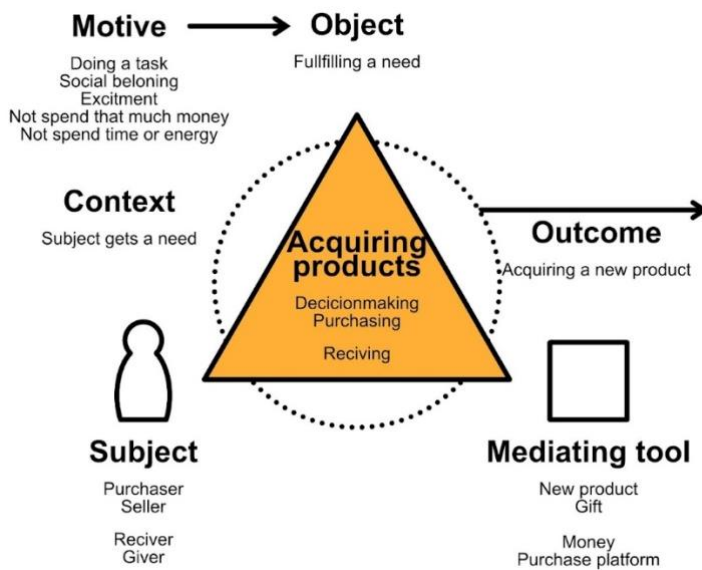


Figure 10: Activity system triangle of acquiring

Within products chosen by participants during the interview, there were both gifts and purchases represented. The way people acquire products influences their willingness to dispose. All the seven participants mentioned at least one unutilised product that was received as a gift from their friends, colleagues or family members. Three participants mentioned that the reason for keeping these unutilised products is that they are gifts from others and that they would feel guilty if they were to dispose of them.

Gifts are not always necessities in their life but could enhance their quality of life. Therefore, when people did not have a certain context to use a product or when they

were not motivated to use a product in their household, they started to decrease the frequency of using them, and even gradually stopped using them eventually.

The way people acquire it does not have an obvious influence on how people use it. However, due to the guilt of disposing of a gift, they are more likely to keep a gift rather than dispose of it even if they have no context to use it. But a purchased product can also be retained for longer because they feel like they must get their money's worth.

4.5 Managing Products in the Household

When a product enters the household, people start to interact with it, which can be seen as a system of managing the products in the household. There are three main activities that people do regarding their products and storage spaces: they use, hibernate, and store their products. When managing their products, people make evaluations and label them consciously or unconsciously. A similar process is done to the storage spaces, they are valued due to their functionality and the products stored in them. The perception of the products and the places they are stored are intertwined and somewhat dependent on each other.

4.4.1 Using products

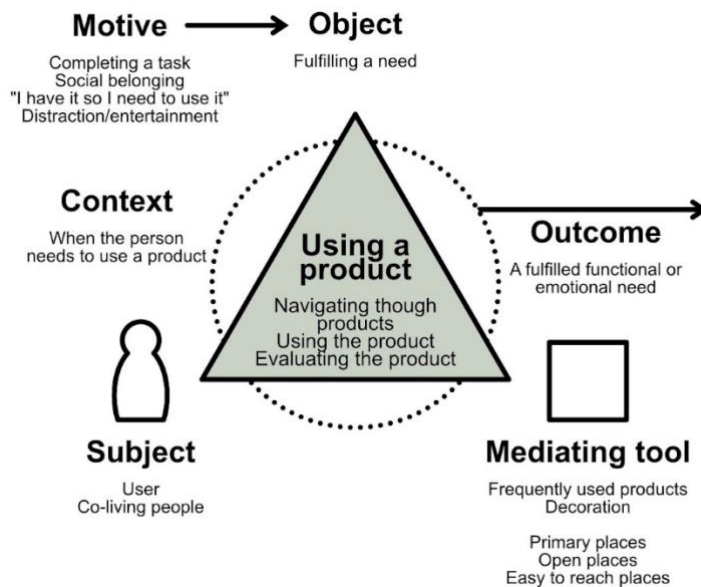


Figure 11: Activity system triangle of using products

When utilising a product, people do so with a specific outcome and objective in mind. Typically, they need to use the product to perform activities such as household chores, getting dressed, or pursuing a hobby. Products can also serve as decorations when a person does not use them for specific actions, but they still hold meaning and value in their everyday lives because they bring joy to the user. While using the product, there are usually some evaluations of the product, whether conscious or not. Taking care of

products can be seen as a part of using the product because the user interacts with it and prepares it for further use. The participants in the user study did not perform care on their chosen unutilised products and had not done so in the past either.

When a person is going to use a product, they need to navigate through their home to find the product they need to use. The products that are used frequently are usually stored in primary storage places which are spaces that the user values high and uses often. These places are assigned to the products that the person uses frequently or products that can be left out in the open in the household. Primary places are easily accessible and provide ample, contextually suitable storage spaces. Examples of these are kitchen counters and eye-level cupboards.

4.5.2 Decreased Frequency of Usage

When a product is less frequently used, the value and perception that the user has of it shifts. The product goes from being frequently used and stored in a primary place to fading into unutilised. The participants in the user study mentioned multiple reasons why a product is unutilised. A major reason for not using a particular product is that there is an alternative or replacement product that the participant prefers to use. The alternative product can be something that the user already has in their household, or they acquire a replacement product that outcompetes the others, pushing it into utilisation.

Many participants felt like they did not have the context to use their chosen product. A person might have changed their opinions, routines, or lifestyle where the chosen product is no longer needed. Another aspect is if the person's physical body changes, it could be a change in weight or function. This can lead to the user not being able to utilise the product anymore. Changes in a person's life such as divorce, relocation, having children, or change of job, etc., can affect how a person uses products. A change like this can lead to less free time, and the activity where one product is needed might not be a priority anymore. For example, a divorce can lead to a lack of interest in an activity the couple had together. The mentioned reasons are due to unconscious actions where the person does not have the intention to stop using a product. The change usually happens over time or has such a big impact that the person does not recognise that they stopped using a product.

“I don't eat toast at all, I switched to porridge for breakfast more than 20 years ago.”

- A respondent to the questionnaire on what impacted how they used their toaster

Some products did not meet the participants' requirements or had something that made them a bad product. It might not live up to the expectations that the person had when acquiring it, making alternative products more appealing. Then the utilisation of the

product becomes a conscious choice where the person might intentionally avoid using it.

4.5.3 Hibernating Products

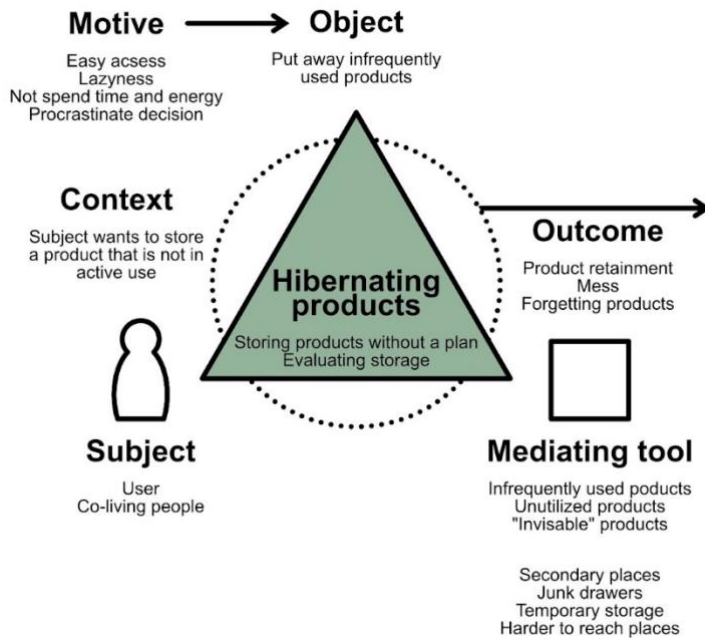


Figure 12: Activity system triangle of hibernating products

In hibernation, the products are in a liminal space where they move between being used and unutilised but are not properly stored. Purgatories involve forgotten spaces that store unutilised and abandoned products. This type of storage space and state of products fall under the hibernation activity. The products in hibernation are not frequently used and are stored in secondary places that are not valued as highly as primary places. The secondary places are usually messy, unorganised, to some extent difficult to access, and not intended as permanent storage. The participants in the user study usually stored their chosen unutilised products in enclosed spaces like cupboards, drawers, and closets. Many of these were also described as hard-to-reach. The unutilised products could also be in a primary and high-valued space but are placed behind used products, making it difficult to see at first glance. Some products are stored out in the open space, they are generally placed there as temporary placement but are later forgotten and they become a part of the furniture they are stored on. Products accumulate in those spaces because people are placing the product in that place without a plan for the product, they just know that they do not need to use the products for now.

“Like yeah, I don't know. I think it starts with like one thing that I need to just put this somewhere, but I don't want to throw it away. So then I do the easy to reach place, yeah. Which is probably why it ends up in that place”

- A participant from the interviews on how things accumulate in places

When a product is placed among other less-likely-to-use or unutilised products, it becomes a part of the mess and is no longer perceived as an individual product. For example, one of the participants mentioned that they had put a jacket, which was once worn daily, on the back of a chair in their living room. They can see the chair and items on it every day when they are home, and the jacket was put alongside other clothing. This jacket remained on the chair for over a year and a half without either of the two people living in the apartment noticing, until they tidied up items on the chair one day. At that moment, they realised that they had forgotten about the jacket, thereby exemplifying the concept mentioned above as “purgatory”. The clutter of low-frequency-use or unutilised products makes it more difficult to evaluate the quantity of them and the necessity of keeping them. Products that hibernate in this situation make people lose track of them in their daily lives, even though they can see them every day. Also, retaining these types of products in the same space reinforces the tendency to keep adding more products in similar situations to there. Besides, the invisibility of products retained in clutter would increase the possibility that people forget the existence of them in their household and acquire new products that serve similar functions which results in product redundancy.

“Because I might use it sometime and then I put it in the drawer and forget about it.”

- A participant from the interviews when asked why they will keep their forgotten power bank

From the interviews and questionnaire, it was clear that the move of a product to a secondary place had a negative effect on the future use of the products. It was undetermined if the product was moved to a secondary place when it had already stopped being used or if it became unutilised after it was moved. Either way, when the person assigns a space as secondary, the products in there have a decrease in use. When the products are moved, the user makes a conscious decision, but the consequence of it becoming unutilised seems to be unplanned.

The reasons for leaving products in this liminal hibernation phase seem to be the procrastination of decision-making and the difficulty in evaluating the future use of the product. Many participants described the decision of keeping a product or not as difficult and energy and time-consuming. The decision came with the additional work of finding a permanent and organised storage space if they want to keep it and figuring out the best disposal method if they want to get rid of it. When all of that work is against just putting it in the junk drawer, the junk drawer usually wins.

4.5.4 Retaining Products

Whether it is a thought-out decision or a spur-of-the-moment action, there are many reasons for retaining a product. When asked about the plans for the product, most respondents said that they wanted to keep the product. The biggest reasons for retention are that the product is good to have and still has potential use because it is still in good condition or that the person has hope of starting a new routine that includes using the product. The latter is connected to products that, when used, have a positive impact on the person's life, e.g., exercise equipment. Some people feel that they still want to keep the product and have the intention to start using it again

Nostalgia is a reason for keeping the product as it can bring the respondent positive memories. Some people are too lazy to act on it or have no plans, meaning they will still keep the product but will decide later. A few products are kept because they need extra actions to be done, e.g. buying more products that are needed to make it work, emptying or cleaning out electronics, or doing some repairs.

As the perceptual map illustrates below (Figure 13), participants in interviews locate themselves in the map that indicates how they feel about the amount of products they have in their home (vertical axis) and how they perceive how many products they have at home. More than half of the participants (4 out of 7) expressed that they have too many products at home. However, most of them feel good or close to neutral about the amount of products.

