

Introduction

This project used design as a medium to explore the significance of ordinary furniture to residents' daily life and the feasibility of sustainable development of furniture.

As a necessity of residents' daily life, furniture hides many unknown stories and secrets and also carries emotions of different users. Every piece of furniture has a special meaning for everyone. However, the fast-paced life of modern society makes the circulation of products faster, and the replacement rate of furniture is increased so waste is inevitable. It is regretted that many furniture worthies of being preserved are therefore neglected and then abandoned. The reason for its waste is not only because of damaged furniture, style changes, and residents' relocation but also ignore daily furniture and the lack of environmental awareness. Although there are endless related education projects, how to implement residents' behaviours into daily life is the pinpoint of this project.

This project traced the circulation process of furniture, explored and redefined the meaning of furniture to residents, and finally designed a solution to extend the service life of furniture accordingly.



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Research Subject

Communi- -cation

Online communication (Zoom/skype)

Future work/study

Stick notes on the windows

Social Application (Instagram/Wechat/Tiktok)

Social activities

Circular Economy

Degradable materials

Sustainable development goals

Over Packaging

Eco-design (manufacturing process/secondary raw materials)

Fashion design/waste

Environmental damage

Health

Mental health (loneliness/Social distancing)

Coronavirus

Doctors and patients' relationship

Healthy diet

Physical health (Exercise)

Nature

The relationship between human and nature

Glacial melting

Seabirds and residents

During quarantine, many wild animals go out of the street

Zoo animals' situation



About Research Subject

In the initial stage of selecting the subject, I mainly interested in four parts. They are communication, circular economy, health, and nature.

Communication

Due to the impact of COVID-19, it is necessary to maintain social distance, and communication is especially important. Moreover, the government's isolation measures make company employees and school students have to use remote communication, which must have some aspects that need to be studied.

Circular economy

It is a topic that all countries are concerned about, and sustainable development goals are also related to people's livelihoods. This is about human survival, and various news remind people to pay attention to it. How to make residents turn the circular economy into daily life is a question worth pondering.

Health

People want to have health, both physically and mentally. Many factors affect people's health, and this is an eternal topic that people pursue.

Nature

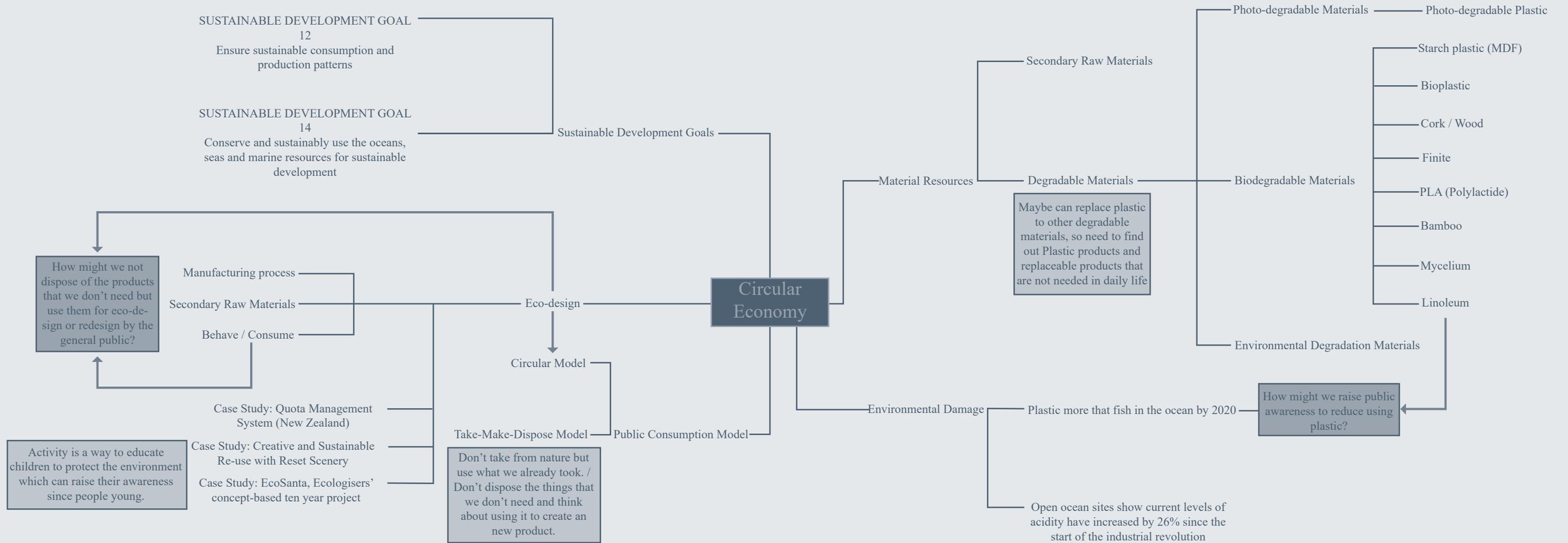
The creatures living on the earth are not only humans but also various animals and plants. Under the influence of human activities, the living environment of animals and plants is facing unprecedented challenges, so is there a new way to lead them out of the predicament?



Mindmap

After comparing the four topics, I chose Circular economy as the research subject and made a mind-map based on my understanding of this topic. The mindmap could help me get clear about the information that I had.

Figure 1.1 Mindmap



Narrow down

Since Circular economy is a big topic, and I was mainly interested in Eco-design, after discussed with my elective mentor Paul Smith, he suggested that narrow down the topic and choose a specific direction and then proceed to the next step.

Eco-design

“Ecodesigning a product or service means making it desirable for people, minimize its environmental impact, and maximize its business impact along its life-cycle by designing a circular system around it.”

<https://sustainabilityguide.eu/ecodesign/>

Furniture

Furniture was the first product I thought of, not only because my background is industrial design, but also because my grandfather liked to repair and redesign furniture in front of me when I was young. So I am fascinated by furniture design and would like to research more about it.



Desk Research

In the desk research, I mainly go through three parts, people, documents and organizations.

People: Understand the different types of furniture used by each age group of people, and due to different places (E.g. restaurants, hospitals, offices). And thus determine the main application scope of the topic of furniture.

Documents: Understand current facts about furniture waste and related design concepts and strategies for sustainable development.

Organizations: Look for relevant organizations, including charities, furniture companies, etc., and select stakeholders.

Figure 2.1 Desk Research

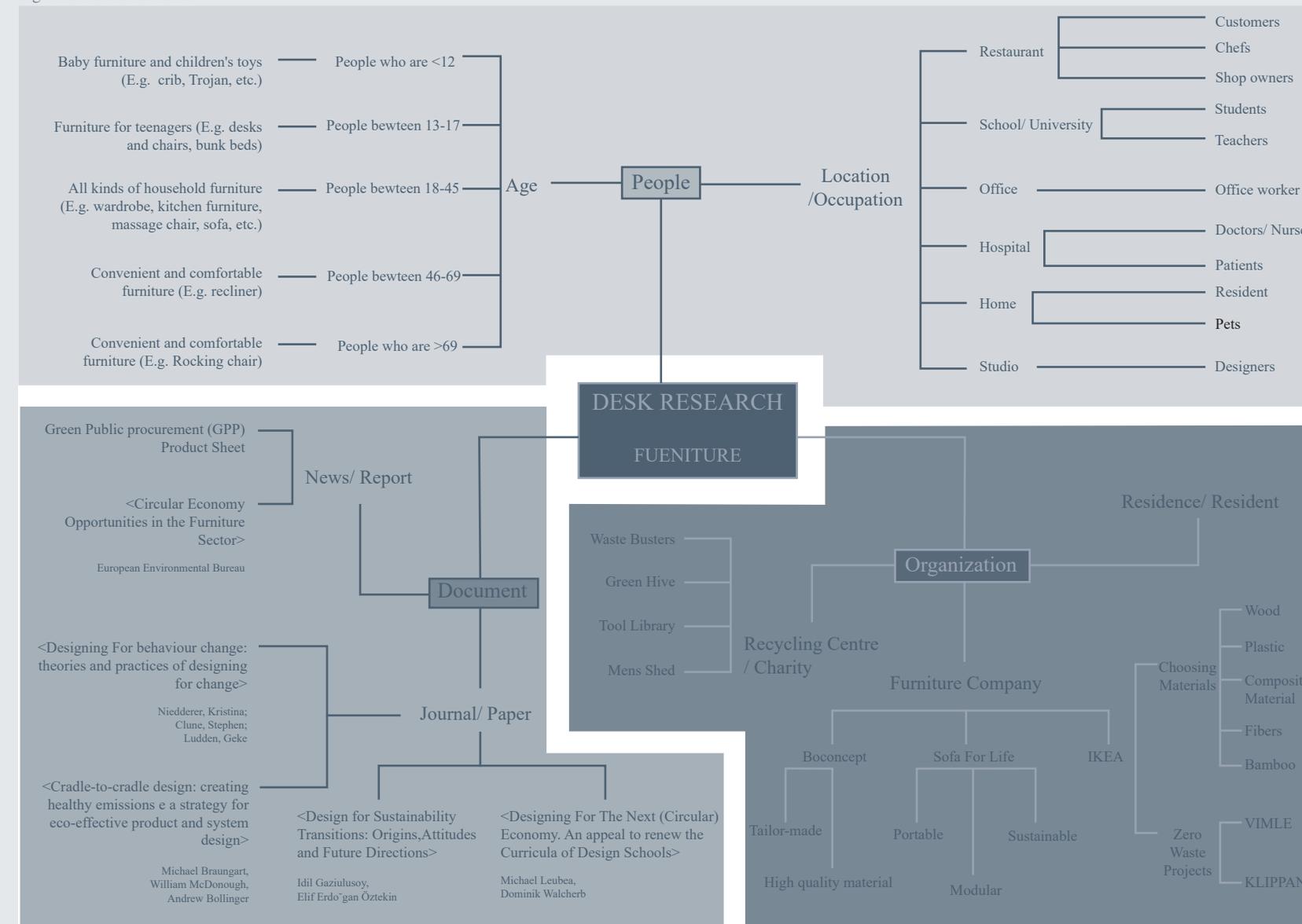




Figure 3.1 Circular Economy Opportunities in the Furniture Sector, produced for the European Environment Bureau (EEB) by Eunomia Research & Consulting Ltd. Authored by: Alex Forrest, Mark Hilton, Ann Ballinger and Daniel Whittaker.

Design Proposal

According to desk research, I confirmed that Furniture is a necessity for people's daily lives, and people need to use them more or less. Therefore, the waste of furniture also exists objectively. Not because of excessive waste by each family, but even if the time and use are not so obvious, furniture is also consumable stuff, and the fact is that this waste is beyond imagination. People replace new furniture not only because of normal wear and tear, but also because of move house, renovate the house, and change the style to eliminate a lot of furniture. According to the European Environmental Bureau's report named *Circular Economy Opportunities in the Furniture Sector*, 10.5 million tons of furniture are consumed every year and in the same period, 10 million tons of furniture are thrown away. It seems like if the enterprises can increase refurbishment and remanufacture of furniture it can do a great help for sustainability. However, there are some issues to stop this resource loop, for example, the low quality of materials, the high cost for repair and refurbishment of furniture, the limited collection, and take-back infrastructure, and poor demand for second-hand furniture and used recycled materials. So maybe some potential ways can inspire people's creativity and recreate the furniture by the old one.



Cradle-to-cradle design: creating healthy emissions — a strategy for eco-effective product and system design

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Abstract

Eco-effectiveness and cradle-to-cradle design present an alternative design and production concept to the strategies of zero emission and eco-efficiency. While eco-efficiency and zero emission seek to reduce the unintended negative consequences of processes of production and consumption, eco-effectiveness is a positive agenda for the conception and production of goods and services that incorporate social, economic, and environmental benefit, enabling triple top line growth.

Eco-effectiveness moves beyond zero emission approaches by focusing on the development of products and industrial systems that maintain or enhance the quality and productivity of materials through subsequent life cycles. The concept of eco-effectiveness also addresses the major shortcomings of eco-efficiency approaches: their inability to address the necessity for fundamental redesign of material flows, their inherent antagonism towards long-term economic growth and innovation, and their insufficiency in addressing toxicity issues.

A central component of the eco-effectiveness concept, cradle-to-cradle design provides a practical design framework for creating products and industrial systems in a positive relationship with ecological health and abundance, and long-term economic growth. Against this background, the transition to eco-effective industrial systems is a five-step process beginning with an elimination of undesirable substances and ultimately calling for a re-invention of products by re-considering how they may optimally fulfill the need or needs for which they are actually intended while simultaneously being supportive of ecological and social systems.

This process necessitates the creation of an eco-effective system of “intentional” management to coordinate the material flows amongst actors in the product system. The concept of intelligent materials pooling illustrates how such a system might take shape, in reality.
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Keywords: Eco-effectiveness; Cradle-to-cradle design; Intelligent materials pooling; Triple top line

The concept of *eco-effectiveness* offers a positive alternative to traditional *eco-efficiency* approaches for the development of healthy and environmentally benign products and product systems. *Eco-efficiency* strategies focus on maintaining or increasing the value of economic output while simultaneously decreasing the impact of economic activity upon ecological systems [1]. **Zero emission, as the ultimate extension of**

eco-efficiency, aims to provide maximal economic value with zero adverse ecological impact—a true decoupling of the relationship between economy and ecology.