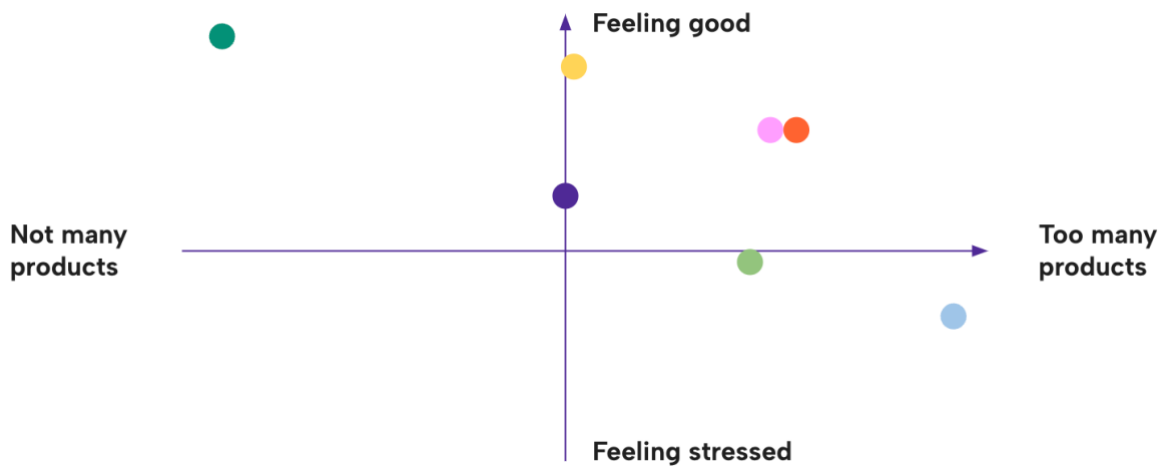


Figure. 13 Perceptual map of perception of the amount of product they own - feeling about products they own

4.5.5 Storing Products

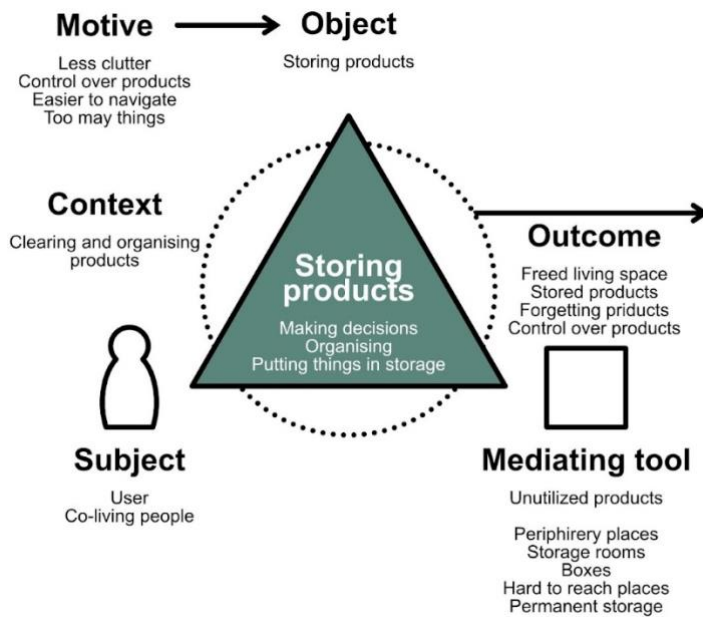


Figure 14: Activity system triangle of storing products

Storing is the activity people do with their household products when they are intentionally storing them. Storing them means that they have decided to keep it and have assigned a place for it. These products are unutilised and are valued important enough to keep, or the task of disposing of them is too much of a hassle. People usually store these products with intention and have some kind of initial organisation. The products are stored in peripheral places such as storage rooms, boxes, and hard-to-reach places, and they are seen as more permanent storage places. People store things here because they want to free up more space, have control over their products, and have less clutter in their living space. The outcome can be an organised storage place, but as time goes on and the product is unutilised, it usually gets forgotten.

4.6 Divesting Products

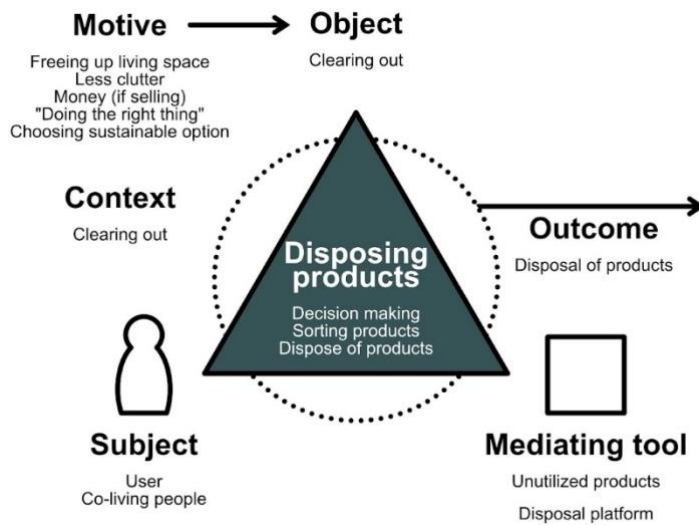


Figure 15: Activity system triangle of disposing of products

The participants in the user study expressed that when they are clearing out and disposing of products, they are usually triggered by their environment. The motives mentioned are freeing up more space for new products, their home looking messy, or realising that they have too many products. Another reason for clearing out could be that the person has a routine to clear out which can be done at a certain time of year or triggered by seasonal changes or holidays. People have to make decisions about how to dispose of the products, which many expressed to be difficult, and then physically dispose of the products from their household. Many felt negative emotions before and during clearing out products but a rewarding and accomplished feeling afterwards. One participant mentioned that they could detach easier when they were physically separated from their product for a while. They described a situation where they had cleared out some clothes from their closet and then left the bags for a couple of months before disposing of them. They explained that when they found the bags they knew that they did not need them anymore because they had not missed them.

4.7 Tensions, Conflict and Harmonies

In the activity system, there are conflicting outcomes, goals, objects, and motives which can hinder people from acting desirably. These tensions can occur within the activity, but in this system, they are more prevalent between different actions.

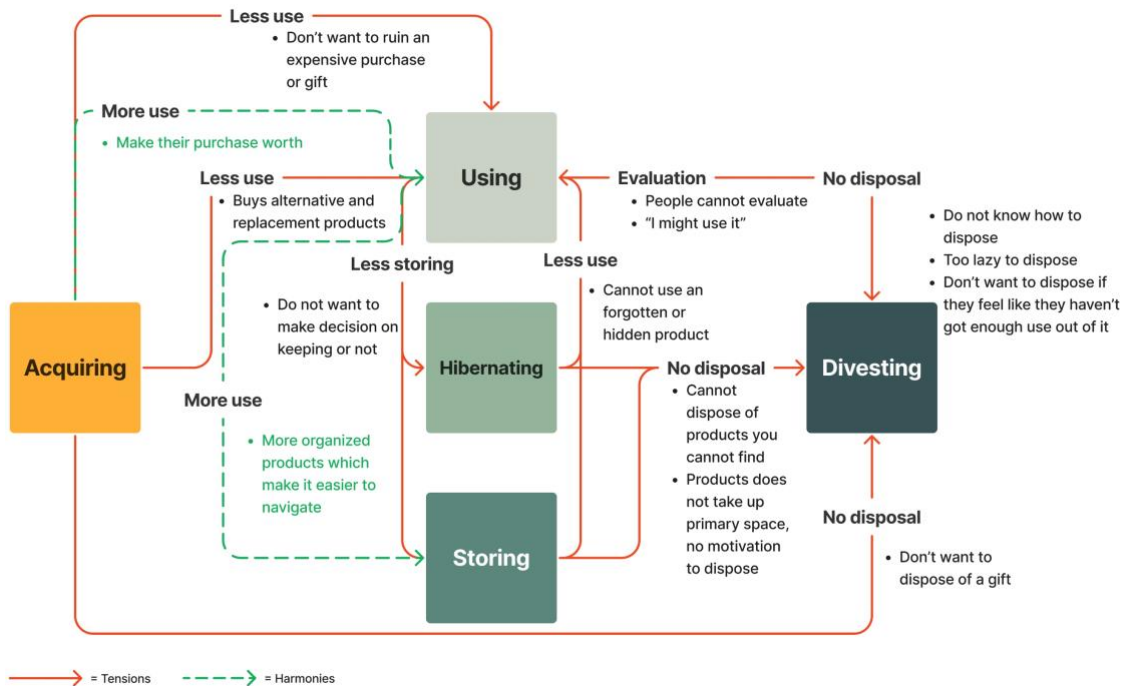


Figure 16: Graphics illustration of the tensions and harmonies

The way a person acquires a product can affect how they manage it and dispose of it. Purchased products can be used more because the user is motivated to get their money's worth by using them, but it can also lead to lesser use if it is an expensive product that the owner does not want to break. It can lead to retention without use because they feel like they do not want to dispose of it when they haven't used it to its full potential.

When receiving a gift, people are less inclined to dispose of an unutilised product. The participants in the user study felt that disposing of a gift is rude and disrespectful, they can also develop a strong attachment to the product which also can hinder disposal. The user study did not give any inclinations if participants were more or less likely to use a product if it was received as a gift.

“It's a gift. It feels wrong to discard a gift. It might go when I move or something. But right now, I don't see any reason to throw it away.”

- A participant from the interviews

In a household, there can be conflicts between people if they have different opinions. This can happen during any of the activities in the system. Having a multiple-person household can also create problems if the people living have different evaluations of products and spaces. One product can be very valuable to one person and useless to the other. In a multiple-person household, there is also more movement of products where people might move around the products without telling the other persons. This causes more disorganisation and can lead to forgotten products.

The hibernation of products usually leads to messy places and forgotten products, which creates trouble when it comes to using the products. If a product is forgotten or cannot be found, it cannot be used. In the user study, some people mentioned that they had forgotten about the product that they chose, and they only found it because of the user study activity of finding unutilised products. This is a big tension that hinders people from being able to use their products because they cannot navigate through their products. Hibernation also stops people from storing their products properly.

Furthermore, the evaluation of future use is stopping people from disposing of a product and storing it properly. The participants felt that they might use the product or that it is good to have which stops them from disposing of it permanently and they want to keep it moderately close by in case they need it, designating it to hibernation.

“I went mountain biking with a friend approximately six years ago. It was a short delightful trip.”

“I don't want to sell it right now. What if I want to take up mountain biking again?”

- A respondent to the questionnaire talked about how they rarely use their mountain bike, but they will keep it

4.8 Design opportunities

The findings from the user research show a complex system in relation to users, products, and storage spaces. Multiple reasons contribute to products becoming unutilised, and they stem from the user, product, or context surrounding it. People have a close personal relationship with their product, and the participants tell detailed stories about the history of the product.

There is no one way of preventing products from becoming unutilised, and when designing for this reason, one needs to consider the complexity of the problem. Multiple activities play a role in how products become unutilised, and they need to be tackled in different ways. To be able to design concepts to address the tensions, we developed five design points to prevent products from becoming unutilised. These design points are not fully developed and cannot be considered design guidelines, but they can be an indication of where and how design can intervene in the activity system.

1. Help people with decision-making.

People express that they want to divest some of their products, but they procrastinate in doing so. Decision-making is time and energy-consuming, leading to procrastination in evaluation. This takes place between the management of products and divesting of them.

2. Guide people to evaluate if they need a product or if they have the context to use it.

During the decision-making process, individuals often evaluate their products solely based on their current attributes, forgetting to consider potential future contexts of use. We could see that participants retained some products, neglecting to consider the need for context for potential future use. They did not consider the fact that their past usage pattern may influence how it is used in the future.

3. Help people reflect on products in hibernation.

The products in hibernation are somewhat forgotten by their owners. These products can hide in plain sight and have become invisible to the user. The user no longer considers them to be useful. Users need help and reminders to acknowledge these products and make use of their potential. They also need to be aware of what behaviours can lead to the unutilisation of products to prevent it from happening.

4. Trigger people to find unutilised products in households.

People ignore less-frequently used products in their household even if it is an open space that they daily interact with. People sometimes do not realise that they have forgotten products or retained products at home. According to the interviews, people tend to feel positive about the amount of their products, but many of them still think they have too many products at home. However, they are not planning to get rid of them if there is still space to store them.

5. Motivate people to share or dispose of their unutilised products.

When a product has been considered unusable for the user, disposal does not always happen. The disposal process comes with more decision-making, considering what options are viable for the specific situation. Sharing can be an alternative to permanent disposal and people can see the benefits of contributing to helping others.

5.1 Wardrobe Tracker



Figure 18: Illustration of wardrobe tracker

What:

A rectangular board with a hanger attached to the hook of a hanger and serves as a tool for users to monitor the usage of their clothing. The hanger acts as a visual indicator, distinguishing between worn and unworn garments. Users can hang clothes to be worn on one side of the board, shifting them to the opposite side after use. For folded clothes, the board is placed on top of them, and garments are placed on top of the board as they are worn. Additionally, users can record the dates items were placed on the board and schedule revaluations of their wardrobe.

Why:

Many individuals struggle with deciding whether to keep or discard products, often opting to retain items for their perceived future use.

How:

- The system provides a clear indication of product usage and gives users tangible evidence of prior use.
- Helping people with decision making
- Helping people in the evaluation process

People often procrastinate making informed decisions about product retention, believing they'll use items in the future despite minimal prior usage. By implementing a low-maintenance system like this, individuals can access factual usage data to inform their decisions. This targets the tension for people not being able to evaluate their items by giving them proof and therefore aiding some in the decision-making. This concept demonstrates how a simple system can encourage users during product evaluations and may motivate them to wear infrequently used clothes to transfer them to the "worn" side, fostering habits of tracking usage and decluttering.

By affecting how people evaluate and aid in creating more sustainable habits, unworn clothes will hopefully be easier to divest. This will affect how many unused clothes are in hibernation and storage. The system will hopefully create a routine that stops products from staying in hibernation for long periods. This can also make the users more aware of what clothes they have used, reminding them to constantly reflect on their behaviours.

While applicable to other product categories, adaptation would be necessary to suit specific actions associated with that product category. The point of this concept is to aid the users in creating a system that is easily sustained. However, similar systems could be established without a dedicated product, offering a convenient implementation.