Eco-efficiency begins with the assumption of a one-way, linear flow of materials through industrial systems: raw materials are extracted from the environment, transformed into products and eventually disposed of. In this system, *eco-efficient* techniques seek only to minimize the volume, velocity and toxicity of the material flow system, but are incapable of altering its linear progression. Some materials are recycled, but often as an end-of-pipe solution since these materials are not designed to be recycled. Instead of true recycling, this process is actually

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Design Proposal

At the same time, we could see that many companies already have some special business model which can encourage people to promote sustainable development. The company named Sofa for life have their sustainable sofa which is not only made by sustainable materials but also separate the sofa in different modular to let people change the part and style more easily. And also the brand named BoConcept from Denmark used high-quality materials and tailor-made which can get the suggestion from the professional interior designers and reduce the furniture waste because of the unsuitable style. However, this kind of business model and brand are more suitable for people who just move to a new house, not for those who already have furniture but old or damaged. In the journal, Cradle-to-cradle design says ‘the concept of eco-efficiency provides a positive alternative to traditional eco-efficiency methods for developing healthy and environmentally friendly products and product systems.’ How to stop taking raw materials from nature but only use secondary raw materials to continue the economy is the way that we need to find out. Most of the furniture made of wood and metal, some of them also used fabric as coating or glass as decoration. Different brands use different materials and assembly methods, which makes take-back infrastructure more difficult. If people have the appropriate hands-on capabilities and places to implement and the process of re-creation has some fun, will this make it easier to recycle and reuse old furniture? How might we stimulate people's nostalgic emotions and reduce the speed with which people change furniture? How can related companies and merchants profit from it?

Figure 3.2 Cradle-to-cradle design: creating healthy emissions e a strategy for eco-effective product and system design
Michael Braungart, William McDonough, Andrew Bollinger
Journal of Cleaner Production 15 (2007) 1337e1348



In this study, I would like to understand the relationship between people and furniture. Not only for sustainability but also about people's emotions with old furniture and try to find out a creative way to reduce furniture waste based on the regular business model.

Therefore, I defined my study title as

"To extend the service life of furniture:
understand the relationship between people and furniture and reduce its waste."



Ethics

My own connection with furniture is related to my family members. Although it is not a sensitive topic, there are many secrets that we did not tell others while furniture witnesses all of these which including happiness and sadness. To understand the relationship between people and furniture need participants to recall the past. I would interview people with a flexible way and let them feel comfortable.

Considering ethical issues can help me complete my process and deliver it into the result. At the same time protect participants.

To extend the service life of furniture need to research not only residence participants but also related organizations and furniture company. Understand their business model also necessary and this sort of participants could bring me insight into the real behaviour of the public and their mindset.

In this study, I told participants what they are concerned regarding ethics and privacy and asked permission for record or the use of conversation. This could help participants feel protected and respected.



Expert Interview

Experts interview could get me up to speed quickly on the topic, and giving me key insights into relevant context and innovations. So I contacted three organizations' person in charge to do the deeper research.

Waste Busters

It is a social enterprise and charity whose main aim is to reduce waste going to landfill by diverting it and selling it on at a fair price.

It located in Forres, I have been there before. In Waste Busters, they sell not only household appliances but also including furniture, bicycle and tools. They have a specific business model that I have never seen before so I decided to interview them.

<https://moraywastebusters.org/>

Green Hive

The legal name is Nairn River Enterprise. It operates as “Green Hive”. They say this summarises their aims – to do all we can to promote our environment, protect and improve our green spaces, focusing on action, learning and community connections.

I did not know much about this organization, but they have many activities related to sustainability. The interview might help me get more useful information about their operating model and their members' behaviours.

<https://greenhive.co.uk/about/>

Men's Shed

The purpose of the Forres Men's Shed is to provide facilities and advance the social needs, health and well being of men.

On the website, the photos are showing that they usually use hands-on ability to build some products which including furniture.

<https://www.facebook.com/Forres-Mens-Shed-376675806179868>



Waste Busters

Collaborated with my colleague Cherry
Interviewee: Phil Mills (Manager)

1

Video

Using video as an engagement tool, to explain the design strategies that reduce the intensity of consumption. Then lead into the main questions.

2

3 Main questions

What initiatives does Waste Busters have?
What are the participants' motivations?
How to reach a group of people without a green mindset?

3

About Furniture

Receive
Repair
Resell



1

Base on the book named Design for behaviour change, we found that there are several design strategies to reduce the intensity of consumption which might help our participant open up his mind and make a connection between the strategies and their project.

Therefore, we created a video as our engagement tools which explain these strategies by using simple sketches and let participant easy to understand them.

Design for Behaviour Change: Theories and Practices of Designing for Change, Niedderer, Kristina, Clune, Stephen, Ludden, Geke.
Account: ns125382.main.eds