5.1.1 Evaluation of Wardrobe Tracker

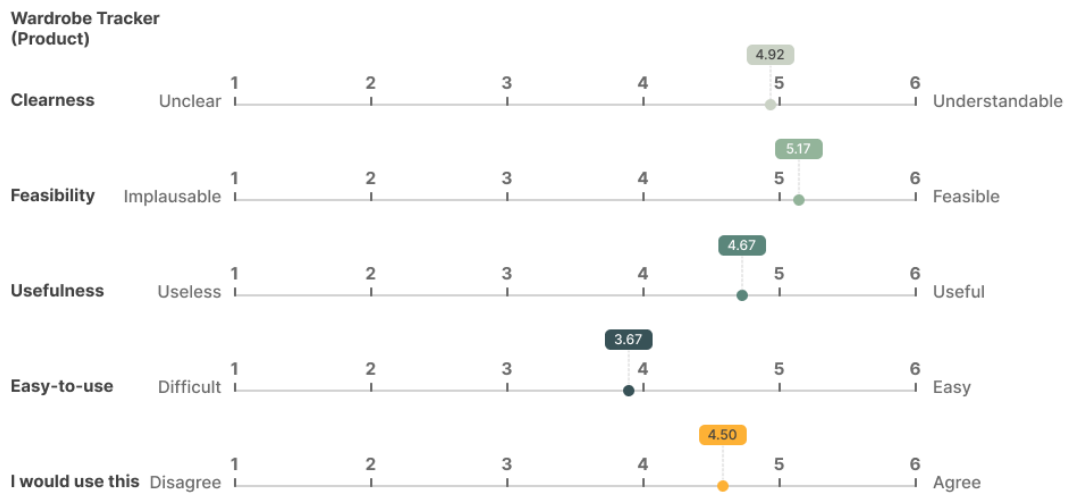


Figure 19: Diagram of the average score for the Wardrobe tracker

The participants were generally positive toward this concept. Overall, they seem to appreciate the simplicity and straightforwardness of the product and could see how it would benefit the user in decluttering their clothes. As the result shown above, this solution has a high score for feasibility (5.17). The participants could understand the basic idea of the product's purpose to keep track of their worn clothes but there is

conflicting opinion about the effectiveness and necessity. Some could see themselves using this and thought that a product like this could help them with decision making and mentioned that the product makes it very simple to keep track and does not take a lot of effort to serve its function. Others questioned the effectiveness because the product is simple and is easy to ignore because it is not steering or forcing people to use it. Some participants suggested that they might want to sort their clothes by which type they are instead of knowing when they were worn.

Overall, the participants could understand the concept easily and could see that the purpose is to help the user keep track of how much they use their clothes. Their critique mentions that the product might not suit everybody's habits and will therefore not work in practicality.

5.2 Purgatory Box

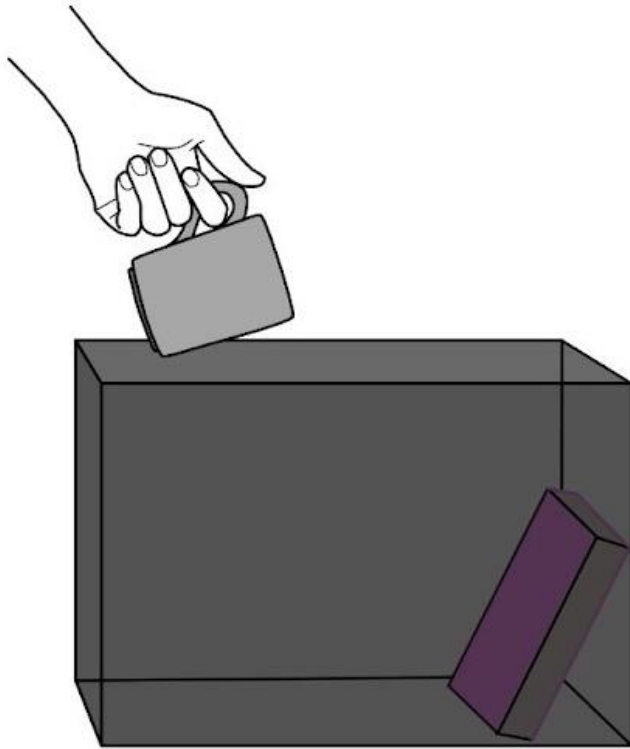


Figure 20: Illustration of purgatory box

What:

A semi-translucent box that is placed in the household. When users are uncertain about where to place a product and lack the time and energy to make a thoughtful decision, they can temporarily store it in this designated box. The box will sound an alarm after a set period to remind users of the item they have placed inside.

Why:

People might forget about products which results in hibernation. These places accumulate products all around the home. Distancing oneself from products can make the detachment process easier, but the risk is forgetting about them.

How:

- Physically separates the users from the product making it easier to detach from products
- Helping people in the evaluation process
- Reminding people to go through the products by sounding an alarm

The purgatory box serves as a solution for forgotten products by creating a designated junk drawer, but instead of leaving things forgotten, it reminds the user of the products placed there. The box can be placed anywhere and can help free up valuable space in

secondary storage areas. It offers a simple and intuitive option for users to store their products when they do not want to make an immediate decision about their future.

This has the potential to change people's habits. Giving people an obvious choice might make them more aware of their actions. This box allows people to keep their habits of laziness and procrastination, but by reminding them about the products they will not be forgotten.

Additionally, physically separating from the product could lead to a faster detachment process, which can facilitate disposal. Detachment occurs when a person separates their emotional value from the product. When separating from the product, users may also rediscover its usefulness. This separation can make them realise the value of the product they have placed in the box and encourage them to use it more.

5.2.1 Evaluation of Purgatory Box

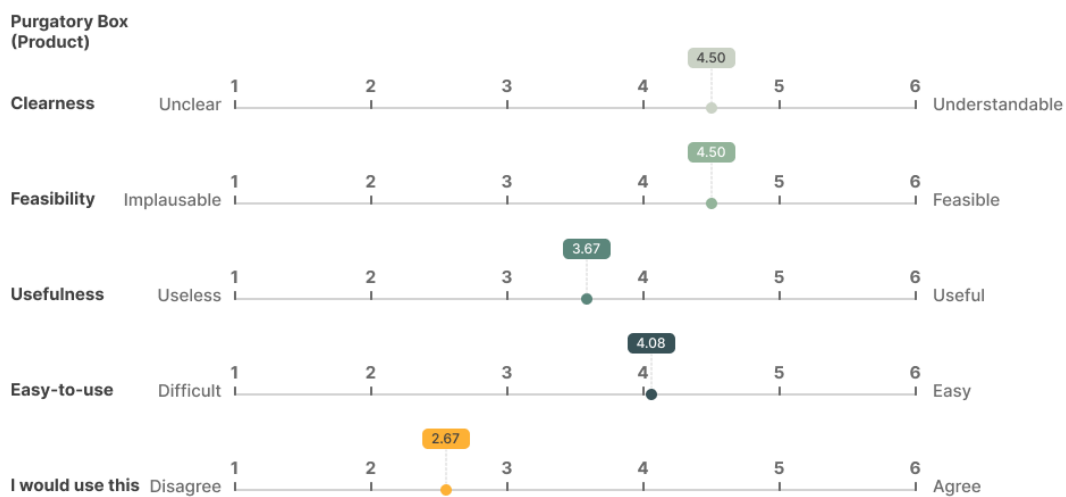


Figure 21: Diagram of the average score for Purgatory box

Although the concept received a relatively high "clearness" score, it was somewhat difficult for users to understand. Some of the comments and questions during the evaluation show that they might not understand what the purpose of the product is. People did not grasp the idea of what purgatory is and the use case for the product. Some could see that it might be convenient to have a dedicated place for these products while others did not see a use case at all because they already can keep track of their products. The participants who identified with the latter could not relate to forgetting items, placing products with no real plan or having a junk drawer. Most people mentioned that they did not think that they would need an alarm and that they would be very annoyed by it. It could be the case that people have a good sense of their products. There is also the possibility that people are not aware of their unutilised products because they are often hidden or forgotten.

The overall reaction to this seems to be confusion and scepticism about the necessity and use case of it. While the participants seem to grasp what the functions of the box are they cannot relate or connect to the purpose of creating a dedicated space for unutilised items that the user is not willing to act about. This can result from the people not relating to purgatories or they do not understand the concept. Improvement in how the concept is communicated and expanding the explanation of the problem and purpose could lead to less confusion.

5.3 Pop-up Plug-in



Figure 22: Illustration of pop-up plug-in

What:

The Pop-up Plug-in is a browser extension designed to assist users during the online checkout process. When a user reaches the checkout page, a pop-up appears, covering the screen, and prompting the user to reflect on their already owned items. The plug-in keeps track of the user's purchase history and gives them reminders if they are trying to buy a similar product.

Why:

People tend to buy multiple products with similar functions, leaving some products unutilised if they are not a preferred alternative.

How:

- An extra confirmation step that intends to make people reflect
- Intervening at the right time, it can make people reflect on their behaviour
- Providing the user with information about their previous purchases so they know if they make a similar one

One of the reasons why people stop using a product is that they have alternative or replacement products that they prefer. This can lead to a redundant consumption pattern that results in products becoming unutilised. One approach to tackling this problem is to intervene before people acquire products. This will prevent products from becoming unutilised by impulse purchases or replacement products. It will foster a new habit of reflection before purchases that can have a positive effect on reflecting on one's products in general.

This plug-in integrates into the browser, and a pop-up appears when a person is on the checkout page of an online store. The pop-up window asks the user if they really need the product and if they already own any similar products. The user is given some time to reflect before proceeding from the pop-up. There is also an option that makes the plug-in save the purchases that the user makes. If a user is trying to purchase products with similar functions or previous purchases, they will be reminded of their previous purchase. By providing relevant information at the right time, this plug-in helps users recognise and avoid redundant purchases

The concept aims to catch people in the moment of purchasing a product to help them reflect more. Even though the purpose is to address the problem of replacement or alternative products, this might also help people reflect on their general buying habits and steer them away from unnecessary purchases which are done even though the user has no use for it.

5.3.1 Evaluation of Pop-up Plug-in

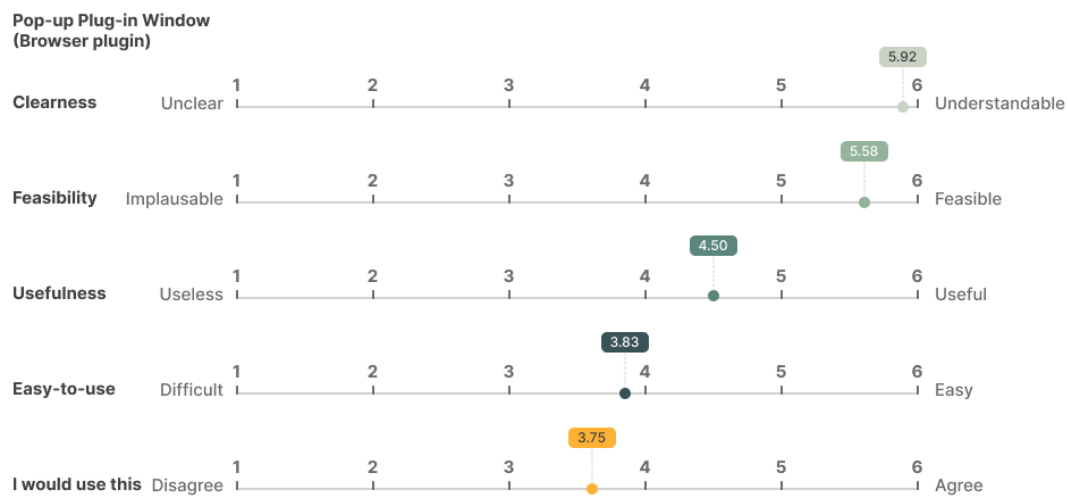


Figure 23: Diagram of the average score for Pop-up plug-in

This concept has the highest mean score and lowest SD in terms of clearness (5.92) and feasibility (5.58). This solution was easily understood by the participants, and they thought that it would be easy to implement. However, it got a low score for willingness to use (3.75)

According to the feedback from the evaluation, participants could easily understand how this concept worked and why it could benefit its users. The concept is simple and easily communicated because it is straightforward with a singular major function. Many could see the benefits of having some time to reflect on purchases and that it can prevent them from buying unnecessary things. They appreciated how it brings

awareness without forcing the user to do anything, except for waiting a little before deciding. The concept and purpose seem clear, but some could not connect it to how it prevents products from becoming unutilised. The potential negative is that people can just ignore the plug-in or uninstall it.

People seemed to be generally positive about this concept. They could easily understand it and see the direct benefits, but only connect it to purchasing fewer items. There was also a concern that they would not use it because it would not fit their habits, or they might already have a habit of evaluating purchases.

5.4 Drawer Spotlight (Product)



Figure 24: Illustration of drawer spotlight

What:

It's a spotlight placed on the roof of a drawer. When the drawer opens, the spotlight shines a light on a specific product. A random product is highlighted every time the drawer is opened.

Why:

When placing products in a junk drawer it becomes a part of the junk. Products are easily forgettable because they are not seen as individual products but as part of the unutilised mass.

How:

- Giving a visual cue to attract the user's attention to a specific product instead of the junk as a whole
- Bringing attention to potentially unutilised products

People tend to categorise and assign value to both their products and their storage places. It seems common for people to store unused products in similar storage places, categorising the group of products as unused instead of seeing the individual products. The owners still assign some value to the products because they are keeping them, but as a whole they become unutilised. These places are usually messy, making it difficult to see all the things in there. The purpose of this concept is to enable users to view products individually rather than as part of a disorganized collection. Some products might be forgotten, but by spotlighting them, the user is compelled to notice their presence. This concept aims to create awareness of items that users might not frequently consider by visually highlighting them.