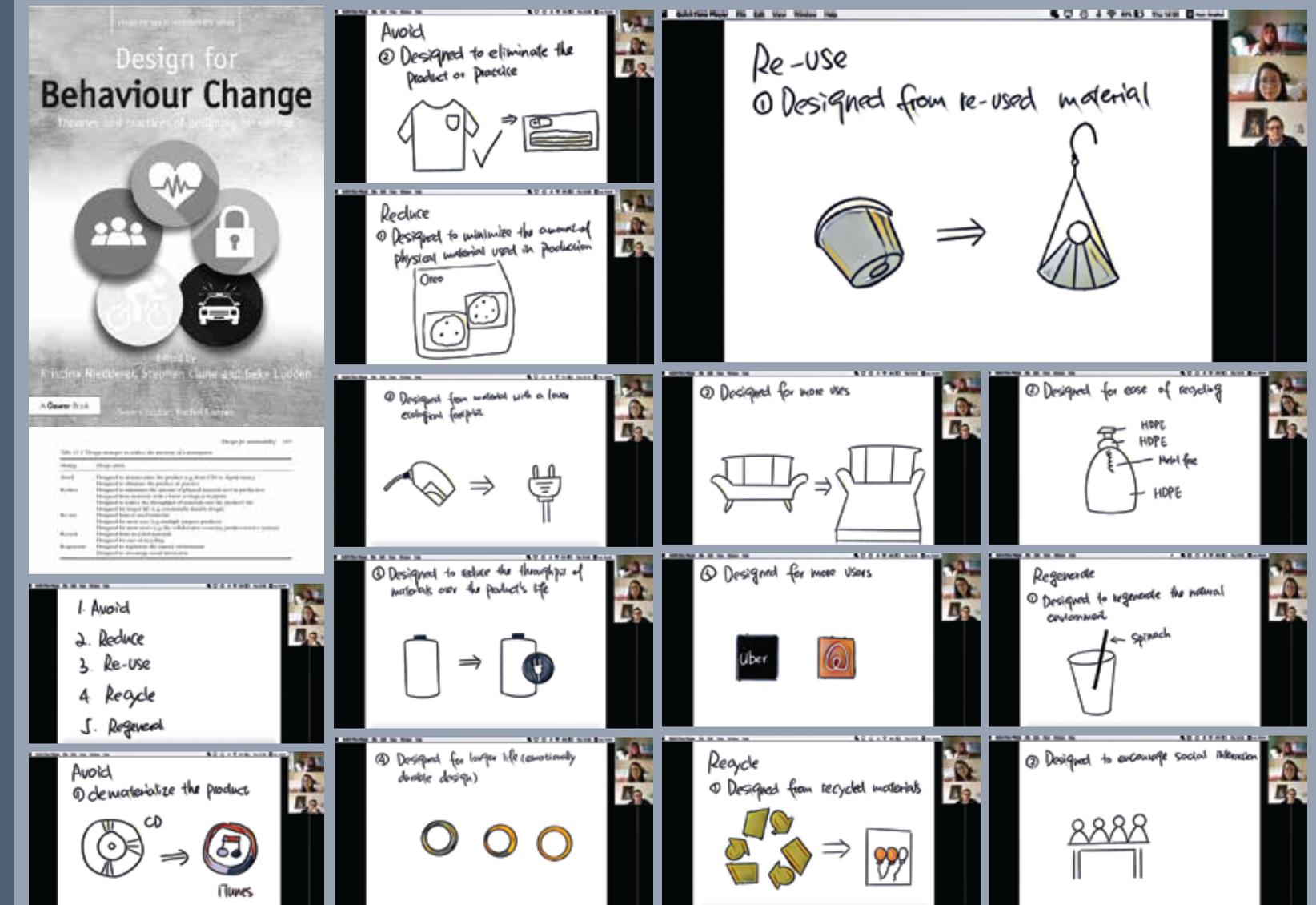


Figure 4.1 Waste Busters Interview Screenshots

3

Due to Waste Busters' main activity is divorcing reusable items from the recycling centre or the landfill which including furniture to re-sell residents. So I designed an interactive board to collect this furniture information about three parts: receive, repair, and resell.

Most of the furniture they receive comes from donations from residents, and basically, all the furniture can be reused. Due to limited manpower and material resources, Waste Busters will not repair the furniture, but directly hand the damaged furniture to the recycling centre. Unexpectedly business of selling second-hand furniture is popular with customers.

More details and data analysis are on page 25

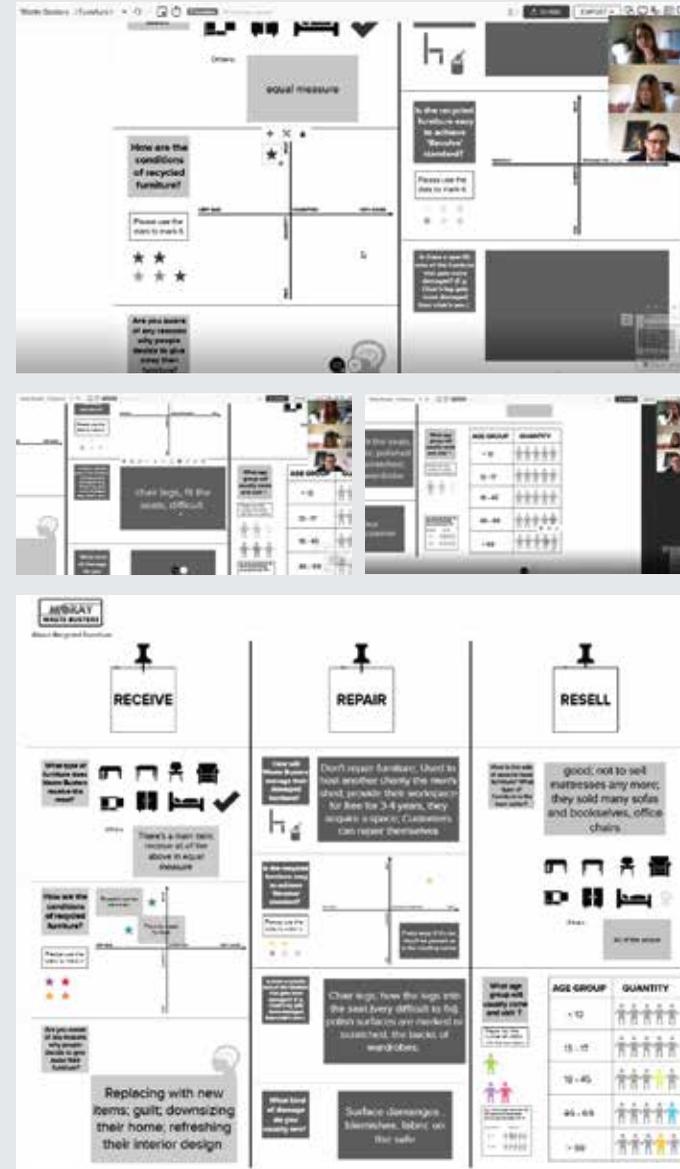


Figure 4.3 Waste Busters Interview Screenshots

Figure 4.4 Waste Busters Interview Data

RECEIVE	REPAIR	RESELL												
<p>What type of furniture does Waste Busters receive the most?</p> <p>All of the above in equal measure.</p>	<p>How will Waste Busters manage their damaged furniture?</p> <p>Don't repair furniture; Used to host another charity the Men's shed (Provide their workspace for free for 3-4 years, they acquire a space); Customers can repair themselves</p>	<p>How is the sale of second-hand furniture? What type of furniture is the best seller?</p> <p>All of the above sell Good; not to sell mattresses any more; they sold many sofas and bookshelves, office chairs</p>												
<p>Are you aware of any reasons why people decide to give away their furniture?</p> <p>Replacing with new items; guilt; downsizing their home; refreshing their interior design.</p>	<p>Is the recycled furniture easy to achieve 'Revolve' standard?</p> <p>Pretty easy; If it's not, they'll be passed on to the recycling center</p>	<p>What age group will usually come and visit?</p> <table border="1"> <thead> <tr> <th>AGE GROUP</th> <th>QUANTITY</th> </tr> </thead> <tbody> <tr> <td>< 12</td> <td></td> </tr> <tr> <td>13 - 17</td> <td></td> </tr> <tr> <td>18 - 45</td> <td></td> </tr> <tr> <td>46 - 69</td> <td></td> </tr> <tr> <td>> 69</td> <td></td> </tr> </tbody> </table>	AGE GROUP	QUANTITY	< 12		13 - 17		18 - 45		46 - 69		> 69	
AGE GROUP	QUANTITY													
< 12														
13 - 17														
18 - 45														
46 - 69														
> 69														
<p>How are the conditions of recycled furniture?</p>	<p>Is there a specific area of the furniture that gets more damaged? (E.g. Chair's leg gets more damaged than chair's arm)</p> <p>Chair legs; how the legs into the seat (very difficult to fix); polish surfaces are marked or scratch, the backs of wardrobes</p>	<p>What kind of damage do you usually see?</p> <p>Surface damages, blemishes; fabric on the surface</p>												

Green Hive

Collaborated with my colleague Cherry
Interviewee: Neil Mapes (Manager)

1

Video

Because of the design strategies are in five parts: Avoid, Reduce, Reuse, Recycle, and Regenerate. If these strategies are in one video, it might confuse participants. So we improved our engagement tools and created version two.

2

3 Main questions

What initiatives does Green Hive have?
What are the participants' motivations?
How to reach a group of people without a green mindset?



1 2

During the interview, we separated the video in five parts and asked each design strategies related projects in Green Hive and participants' motivations. The engagement tool is more manageable than the previous version and can get clear information.

More details and data analysis are on page 23

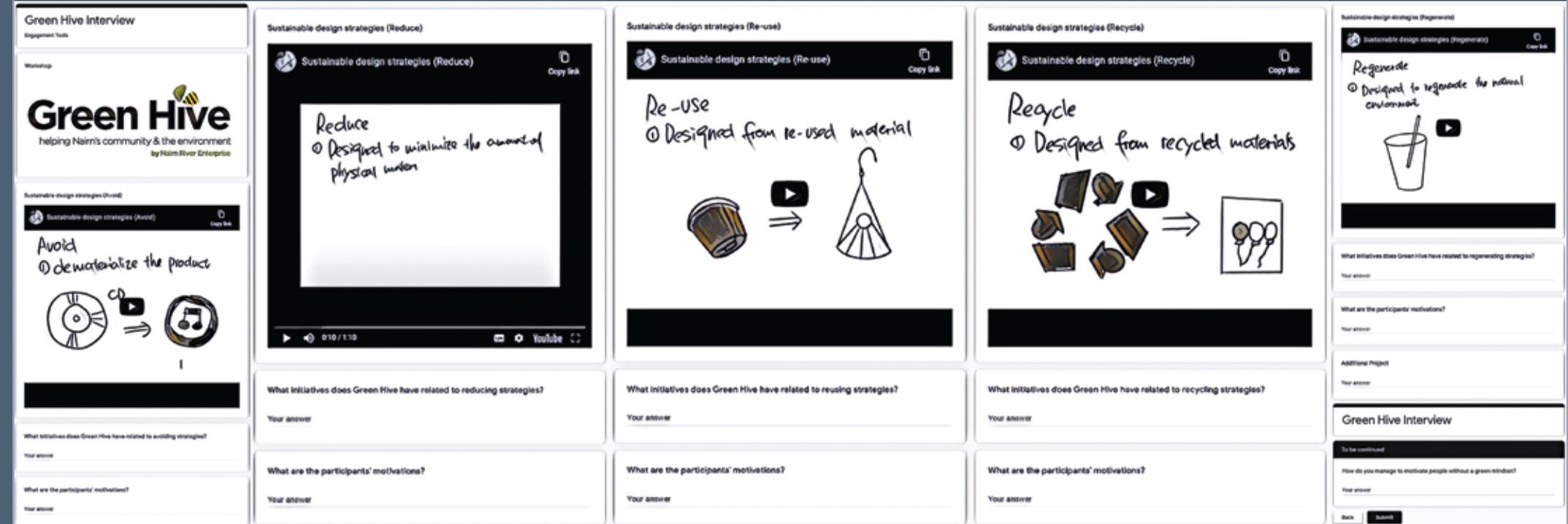


Figure 5.1 Green Hive Engagement tool Screenshots

Mens Shed

Interviewee: David Parker (Secretary)

Men's Shed is a charity for a group of retired gentlemen who are passionate about furniture and have time at hand. People can build gardening furniture here and eliminate loneliness with socialization. They also teach each other wood-made skills. I interviewed David to understand how this charity operates and the reason people join the group. It does not similar to Waste Busters and Green Hive which have their own business model. Men's Shed gathers local residents and builds up members friendship by work together.

The insights that I got from Men's Shed is people are willing to do some carpentry work by themselves as part of their social life. These activities can allow people to promote communication among local residents while reducing their loneliness. If their skills can be applied to eco-design, it will promote the local residents to realize the idea of extending the service life of the furniture.