5.4.1 Evaluation of Drawer Spotlight

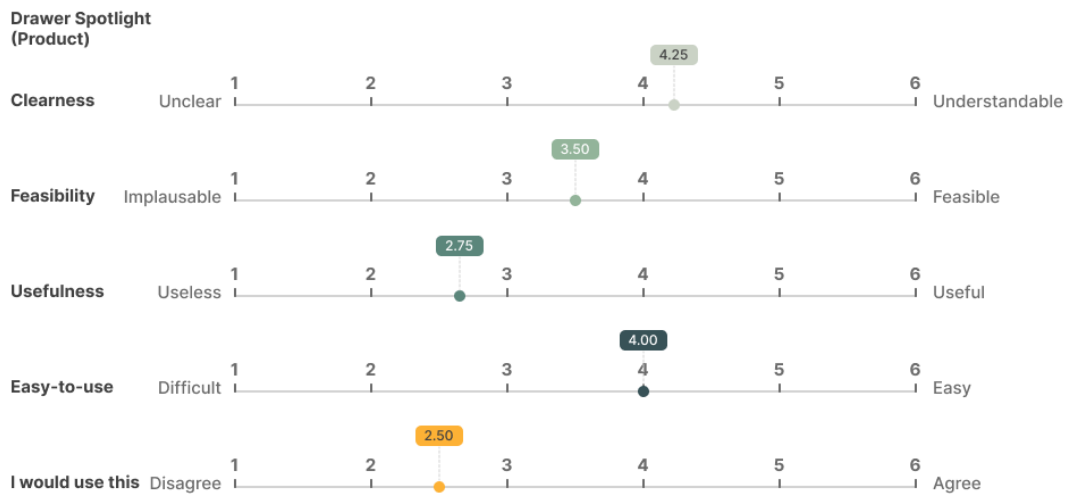


Figure 25: Diagram of the average score for Drawer spotlight

This concept was mediocly perceived by the participants. It is the one that they are least likely to use and see the least usefulness in. The user's understanding of the concept and its purpose varies. They seemed to understand the basic functions of the concept but could not see a use case for it. Similarly, as in the case of the purgatory box, the participants could not relate to the problem that the Drawer Spotlight addresses. They could not see themselves grouping individual products as a whole and could not see how this would benefit them. A reason for this might be that the description given to them was not clear enough. Some acknowledged that it can be used as a fun way to remind people of decluttering and decision making but most people did not see the benefits and focused on how it could only work in some circumstances.

This concept could not be connected to the intended purpose and problems it could potentially solve. The participants were confused about what it brings to the user and how it would benefit them. This concept needs to be improved in the way of presented that provide a clarification on the value and purpose of the concept.

5.5 To Keep or Not to Keep

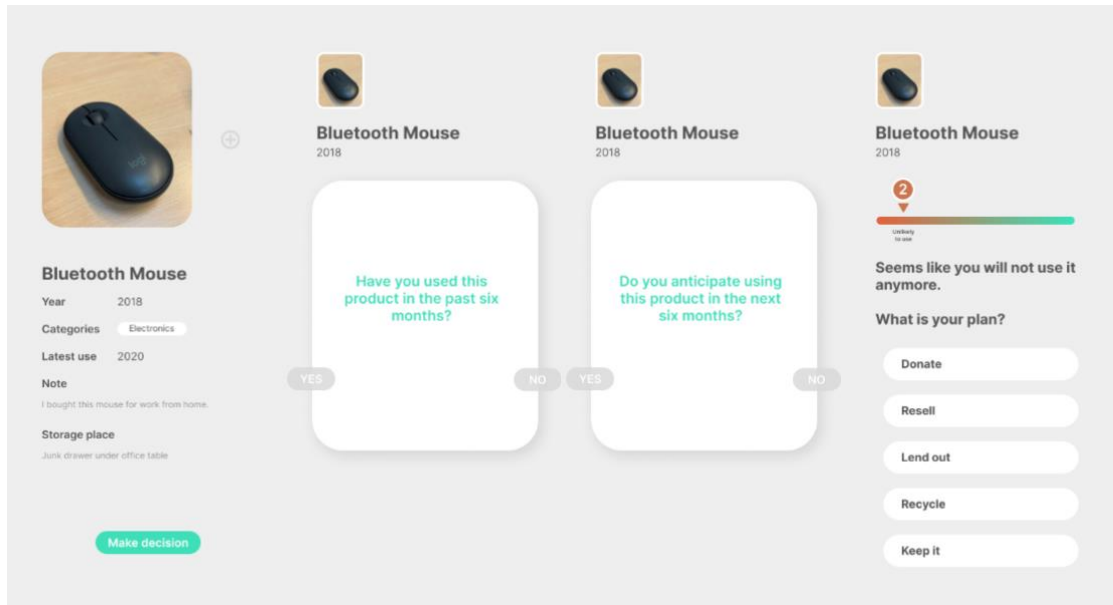


Figure 26: User interface of To Keep or Not to Keep application

What:

An app with yes and no questions that inquire about the previous usage of the product and the future plans for it. When the user has answered the questions, it gives the user a score which indicates if they should keep the product or not. If they should dispose of the product the app provides the user with relevant disposal options. In the end, the user needs to register if they decide to keep the product or not. If they keep it, they will be reminded to use it.

Why:

People have a difficult time evaluating their products and deciding whether they should keep them or not. They often believe that they will use them sometime in the future, even though their past usage shows no sign of that. This concept aims to take the decision-making burden from the user and instead provide them with recommendations on what to do.

How:

- Decreasing a part of the mental work from the user
- Providing information
- Helping people in the evaluation process
- Helps people reflect on the past usage of products by asking a series of questions

People often struggle with evaluating their products. Many items fall into the category of 'good to have', but individuals may not fully understand why they consider a product as such. They highly value the possibility of a product becoming good to have in the

future without considering the context of use or past usage. This label sometimes serves as a reason to keep items and avoid disposing of them.

To aid in decision-making, individuals can use this app. First, they register their products, and the app can track their decisions. The app provides users with questions about their prior use of the product, its value to them, and their anticipated future use. Once the user has answered all the questions, they receive a score based on their responses to the yes/no questions. Then, they can interpret their total score within a predefined range to determine whether they should keep or dispose of the unutilised product. The range and corresponding decisions can be customised based on their preferences and circumstances. If the score is low, they are advised to dispose of the product and are provided with different suggestions on how to do so. The user then indicates whether they choose to keep or dispose of the product. If they decide to keep it, the app will send follow-up questions later to inquire whether they have used it.

This affects the tension between management and divestment. People can use this to aid in the process of decision-making and evaluation to promote divestment. If the user decides to keep the product, they will hopefully reflect on ways they can make it useful for them again, stimulating a longer use period.

Examples of questions (Yes - 1 point or No - 0 point) :

Have you used this product in the past six months?

Do you anticipate using this product in the next six months?

Does this product hold sentimental value for you?

Is this product easily replaceable if needed?

Does this product serve a specific purpose that other products you own cannot fulfil?

Do you have adequate storage space for this product?

Are you willing to invest time and effort into repairing or maintaining this product if necessary?

Do you feel guilty about getting rid of this product?

Have you received positive feedback or compliments about this product from others?

Do you have plans to repurpose or upcycle this product in the near future?

5.5.1 Evaluation of To Keep or Not to Keep

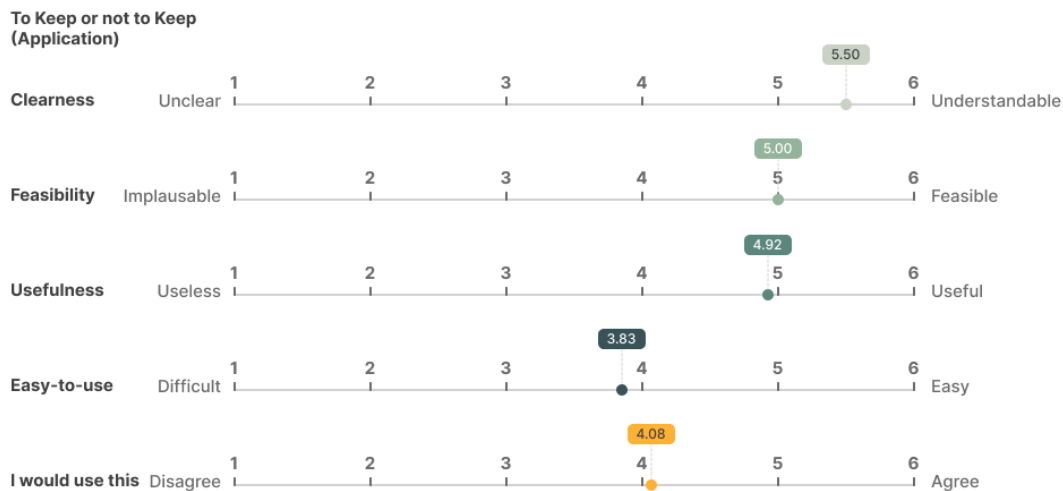


Figure 27: Diagram of the average score for To keep or not to keep

This concept received a relatively high score in terms of clearness (5.50), feasibility (5.00) and usefulness (4.92) and is ranked as the third most willing-to-use solution (4.08). However, according to feedback from participants, many of them thought it was a time-consuming task to register products in this application. Meanwhile, they thought it would be useful for people who need to sort their things. Some participants also pointed out that users can perceive the questions differently and they might not have the same meaning to everyone.

The concept helps people make decisions, whereas it is difficult to trigger them to do this behaviour if they are not motivated. The participants understood the concept and its functions, but they mentioned that it might not be practical. They understood that it is good to have something to help with evaluation but that it might be too time-consuming. Some participants suggested that it would be nice if they could see a donation store nearby if they chose this option.

5.6 Treasure Hunting (Application)

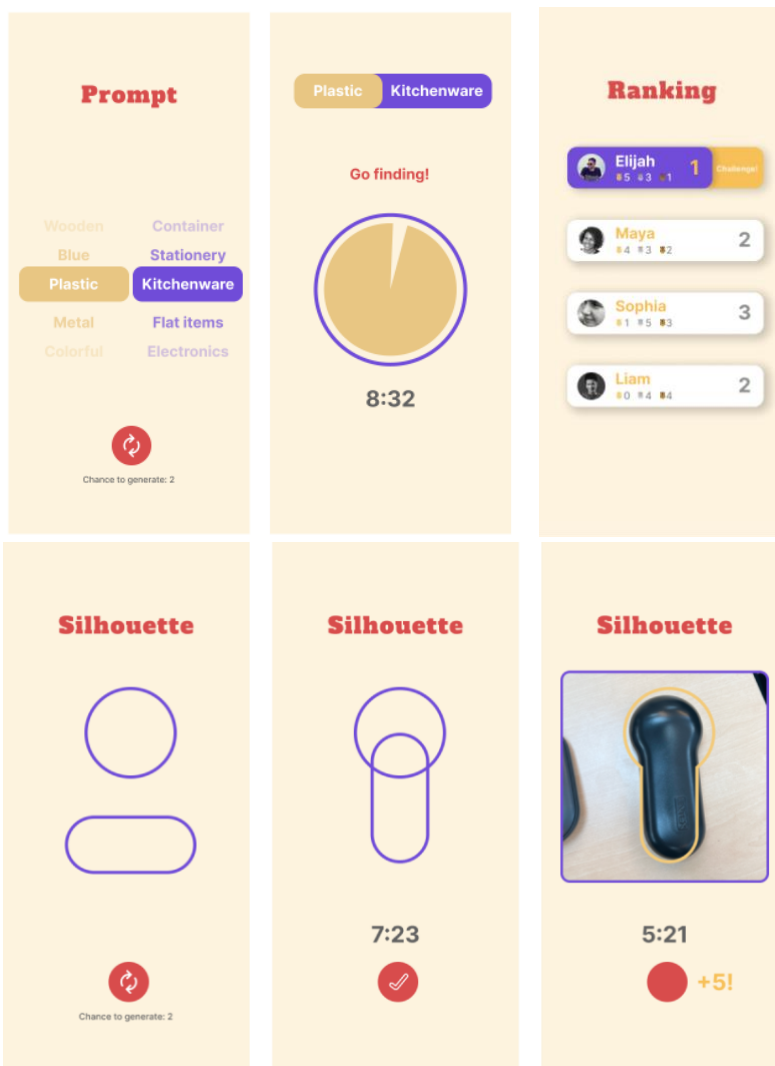


Figure 28: User interface of treasure hunting application

What:

It's a game for the whole family that involves finding unused products in the household. The game is a competitive hunting where players are prompted to find hidden treasures in their home. Once they have found the products, they engage in a product trial where they discuss and vote on whether they should keep the product or dispose of it.

Why:

Unutilised products are usually forgotten around the household. This activity aims to get people to move around in the spaces where unutilised products might gather. By making people move around in the household it can make them more aware of the different storage spaces and the products they keep inside of them. Another aspect is by making the whole family involved they all have a say in how they manage their products.

How:

- Prompting the players to look at their storage spaces and create familiarity
- Motivating people to find unutilised products
- Prompting players to find unutilised products and where they are stored
- Collective decisions that shape a family-based method of managing products in the household

Unutilised products are often forgotten somewhere in households. The user can have forgotten the existence of the product or the placement of the product, either way, it leaves the product unutilised. When many hibernating products are stored in the same space they become a part of a whole unutilised mess. The users have an idea of what kinds of products they store in their spaces but might not know in more detail what other products are in there, especially in the secondary and periphery spaces. By prompting users to move around and look for specific things in their spaces they will become more aware of what is in there, which can lead to more use of the products because they are more aware of their existence.