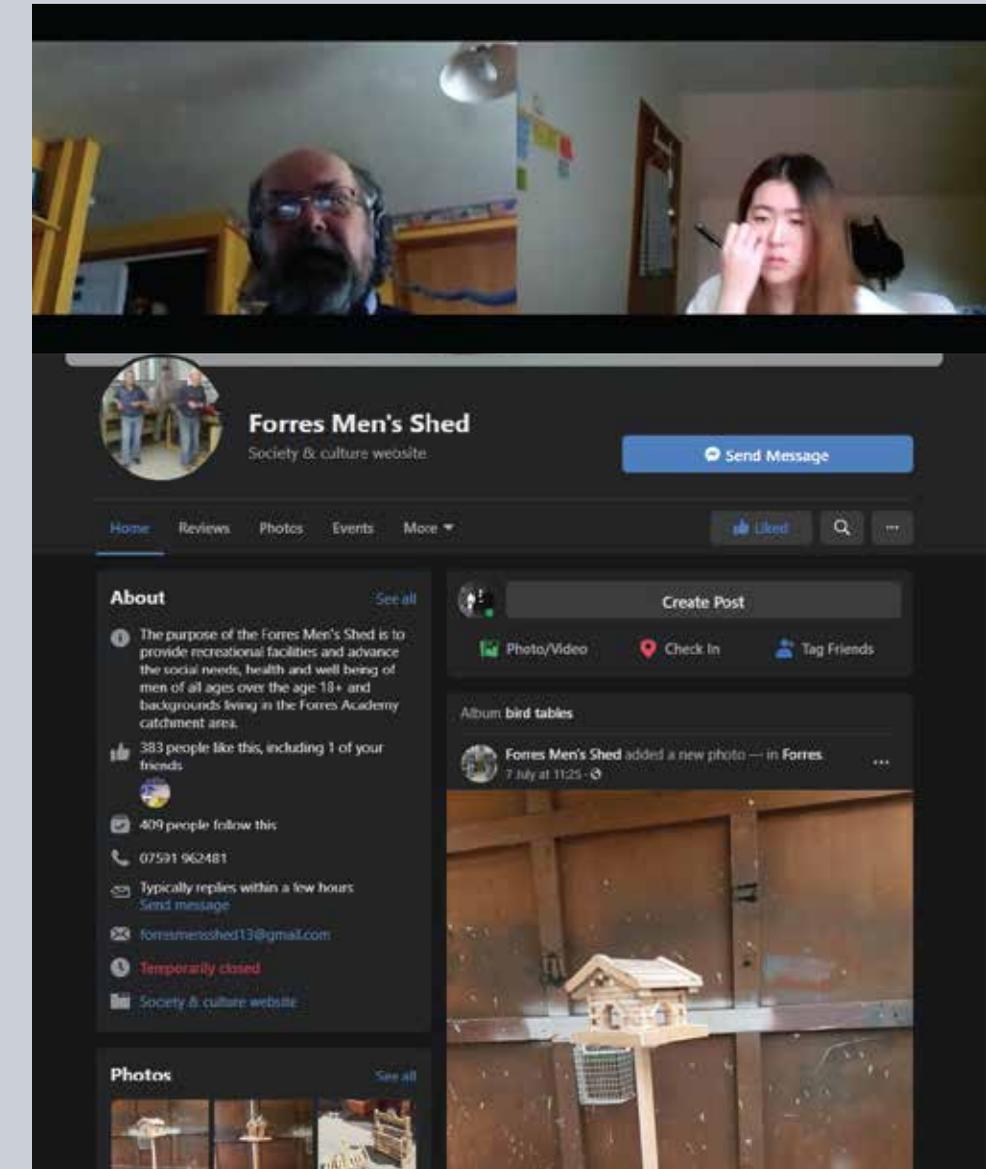


Figure 6.1 Men's Shed Interview Screenshots

Research Visualisation and Data Analyze

Waste Busters and Green Hive data visualization

Furniture service flow chart in Waste Busters



Figure 7.1 Waste Busters Data Visualization

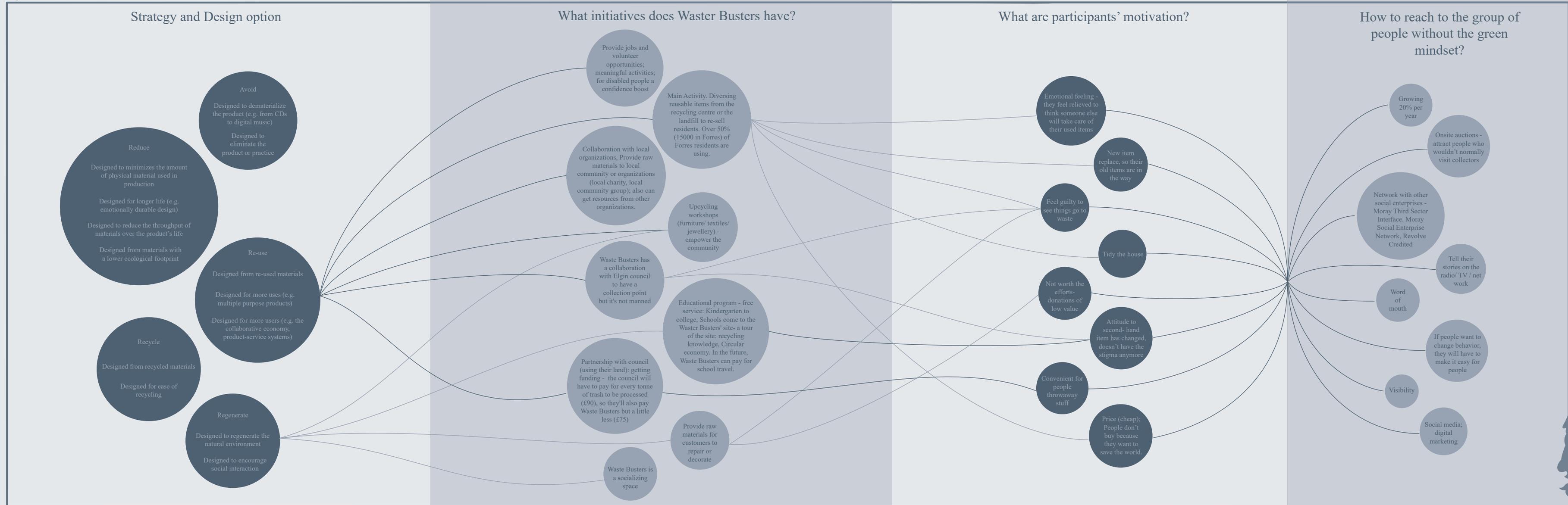


Figure 7.2 Green Hive Data Visualization



Insights

When I compared two organizations, it was easy to find that they have different business mode but all their projects are related to five design strategies. For example, the main activity in Waste Busters is to resell the donation items and the plastic workshop in Green Hive can learn different ways to reuse plastic. These two projects are using 'reuse' sustainable design strategies. This means that when I consider the solutions, I must attach the importance of those strategies and projects and as an example.

About the participants' motivations, I knew that people always take their benefits as their primary goal. When the organizations creating a new project, they need to consider participants' behaviour and thoughts. Only in this way, the solution could be successfully applied instead of on paper.

In the last part, Phil gave ideas about advertising the green mindset and Neil provided with some ways to change people's minds. So how to let people change their behaviours basically is changing their mind. It helped me target my next step: interview residents.