The game is treasure hunt themed to help them make the connection that unutilised products in their home have potential. The players are given a series of prompts to go look for an unutilised product that they have. The prompt consists of an adjective and a noun e.g. “plastic” and “kitchenware” so they have some instructions but do not make it so specific that they might not have a product like it. A timer is added to create a competitive atmosphere which can lead to heightened engagement.

Another suggestion is to use their camera where the users are asked to find a product that fits into a specific shape (or they design a shape by given geometric elements) on their phone. Then they go around their house and look with their camera to see if anything will fit the shape. When all players have found their product, they have a family council to decide for each product if they will keep it or not.

After each player finds at least one product, they will start a “product trial”. They will have a discussion and then they need to vote for the future of this product. Before voting, they can express their feelings about the product and reasons for their opinion. In the trial, they can vote on the app. There are three options: “keep it”, “get rid of it” and “indecisive”. After voting, they will see the result in the application. Managing household products can be seen as part of a system where all members of the household contribute and collaborate. The game can help to get everybody involved, and they can create a system that works well for their specific needs.

This addresses the tensions within management and towards divestment. The users will become more aware of their products, making it possible to use or divest them. This will create a new activity and way of managing products that include the whole family in the clearing out process.

5.6.1 Evaluation of Treasure Hunting

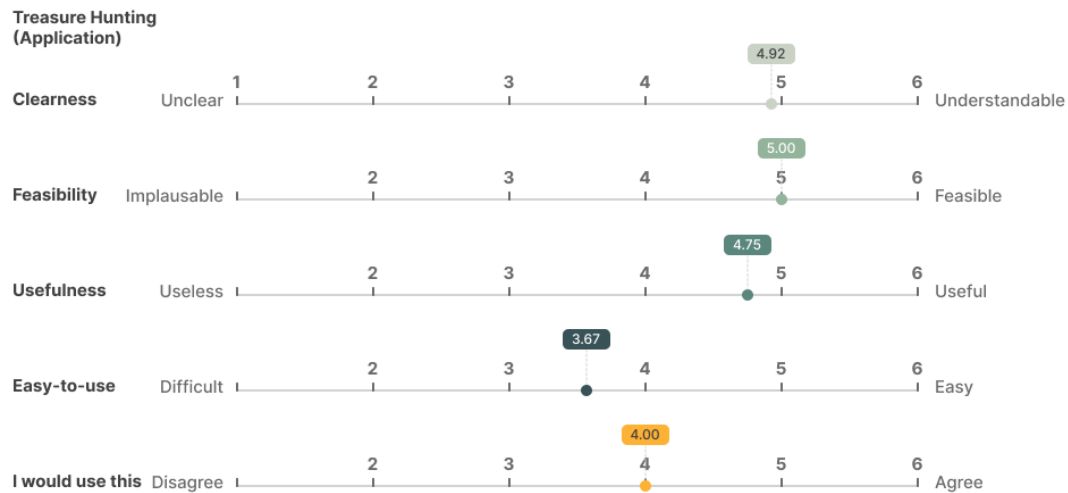


Figure 29: Diagram of the average score for Treasure Hunting

This was an appreciated concept, and the participants could see the potential and benefits it would bring, mainly for families with children. They generally found the concept enjoyable and engaging because it involves the whole family and could understand the purpose of doing so. They understood how it would be beneficial to create a fun game out of something that is generally considered boring. Benefits for children, like learning organisational skills and responsibility in the household, were mentioned. However, one concern was about forgetting about the application and some confusion was mentioned about the specific functions and mechanics of the application when used in practicality.

People could see the benefits of involving the whole family in decision-making and that this concept could provide a fun incentive to do so. Some understand that it can help to find unutilised items while others focus more on how it can be used cleaning and organising the household.

5.7 Sharing System (Application and Service System)

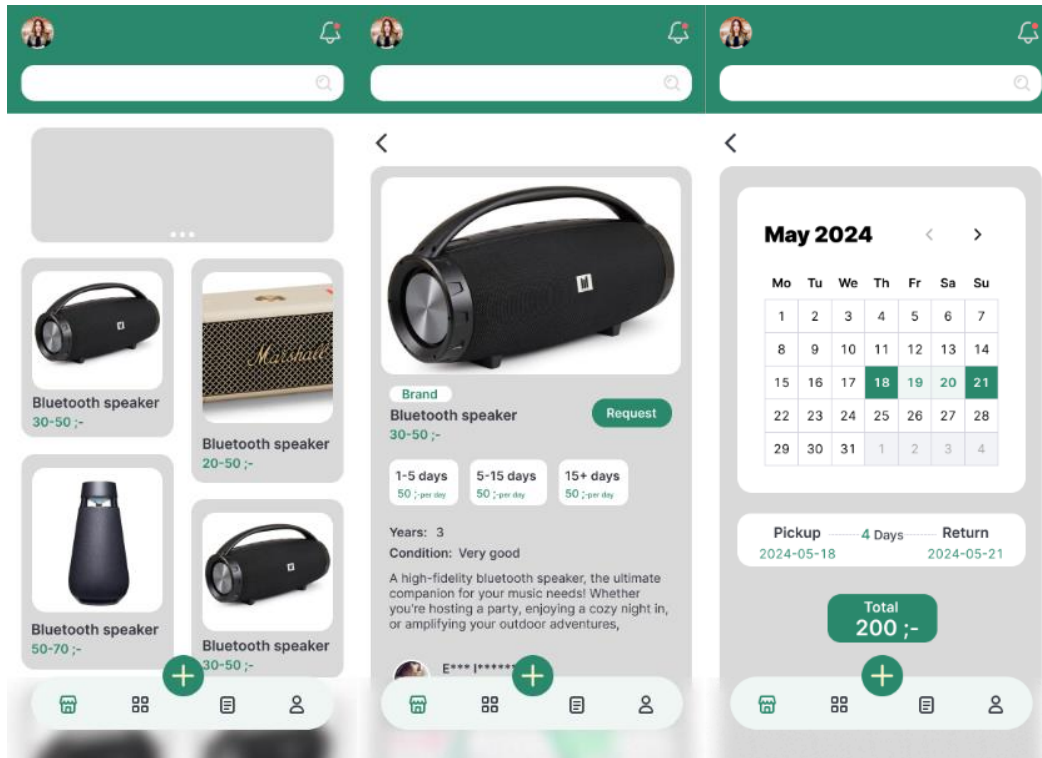


Figure 30: User interface of sharing system

What:

A sharing system that provides product lending and borrowing services, allowing people to borrow products by daily/ hourly price. The lender and borrower can post and match their needs and agree on an exchange. Products can be placed at a sharing station where the lender and borrower can exchange products without interacting with each other if that is preferred.

Why:

People acquire products that they do not need, or they already have similar products that become unutilised. Additionally, people have a hard time disposing of products and retaining unutilised items instead of divesting.

How:

- Providing people with the option of lending, not disposing permanently
- Fulfilling people's temporary need for products by allowing them to rent instead of buying
- Motivating people to share and borrow unutilised items

People acquire products that they do not need or might only need for a certain amount of time. This can make products pile up in the household with a low frequency of use or

become unutilised. People keep products that they feel like they have not used enough or are still in good condition and can be used. Providing people with a service where they can borrow instead of purchase it can prevent them from buying unnecessary products.

On the platform (App or website), people can post their needs. Borrowers post what product they would like to borrow and for what time and lenders post products that they are willing to lend out. Lenders can fill in what type of product they are lending out and specify price, time and location. In that way, people can be matched up based on their needs. People can browse the posts in their area and see if someone has what they need or if they have a product to fulfil someone else's needs. When a match is made people can either meet up in person or if they prefer, they can use a product sharing station. In the station the lender can place the products that they are lending out and the borrower can collect them.

This concept impacts the entire activity system. It focuses on the acquisition and divestment of products, but it impacts how people manage their products. A system like this can change people's buying habits and allow people to divest products on a trial run because they are only disposing of them temporarily. People retain a diverse range of products, but a service like this would work especially well for products that are only used temporarily. Examples of this could be tools, seasonal products, holiday decorations, camping gear etcetera.

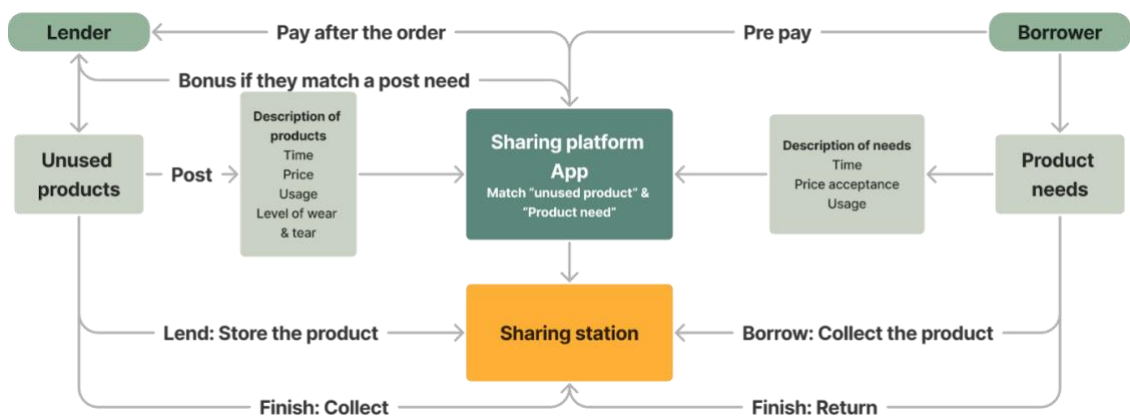


Figure 31: Flowchart of the service system

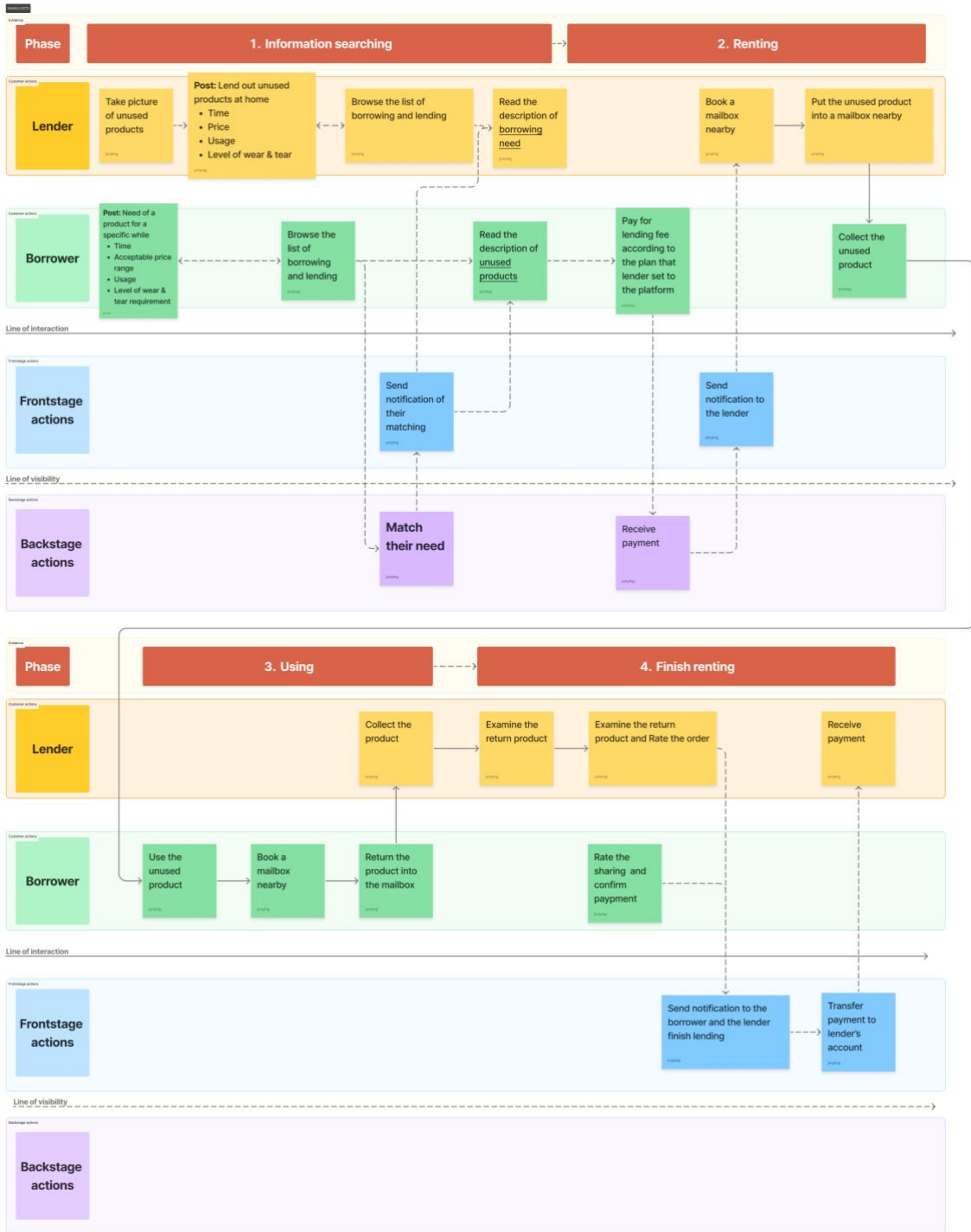


Figure 32: Service blueprint of the sharing system

5.7.1 Evaluation of Sharing System



Figure 33: Diagram of the average score for Sharing System

Many participants would like to use this product and could see the benefits it could bring users. They understood that it would help with the acquisition of products that are used for a short period as well as giving people an opportunity to temporarily dispose of products. This is one of the more complex concepts because it has multiple stakeholders, actions and interactions. The participants found this most difficult to use, a contributing factor to this could be that it requires the most time and effort from the users. They appreciated that it focuses on easy communication and smooth exchanges of products. The concepts are focused on the security of people and products and the trustworthiness of the other party.