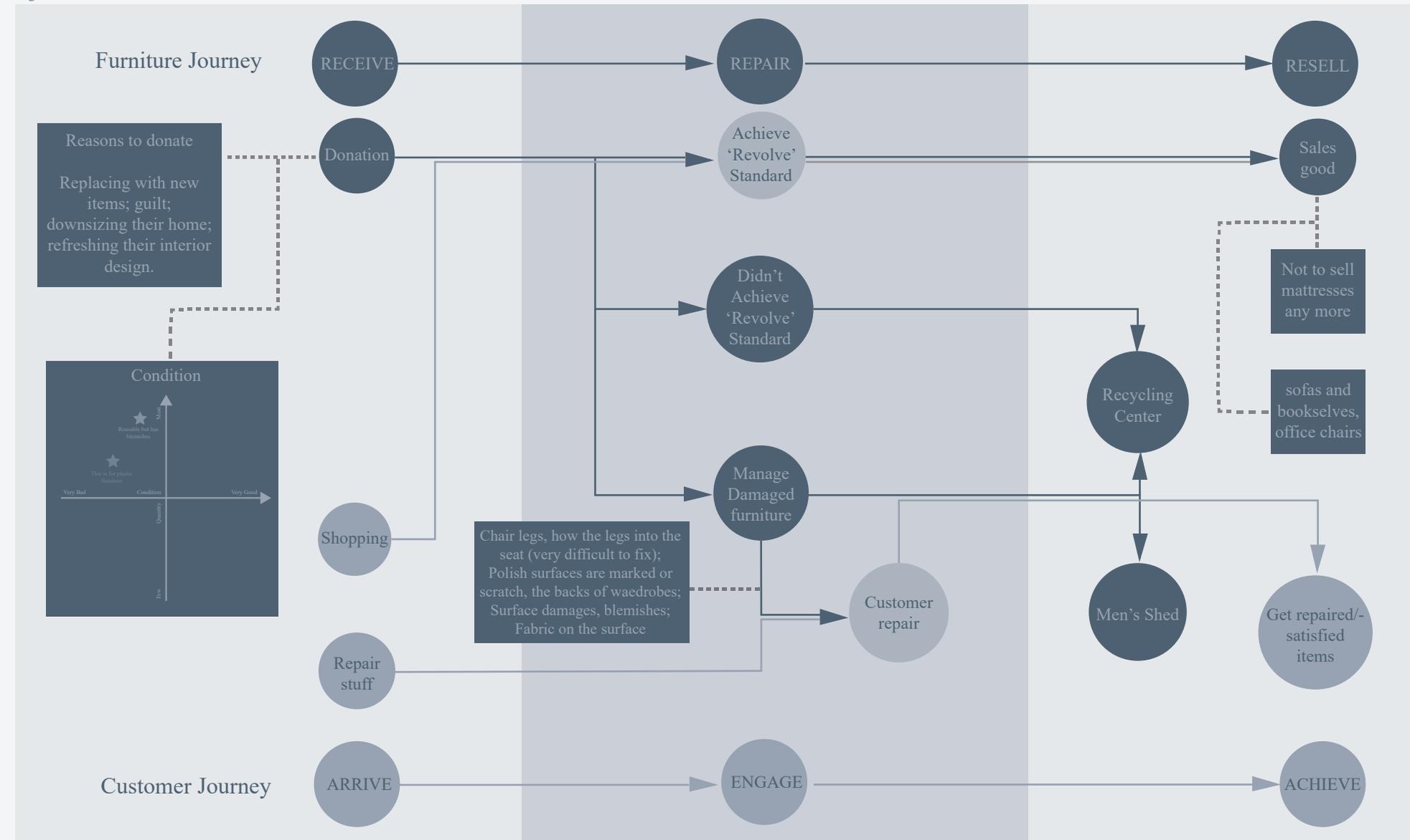
Service Flow Chart

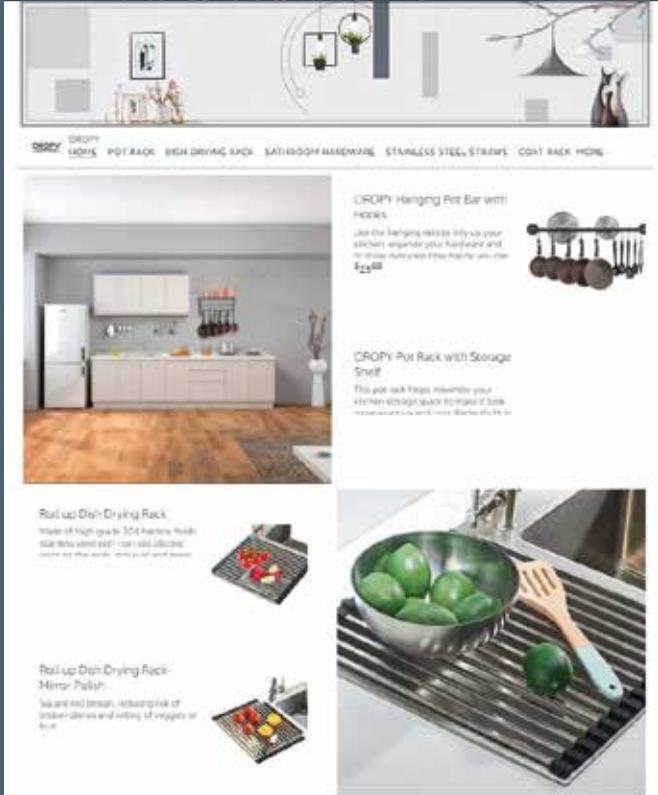
According to the data, I made the Waste Busters service flow chart which has furniture journey and customer journey. These flow chart can let me clear how furniture circulation in Waste Busters.

The left part shows the first step when furniture and customers enter the Waster Busters. The middle part shows the actions that furniture and customers might take. And the right part shows the final result in the journey.

Later when I built my result, this information could help me clarify my thinking and consider the possibility of new projects at each step.

Figure 7.3 Waste Busters Service Flow Chart





Oropy

Interviewee: Will New (Manager)

After interviewed the above three organizations, I realized that I need to research more about the beginning of the furniture business. So I contact the furniture enterprise named Oropy.

This company's main market is distributed in Europe and North America, and it is mainly sold on Amazon. Currently, the company's related website is being produced.

It sells products in five scenarios, including the living room, bedroom, bathroom, kitchen, and dining room. The main materials used include metal, solid wood, a combination of metal and solid wood, and synthetic density board.

Oropy's main business model is sales and after-sales, and it does not include the purchase of raw materials and product processing, so the company's principal business direction is marketing and customer needs.

Regarding the sustainable development of furniture, the person in charge of the company expressed that he concern about related topics, but at present, the company has no projects based on sustainability. As for the end life of the product, he said that they strive to use high-quality materials to ensure the longest service life of the product and provide the best after-sales service guarantee. However, the company currently has no plans to implement a project to recycle products. The reason is that because the unit price of a single item is low and the recycling cost is high, especially the high labour and transportation costs in Europe and the United States. If the product is recycled, the company will not make ends meet.

Figure 8.1 Oropy Interview Screenshots



Residents Interview

To understand the relationship between people and furniture, I contact some residents who willing to share their ideas with me. My main expectation in the interview is to know what are people's views on second-hand furniture, the stories between themselves and furniture, and their hands-on ability.

In this section, I used directed storytelling as the research methods to easily gather rich stories of lived experiences from participants by using empathy prompts and guiding questions.





Storytelling

To make participants easily understand my topic, I shared my research purpose and my grandpa's story with them.

"I think Furniture has been with us for a long time, and some stories or emotions have been forgotten over time, but furniture has always witnessed all of this. I hope these stories and emotions can be continued, and at the same time reduce furniture waste caused by consumption in the fast era."

"The main reason that I choose this topic is because of my grandfather. He likes to redesign and repair furniture, and that is the reason I am interested in furniture. He used to sit on this sofa and watched me played with toys, but my grandfather had left me for five years. Whenever I see this sofa, I feel that my grandfather has always been with me, so this furniture was the bridge for me to contact my grandfather which makes me feel precious."

The storytelling was based on a piece of drawing and the old photo. After the interview, I used drawing to catch their stories.



Figure 9.2 My grandfather and I



Figure 9.3 Drawing



Figure 9.4 Interviewee provide pictures
 Interviewee's Name: Angus Williams (fake name)
 Participant request anonymity
 Living Environment: Renting an apartment

Views on furniture (second-hand furniture): He said that he did not think about furniture issues before. He usually buys it when necessary. Whether it is second-hand or brand-new, if the price and style are acceptable he will buy it. He has never encountered the issue to discard furniture, but it is usually sold to others or given to people in need. *"It is a shame to throw away the furniture that can be used, so I will never do it,"* he said and hopes that everyone will not do it, especially wood furniture.

Story: Angus shared with me the story of the sofa at home when he was a kid.

At that time, the sofa at home was very classical and beautiful. It was especially fun for him. As a kid, he was also particularly lively and active, so he was quite happy to jump up and down on the sofa. Now, he has grown up, there is no way to be the same as before. And because he often works in other places, there is no chance to back home. The sofa at home has made him back to childhood, like a familiar family member.



Figure 9.5 Drawing



View on furniture (second-hand furniture): In fact, she doesn't care much about the commonly used furniture, because it is used every day, so it is easy to ignore. When she buying furniture, it might because of good-looking. However, if the furniture is made by herself, it will be different. Because she has spent her time, so she will more concerned about it. She will not buy second-hand furniture because she thinks that is full of bacterial and makes her feel bad.

Stroy: Diana shared her works as stools made of wood stumps.

She cherishes these stools because she has been doing it for a long time and the natural wood texture makes her put it down. *"It was a pity to see these trees falling at that time, so I tried to collect them and made them into stools,"* she said. However, she was not a craftsman but with full interest in it, so she did it for a long time. She was very excited that she finally succeeded. Because they are hand-made stools, the interviewee loves them very much, just like her own children, and be very careful when using it.