Overall people reacted positively to this concept and can see the benefits from it. They could see the purpose of having people be able to post both as a borrower and lender to create a sustainable consumption pattern and how unutilised items can contribute.

6. Discussion

This chapter delves into the discussion that follows the findings presented in the previous chapters. We address whether and how we answered the research questions that we initially set out to explore. The chapter evaluates the process of some of the methods and how they could have been approved. Interesting reflections from the findings and surprising results are discussed. Lastly, the future research and development of the project are reflected upon.

6.1 Unpacking the Research

This thesis has contributed to the understanding of people's behaviours when interacting with their unutilised products and the factors that lead to these products becoming unutilised. The user research helped in answering the research questions created at the beginning of the project. The user research presented various reasons for products becoming unutilised, including lack of context of use, changes in the product, person, or environment, disliking the product, and the availability of alternative products.

The research area became bigger than expected to understand how products become unutilised and why people retain them. It was important to understand how the products have been used and what keeps people from disposing of them. By understanding their behaviours and examining the activities in connection to managing products, some processes on how products transition into unutilisation were observed. A system was created between the unutilised products, people and environment. The actors in this system act together, resulting in a product retaining situation. The interpretation and evaluation of the products and environment by people contribute to how they act and make decisions. Not reflecting on their products and purchases and not planning storage leads to unutilised products. An observed behaviour of procrastination in decision-making, due to an inability to evaluate products fairly, leads to the retention of these products.

The findings contributed to the process of creating the concept portfolio. The complex system prompted us to create a design portfolio. These concepts are examples of how design could prevent products from becoming unutilised. Even though the concepts do not specifically focus on actions that directly lead to products becoming unutilised, they emphasise the need to address multiple areas to prevent this consequence.

6.2 Intriguing Instincts

6.2.1 Definition of Unutilised

When analysing the chosen products in the questionnaire and sensitising activity we could see that the participants seemed to have a different understanding of what unutilised means. This was a surprising finding that had not been found in previous research. In the instructions for the tasks, there was no definition of what an unutilised product is, it was up to the interpretations of the participants. We could see that some define a product as unutilised when they have not used it in a specific amount of time. There was no indication that people had a set time, and it seemed to be more of a spontaneous decision at the moment that they were choosing a product.

Some people cared less about the actual time or amount they used the product and more about their perception of use and its potential. They might have not used the product as much as they would like but they still use it on a somewhat regular basis. The takeaway from this finding is that it might not matter to the users how much they have used their product, but it matters how much they feel like they have used it. The participants did not appear to have a clear understanding of what they consider an unutilised product. This might have an impact on the fact that people have difficulty recognising their problem with unutilised products or even noticing that they possess such products. If they do not have a concrete definition of what unutilised is, it can be challenging to categorise products accordingly.

6.2.2 Holding on to Unutilised Products

Based on the results of the user research, an interesting finding is that the participants are very stubborn about keeping their products. The previous research by van den Berge et al. (2021) speaks to the fact that people are reluctant to divest their products and Nilsson et al. (2023) present multiple reasons for retaining products. The user research in this study adds to the idea that people have difficulties in divesting products, even though they have no functional reason to keep them.

In the questionnaire and the interviews, participants described the products and their feelings about them. Many shared that they had not used the product in years, did not like using it, and had had negative experiences with it. However, when asked about the future of the product, they expressed certainty about keeping it. We uncovered multiple reasons why a person would keep a product that they do not use anymore, e.g. memories, laziness, “good to have” etc. One would think that an overtly negative user experience would conquer the potential for future use, but that does not always seem to be the case. When speculating, several factors can influence individuals’ decision-making and behaviours. For example, it might be easier to keep a product than to dispose of it. Many participants described how they dislike making decisions and find it

energy-consuming to dispose of products. What is the harm of keeping a mug, ball, toaster, or other small product that you do not use anymore? Regardless of the reasons, people remain attached to their products in some way. Whether their experiences are negative or positive, this attachment keeps them from disposing of the product.

6.2.3 Complexity of Topic

When analysing the results from the user studies it became a complex set of data. To be able to understand the data we created an activity system. The system addressed people's behaviours, psychological processes and interpretations along with the functions of the products and storage spaces. Presenting the findings in this way presented the interactions between the activities more clearly. Activity theory helped by making the tensions clear to see where design could alleviate them.

We chose to create multiple design solutions in a concept portfolio rather than developing a single, more detailed design solution. We intended to highlight important tensions and conflicts within the system and identify potential points for design intervention, which were deemed difficult to tackle with one solution. By compiling a portfolio, the focus shifted from a specific design solution to the impact of design solutions on the system and its potential as an example of how design can address these issues. We believe that by creating a portfolio we could show how design can prevent products from becoming unutilised by addressing different parts of the system.

The portfolio is a collection of concepts that each can play a role in the activity system. While some focus on one specific behaviour or problem, e.g. Pop-up Plug-in, others address multiple behaviours, e.g. Service system. The activities are related and how products are acquired will affect how they are managed and divested. We think that to prevent products from becoming unutilised a significant behaviour change needs to happen where people change their routines.

6.2.4 Keeping it Fun

The sensitising activity was developed to prepare the participants for their interviews and give them some time for reflection. During the development of the sensitising activity, we also focused on creating a fun experience for the participants. The theme and materials were carefully chosen to make it exciting. The activity got positive feedback from the participants, and we think that creating a fun and engaging experience can lead to a better result. This is an insight that can be considered in future work while collaborating with users.

Home visits were done during the interviews. These were valuable additions as they allowed the participants home to act as a mediating tool. It was insightful to see the users in their homes because it made it easier to discuss their feelings and reflections on

specific products and storage spaces. Additionally, it was interesting to see how different people manage their products in their household which gave us practical facts about habits and routines.

6.3 Weaknesses of this research

Due to the limitation of time and resources, there were some weaknesses and barriers during the development of the project. In the user study phase, there was a limitation of the number of participants and similarities between them.

Apart from limitations related to participants, due to the academic background of the project group, there was a limitation of investigation from cognitive science and psychological aspects during quantitative analysis.

6.3.1 Participants

In the user study phase, there was a limitation in the number of participants (25 answers for the questionnaire and 7 answers for interviews). Some biases could be caused by the small sample size, for example, overgeneralising the findings, narrow perspectives from participants and the limitation of identifying patterns or trends.

All participants but one for the interviews were previously known by the project group. Because the interviews were done in people's homes, the project group needed to be familiar with the participants for safety reasons. Knowing the interviewee can lead to a more comfortable and calmer atmosphere. However, it can evoke feelings of discomfort in the participants due to a heightened feeling of shame or guilt regarding the state of their personal belongings.

Besides, all participants in evaluation all of the students were studying the Master of Industrial Design Engineering, so they have similar backgrounds. The lack of diversity of academic background might result in similar perspectives leaving some opinions undiscovered. Having designs evaluate the concepts was done due to the availability of the people and their academic background seemed to be appropriate to the evaluation. They have experience in design and that could help in evolving the concepts. The discussions during the evaluation focused on how they would use the design in their life, but we still believe that their being designers gave us some more insights into how the concepts were communicated.

6.3.2 Studying the Unknown

Studying why and how products become unutilised comes with its challenges. The user study needed to dig deep and uncover hidden and unconscious behaviours exploring latent and tacit knowledge. Studying people's behaviour that they might not be aware of

was difficult as they could not always see the consequences of their actions. Additionally, the invisible nature of unutilised products made it even harder for them to see the problems.

The sensitising activity was done to gain under-the-surface knowledge. The participants were asked to do some self-observation. Self-observation can be hard to do on actions and behaviour that are unintentional and non-reflective. Even though the sensitising activity and home visits contributed to valuable insights into tacit knowledge there is still more to investigate to gain latent knowledge. Our sensitising activity relied on reflection on actions and non-reflective behaviour after a product had become unutilised. To gain latent knowledge an activity that captured behaviour proactively or in the moment might have been more successful.

6.4 Implementation and Future Work

As mentioned in demarcations, this project belongs to the Mining Garage Gold project which aims to explore and increase the potential of reuse in Swedish households (Chalmers Tekniska Högskola, 2022). The user studies, design portfolio and evaluation provide insights into the product's transition from being used to becoming unutilised.

For further study, the activity system can be used as a research framework for user study and analysis in the future. The concept portfolio and evaluation provide inspiration for design ideation and feedback from potential users. Also, as a part of the circular economy, this project will provide perspectives on the process of product transition.

Some topics would be interesting to research further. Doing a user study with a more diverse group of participants, e.g. elderly, families, different living situations etc, would be interesting. Doing a study over a longer period could lead to more in depth and latent knowledge. This has the potential to see more connections between actions and the products transition into becoming unutilised and the role of the different storages. Additionally, focusing on the emotional and psychological process of retention and divestment seems to be an important aspect to promote recirculation.

7. Conclusions

The project contributes with valuable knowledge about how and why products become unutilised. The research questions cannot be addressed with a simple answer and require a complex system to be explained. The user research conducted delves into people's personal stories and relationships with their products. This helped us paint a picture of how people manage the products in their households and how value and perception play a role in their behaviour. It reveals that system thinking needs to be applied when researching this area and developing design solutions.

There are multiple reasons for products becoming unutilised, but they stem from the product, person or context. Product value and attachment have an important role in how people interact with their products. Attachment could lead to more or less use, depending on how it is formed and in what context.

The process by which products become unutilised is diffuse and hard to dissect, as it often involves unconscious behaviours. By studying the behaviour surrounding the process of products becoming unutilised, we could reveal conscious actions that lead to the unintended consequence of a product becoming unutilised. The use and managing of product behaviours from people such as procrastination in making decisions, and putting products in forgotten spaces like junk drawers, can lead to unintentional product retainment.

We believe that by creating a concept portfolio, this thesis could be used to get a deep understanding of the area as well as how design could be used to address the problem of unutilised products. The portfolio highlights the importance of system thinking and the complex findings from the user research.

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Appendix

A. Questionnaire

Unused products in households

We sincerely appreciate your time and effort in responding to our questionnaire. Thank you very much! 🍷 ☀️

The questionnaire is in English but if it is easier to express yourself in Swedish feel free to do so!

Contact us if there is any questions:

junying@student.chalmers.se

verai@student.chalmers.se

* Anger obligatorisk fråga

First we would like to explain a bit about our project!

This study is a part of our Master Thesis from MSc Industrial Design Engineering at Chalmers University of Technology 🧑

We are exploring the world of unused and hidden products in your household and would love some insights from you. The questionnaire is anonymous and the information we collect will be part of the final master thesis 📄

The questionnaire will take about 20 minutes and requires you to be in your home 🏠 📱 🧑

Participation in this study is voluntary. You may withdraw from the study at any time without penalty or loss of benefits.

1. I acknowledge that I have read and understand the information provided in this consent form, and I consent to participate in this study. *

Markera alla som gäller.

I Consent

Persona

We would love to get to know you 😊

2. Age *

Markera endast en oval.

18-25

26-30

31-35

36-40

41-45

46-50

51-60

61+

3. Occupation *

Markera alla som gäller.

Student

Working

Retired

Övrigt: _____

4. What type of housing do you live in? *

Markera endast en oval.

Apartment

House

Övrigt: _____

5. Where do you live? *

Markera endast en oval.

- Big city
- Small city
- Suburb
- Rural area (landsbygden)
- Övrigt: _____

6. How many people live in your household? *

Markera endast en oval.

- 1
- 2
- 3
- 4
- 5
- 6
- More than 6

7. Who do you live with? *

Markera endast en oval.

- I live alone
- I live with family
- I live with a partner
- I live with roommate(s)
- Övrigt: _____

8. How many square meters is your housing? *

Markera endast en oval.

- 15-20 m2
- 21-30 m2
- 31-40 m2
- 41-50 m2
- 51-60 m2
- 61-70 m2
- 71-80 m2
- 81-90 m2
- 91-100 m2
- 101-110 m2
- 111-120 m2
- 121-130 m2
- 131-140 m2
- 141-150 m2
- More than 150 m2

9. How many years have you lived in your current housing? (enter number only) *

10. What kind of storage space do you have? *

Markera alla som gäller.

- Attic
- Storage room in the house
- Storage room in the same building
- Barn or other large storage in connection to your house
- Rented storage unit
- No storage space
- Övrigt: _____

We ❤️ your products

We'd like to get some more information about your products and your relationship with them 🤖

We ask you to look around in your home to find a product that you no longer use

Please take a look in your:

1. Bathroom cabinet
2. Back of your closet
3. "Junk drawer" (skräplåda, böslåda på svenska)
4. Cupboard with kitchen appliances

If none of these places make sense to you, choose another place to look in

Now choose one product that you no longer use, preferably forgot about

We ❤️ your products

11. What product did you choose? *
- (Describe the look and functions)*

12. Where do you store this product? *
- (please answer this as detail as possible, example: top shelf of my cupboard that I frequently use but I cannot see the product when it is up there)*

13. Describe how the product has moved around in your home or if it has always been stored *
in the same place

14. Please share how and why the product entered your household *

Example: "I bought it because I needed it at the time", "it was a birthday gift from my aunt who got it on a trip in Greece".

15. Tell us about how much you used to use this product and in what context *

16. Describe your latest use of this product *
When was it and why did you use it?

17. What do you like about this product? *

18. What do you dislike about this product? *

19. Please share how the product makes you feel *
Does it bring forth any memories or emotions?

20. Did anything change about the **PRODUCT** that made you stop using it? *
Tell us about it

(examples, broken, scuff marks, material age, wear and tear etc.)

21. Did anything change about the **YOU or YOUR LIFE** that made you stop using the product? *
Tell us about it

(examples, change of style, moved, new time consuming job, bought a better version of the product, new hobbies that took over etc.)

22. Do you have any other reasons why you stopped using the product? *

23. What are your future plans for the product? *

24. Why do you keep this product if you no longer use it? *

25. After reflecting on this specific product we'd like you to consider all of your products that ^{*} you own

Please share your thoughts on how much stuff you have and how the amount makes you feel

26. Is there anything else you would like to share about this topic or your experience doing the questionnaire? ❤️

Thank you! 🌟

We really appreciate that you took time out of your day to answer our questionnaire!

27. We would love to hear more from you!
If you want to participate in an interview please add you email below (the questionnaire will not be anonymous)

B. Sensitising toolkit instructions

3 Lastly, ponder like a pirate wise

Product 1

What is the future for this product?

Where will it go?

When and how will it go there?

Product 2

What is the future for this product?

Where will it go?

When and how will it go there?

Product 3

What is the future for this product?

Where will it go?

When and how will it go there?

1 The quest is simple, the thrill is grand, Seek out treasures across the land!

Here the treasure hunt begins,
We ask you to look for some things!

Hunt for these things in your home:

1. A product that you have never used
2. A product you haven't used in years
3. A product that you have used and loved but do not use anymore

But fear not if you're feeling lost, here are places that can be crossed:

1. The top kitchen cabinet, oh so high,
2. The closet's back where secrets lie.
3. The bathroom cabinet, a treasure trove,
4. The junk drawer, where mysteries rove!

Now look at all the treasure you found,
We would really like to know their background!



I have lost me treasure

Ahoy, me hearties, gather here,
A pirate's treasure has disappeared!
So gather 'round, ye brave and true,
for now the hunt belongs to you!



Embark on this treasure hunt with glee,
in the comfort of your own home, you'll see!
They're hidden deep within your homes,
amidst the clutter, the treasure roams.

So search ye well, with all your might,
from morning dawn 'til dark of night.
In every corner, every nook,
uncover treasures with a look.

With courage bold and spirits high,
adventure calls, let's give it a try!
For in our homes, a wealth untold,
az treasure for us to behold!



Product 2: _____

How have you used this product?

How many times have you used it?

How did you feel when using this product?

How do you feel about the product after you have used it?

Product 3: _____

How have you used this product?

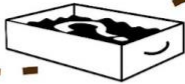
How many times have you used it?

How did you feel when using this product?

How do you feel about the product after you have used it?



Product 2



Describe your product:

How did it end up in your home?

Where did you find it?

How did it end up in that place?

Describe the last time you used it?

How much have you used this?

Product 3

Describe your product:

How did it end up in your home?



Where did you find it?

How did it end up in that place?


Describe the last time you used it?

How much have you used this?

2 Utilise your newfound treasures!





Unleash your creativity bold,
 decorate your finds, make them shine like gold!
 Display them proudly in the light of day,
 So their worth and wonder will never sway!



After you have decorated your treasures, we want you to start using the products during the days until the interview

Before the interview we want you to fill out these questions about your experience



Product 1: _____

How have you used this product?

How many times have you used it?

How did you feel when using this product?

How do you feel about the product after you have used it?

Product 1

Describe your product:

How did it end up in your home?

Where did you find it?

How did it end up in that place?

Describe the last time you used it?

How much have you used this?

C. Interview guide

First we want to thank you so much for participating in our study for our master thesis!
In our thesis we are researching how and why products go from being used to being unused.

This interview will take about 1 hour and you talk about how much you want to.
The answers will be used in our analysis and the information we gather will be published in our thesis.

You will be anonymous, but we wonder if it is okay to record so we can transcribe the interview? No one will hear it except for us.

Personal information:

Can you tell us a bit about yourself?

How old are you?

What is your occupation? (student, working etc.)

How many people live in your household?

If more than one, Who do you live with?

How big is your apartment/ house?

How long have you lived here?

Sensitising activity

How was it to participate in this activity?

What is the story behind this product, can you go through its life?

Take pictures

How did this product enter your households?

How did you feel about the product when you got it?

Where has it been stored? (product journey)

In one place or moved around?

How much have you used this product?

Has it gone up or down during the time you have had it?

Have you done any care for this product?
Repairing, cleaning, updating etc.

Where is the product usually stored?
Take pictures
What kind of space is it?
What other products are in there?
How often do you go into that space?
How often do you use products in this space?

How was it to start using these products again (or for the first time)?
What did you think about when you used them?
Did you encounter any problem with using this product?
How did it make you feel?
Has it had any impact on your daily life and routines?

What was the last use of this product? (before you used it for this activity)
When was this?

Have you thought about why you stopped using the product?
Did anything happen?
To the product
to you
to the context
Do you have similar products?
How did it happen?
Conscious or unconscious?

Did your perception of the product change after you have used it now?
How did you feel before?
How do you feel now?

How have your feelings about the product changed over time?
Developed stronger or lesser feelings?

What will you do with the product now?
Why?
Where will it go?
When will you do that?
How will you do that?

If they don't want to use it anymore,

What would make you want to use this again?

What has to change to make you use it?

What motivates you to use this again?

Now we are going to ask questions about your things in general:

How does the amount of products you have make you feel?

Make them fill in the perception map

Why do you feel that way?

Do you want to do anything about it?

Why/why not?

Do you feel that many of them are unused?

Clearing out products:

Do you have a ritual of cleaning out unused products?

What triggered you to do that?

How often do you do that?

How do you do that?

How do you feel after you have cleaned out products? (relieved/stressed/sad/free etc.)

Unutilized products:

What kind of storage do you have?

Do you have any places where products just end up?

Take pictures

Like a junk drawer or box or cupboard?

Why do things collect in here?

Do you look in the place often?

Do you use the products that are in here?

Do you have a designated space where you store things that you do not use?

D. Evaluation form

<p>Clearness *</p>							
	1	2	3	4	5	6	
Unclear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Understandable
<p>Feasibility *</p>							
	1	2	3	4	5	6	
Implausible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Feasible
<p>Usefulness *</p>							
	1	2	3	4	5	6	
Useless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Useful
<p>Easy-to-use *</p>							
	1	2	3	4	5	6	
Easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Difficuly
<p>I would use this *</p>							
	1	2	3	4	5	6	
Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree
<p>Why or why not? *</p> <p>Lång svarstext</p> <p>.....</p>							

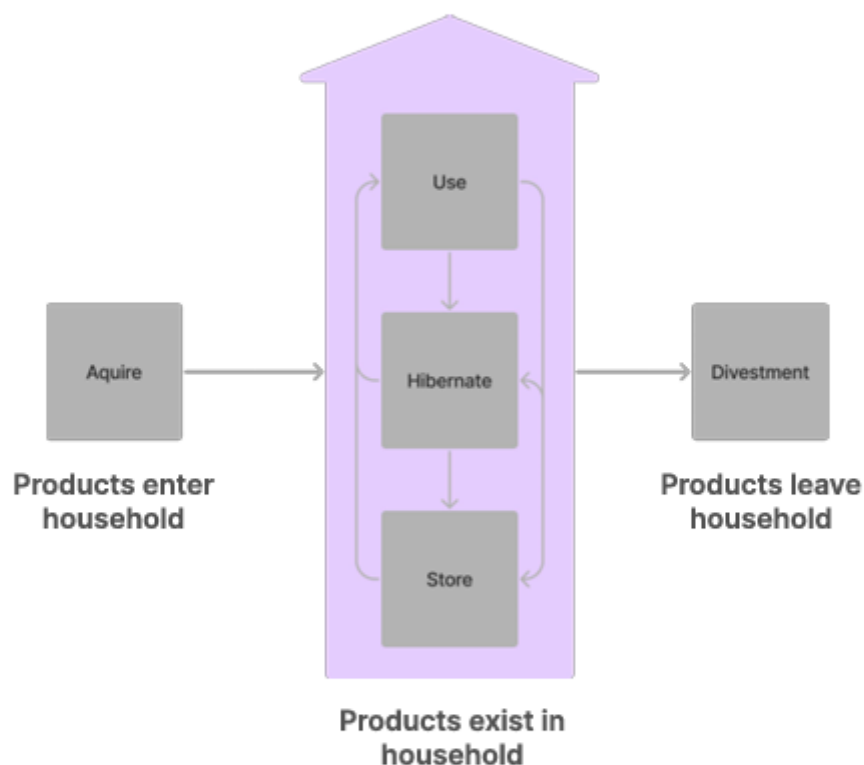
E. Evaluation posters

The project

Project aim

We are studying the product journey and specifically when a product goes from being used to unutilized.

This could be seen as a system where people acquire products, have products in their house and dispose of the products. When a product exists in the household it usually starts being used but then fades into being unutilised.



Evaluation

We have done a design portfolio with seven concepts. The aim of the portfolio is to exemplify the problems that we found in our user study. The portfolio is directed toward people researching this subject to present how design could be used to address the problem of unutilized products in households.



Plug- in pop-up



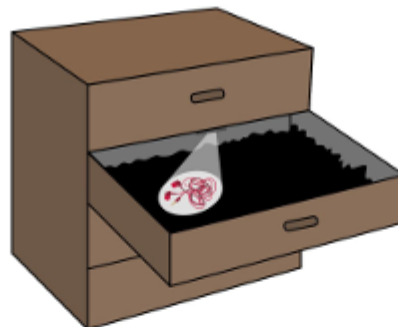
What is it?

A plug-in to your browser. A pop-up appears and alerts the user when they are at the checkout of a purchase. It gives them time to reflect over the products they already own and if they need this new one.

Target problem:

People acquire replacement and alternative products that they dont need.

Drawer spotlight



What is it?

A spotlight that is placed at the roof of a messy dresser drawer. When the drawer opens the spotlight shines a light on a specific product. A random product is highlighted every time it opens.

Target problem:

People forget and ignore products that they have in junk drawer

Wardrobe tracker



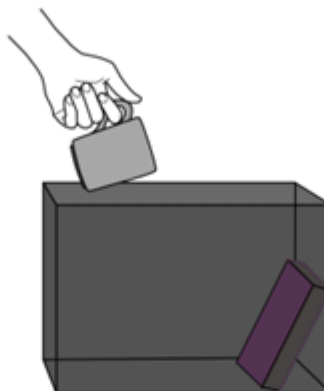
What is it?

A board with a hanger. The board is placed on one side of the clothes rack and the clothes are moved to the other side when they have been worn

Target problem:

People do not keep track on how they use their product which makes it hard when they are going to decide if they should keep them or not

Purgatory box



What is it?

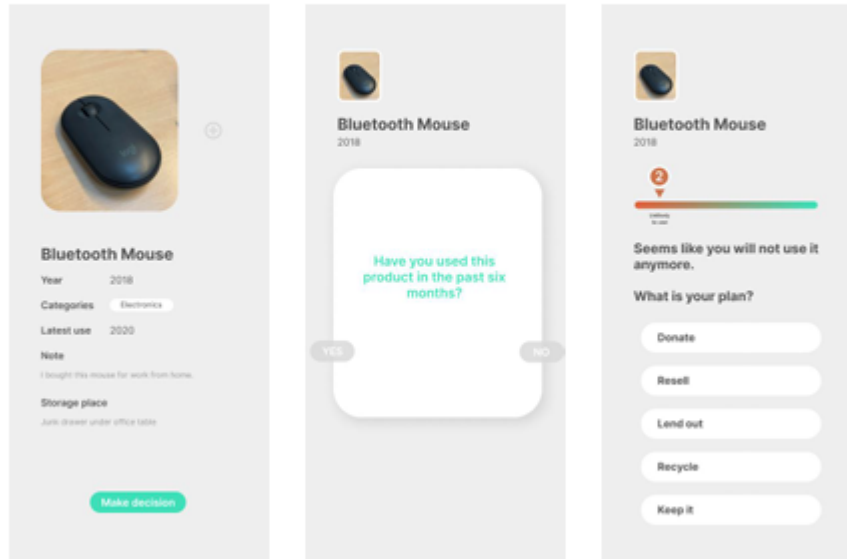
A semi-translucent box that is placed in the household. When the user is just placing a product without a plan they can put it in this box. The box gives an alarm to remind the user of the products in there.

Target problem:

People forget where they place products and forgets about them

APP - Keep or not keep

A app that helps you make decisions for your products



What is it?

An app that provides a list of "yes or no" questions that ask about the previous usage of the product and the future plans.

Target problem

People have difficulties evaluating their future use of products retaining in their home.

How it works?

1. Register a product
2. Answer 10 questions (Yes- 1 points, No- 0 points)
3. Receive the answer based on the score(0 - 10), and the suggestion for future plan of the product (0 for get rid of it and 10 for keep it)
4. Make a decision

Question for evaluation

1. Have you used this product in the past **six months**?
2. Do you anticipate using this product in the **next six months**?
3. Does this product hold **sentimental value** for you?
4. Is this product **easily replaceable** if needed?
5. Does this product serve a **specific purpose** that other products you own cannot fulfill?
6. Do you have **adequate storage space** for this product?
7. Are you willing to invest time and effort into **repairing or maintaining** this product if necessary?
8. Do you **feel guilty** about getting rid of this product?
9. Have you received **positive feedback or compliments** about this product from others?
10. Do you have plans to **repurpose or upcycle** this product in the near future?

APP - Treasure hunting

A family game app that helps people to find forgotten products at home



What is it?

A game for the whole family that involves finding unutilized products in the household. The game is a competitive scavenger hunt where the players are prompted to find products in their home.

After they have found products they will have a product trial where they discuss and vote on if they should keep the product or dispose of it.

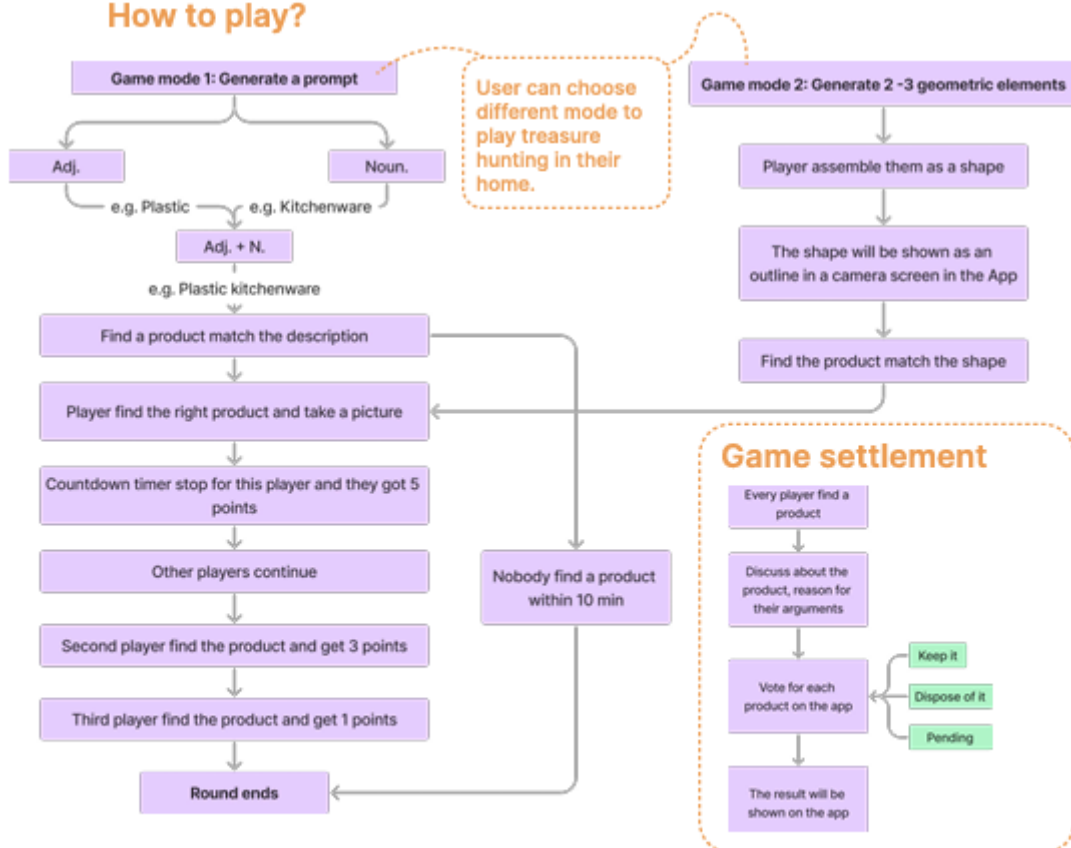
Target problem

People have forget about what products they have and where they are stored. In a multiple person household it is even harder to keep track of products because of the different users.

How it works?

- Prompting the players to look in their storage spaces to creating familiarity
- Prompting players to find unused products and where they are stored
- Provide a scenario for the whole family to make decision for products and reduce retaining

How to play?



APP - Treasure hunting

A family game app that helps people to find forgotten products at home



Game mode - Find a product with a prompt

Prompt

Wooden Container
Blue Stationery
Plastic Kitchenware
Metal Flat Items
Clothing Electronics

Chance to generate: 2

Go finding!

8:32

Find a product according to a random combination of an adjective and a noun.

Ranking

Elijah	45:03	1
Maya	04:03	2
Sophia	11:05	3
Liam	10:14	2

Rank with people in your home.

Game mode - Find a product with a shape

Silhouette

Chance to generate: 2

Silhouette

7:23

Silhouette

5:21 +5!

Find a product according to a customized shape design by yourself with provided random geometric elements.

Service system - Product renting

A platform that support people to rent out their unused products and borrow products for temporary use

What is it?

A sharing system that provides product lending and borrowing service, allowing people to borrow products by daily/ hourly price. The lender and borrower can post and match their needs and agree on an exchange. Products can be placed at a sharing station where the lender and borrower can exchange products without interacting with each other if that is preferred.

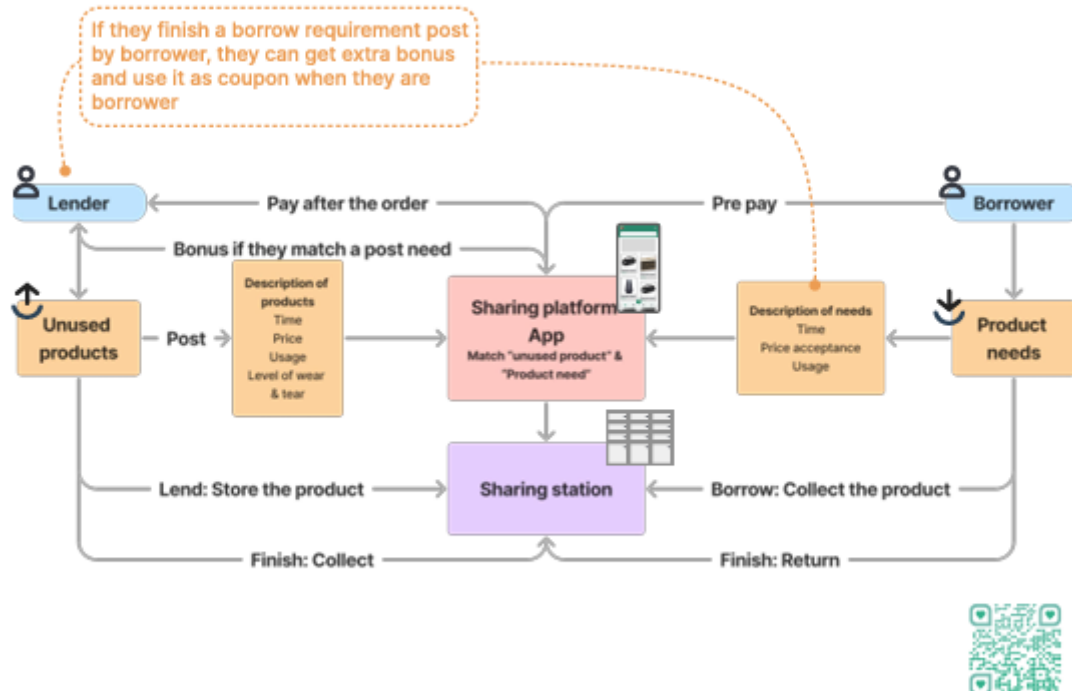
Target problem

People acquire products that they do not need or only need for a short period of time. People are reluctant to get rid of their products permanently.

How it works?

- Providing people with the option of lending, not disposing permanently
- Fulfill people's temporary need for products, pay cost-effective fees, renting instead of buying

Service map



Service system - Product renting

A platform that support people to rent out their unused products and borrow products for temporary use

Borrower

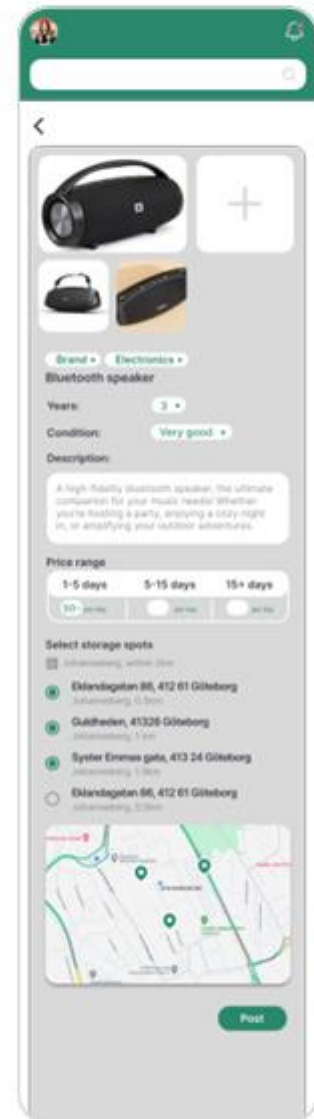
1.



2.



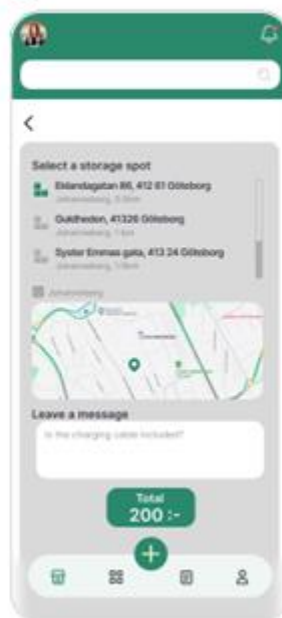
Lender



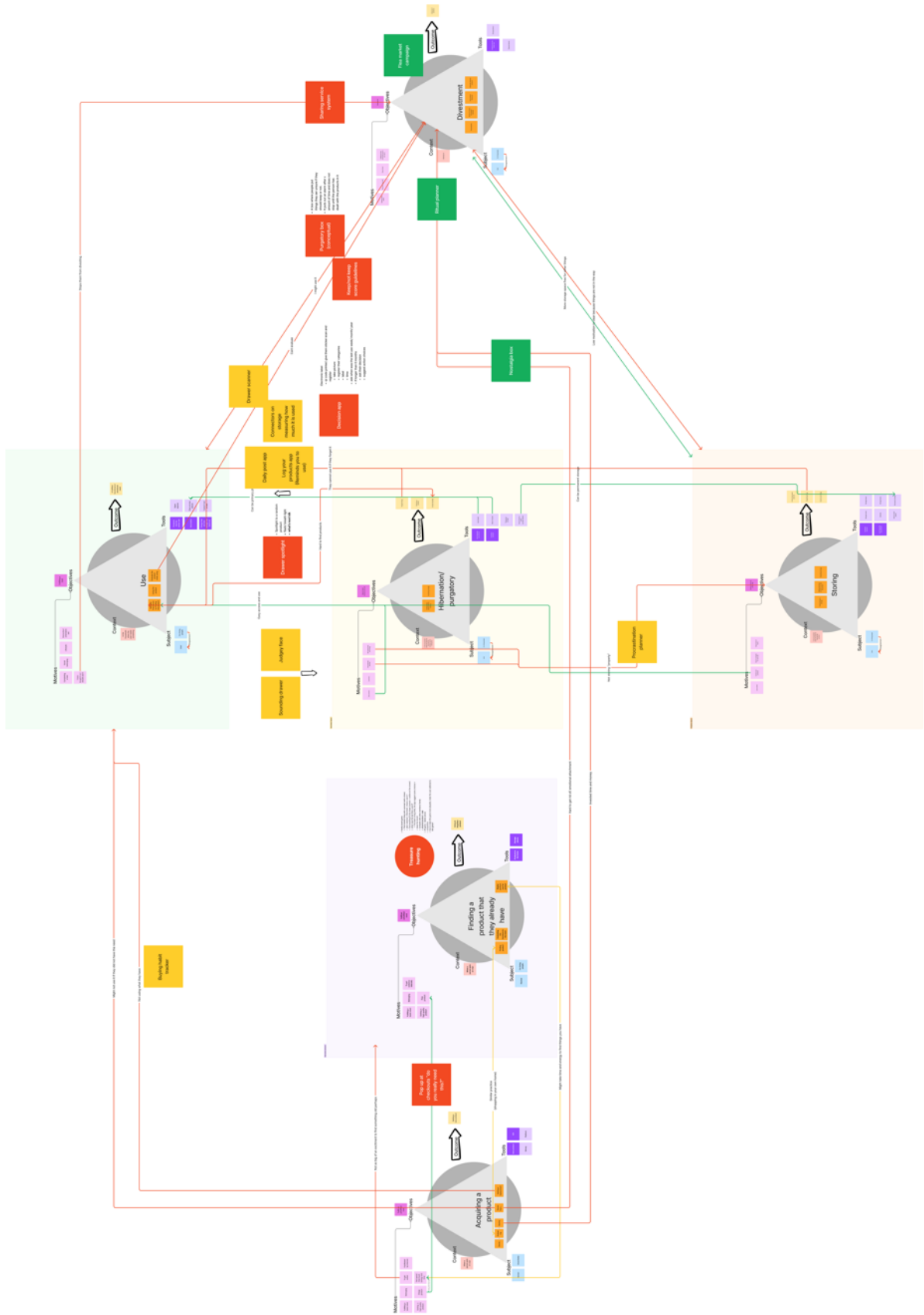
3.



4.



F. Activity system





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