Figure 9.6 Interviewee provide pictures
 Interviewee's Name: Diana Jumpol
 Living Environment: Own apartment

Figure 9.7 Drawing



Views on furniture (second-hand furniture): She feels guilty when facing furniture that needs to be discarded, so she usually sells it to others. When the furniture is broken, she will ask her father to repair it. She has also made bookshelves and small tables herself and still keep it. Regarding second-hand furniture, she felt that she could accept a table or chair, but she could not accept it if it with cloth or cushions.

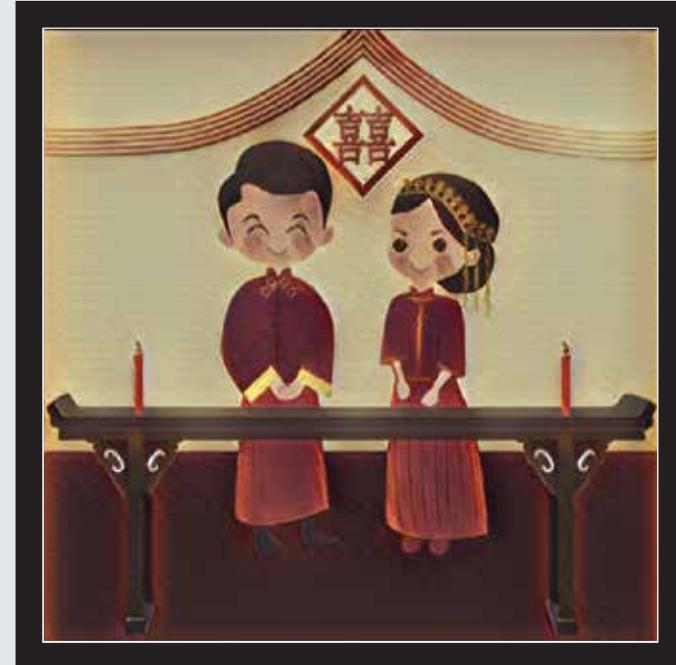
Story: Nicole told me that when she was young, she and her sister often played happily on the sofa at home. Sometimes lying down to watch TV together, sometimes chatting together, it is also a memorable time in retrospect.

However, She said furniture may not give a particularly memorable thing for her unless she is using them with some particular person. She thinks furniture are tools, that will make people's lives more convenient, and she believes that the tool can only be reflected in its value when it gives a sense of comfort or convenience.



Figure 9.8 Resident Interview Screenshot
Interviewee's Name: Nicole McLaughlin
Living Environment: Renting an apartment

Figure 9.9 Drawing



Views on furniture (second-hand furniture): He believes that furniture is not only what we use every day, it is also a partner that accompanies us for a long time. A person will naturally have feelings for a product after using it for a long time, and then he will want to use it as long as he can. He thinks second-hand furniture actually has its own stories. If there is a way to show the history or stories of this furniture, it might be more popular with customers.

Story: Will told a long time ago story about his grandparents. At that time, his family was poor. His grandparents borrowed the table when they got married. After a long time, his grandfather saved enough money to buy the table. So this table witnessed the wedding of his grandparents, and it has remained until now. This table is like a witness to time, accompany them all the time from poverty to wealth. So he also cherishes this table.



Figure 9.10 Resident Interview Screenshot
Interviewee's Name: Will New
Living Environment: Own house

Figure 9.11 Drawing

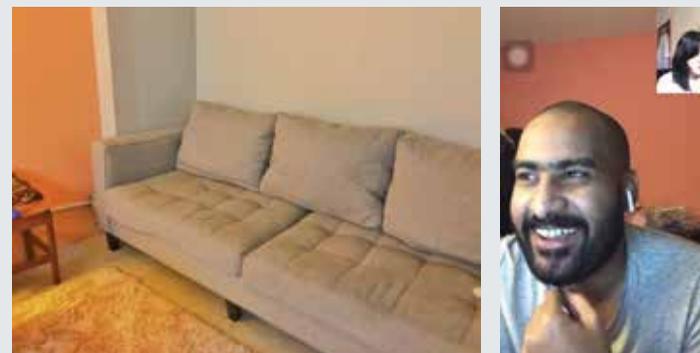


Figure 9.12 Interviewee provide picture & Interview Screenshot
Interviewee's Name: Ahmed Mahmoud Saad Elkafrawi.
Living Environment: Own house

Views on furniture (second-hand furniture): He thinks that furniture exists to take care of people's lives. Comfortable and convenient furniture makes people feel happy. When the furniture is damaged, people will feel tired, so he generally chooses high-quality furniture. He bought second-hand furniture when he was a student. During that time because of finance and location issues, furniture is not that important for him.

Story: Ahmed shared his sofa with me. He likes the texture of this sofa very softly, although there are some shortcomings, such as being too short, so he likes to lie on the sofa. When he was alone at night, he often turned on the stereo and lay on the sofa to feel the vibration of music. *"It was my own space and I could enjoy my own time,"* he said. This sofa is his friend to him and he really likes it.



Figure 9.13 Drawing



Views on furniture (second-hand furniture): He is good at making garden furniture and always uses pine wood as materials. He thinks it's difficult to repair indoor furniture because they have different structures and materials.

Story: David always made garden furniture by himself and he is the secretary in Forres Men's Shed. He likes to do this kind of work but during the quarantine time, he can only do this in his own shed. He wants to reopen Forres Men's Shed to release the isolated feeling and chat with people. For him, making furniture is the way to communicate with people.



Figure 9.14 Resident Interview Screenshot
Interviewee's Name: David Parker
Living Environment: Own house



Interviewee 's Name: George Wales (fake name)
Participant request anonymity
Living Environment: Renting an apartment

Views on furniture (second-hand furniture): Since the furniture is a large item, He usually repaired them when it is broken. When there is no way to repair, he will replace it with a new one. He felt guilty when he needs to throw the furniture, so he always reuses them as much as possible. He never buys furniture in the second-hand shop yet but he does not care about the product come from the second-hand shop.

Story: George shared his most commonly used furniture, the office chair. Because of work, he uses this office chair almost every day. However, the design of this chair does not meet his requirements very well. Sometimes, sitting for a long time even makes him feel back pain. He hopes that he could change a more comfortable chair or redesign it. Now, he can only use the pillow to relieve discomfort.

Insights

During the interview, most of the participants share positive stories with me. They unconsciously define the relationship between furniture and themselves when they immersed in memories. I draw a picture for each story from participants and these stories can show that each piece of furniture has meaning for different people.

Most of the participants never share their furniture stories like this, but after the conversation, they felt there are some memories that can be recalled through the furniture.

I think these stories are furniture's history, similar as we saw in the museum. When people see antiques, the historical record can show us the past. The furniture story could keep and present the time trace. People might be interested in these stories and treat them more carefully.

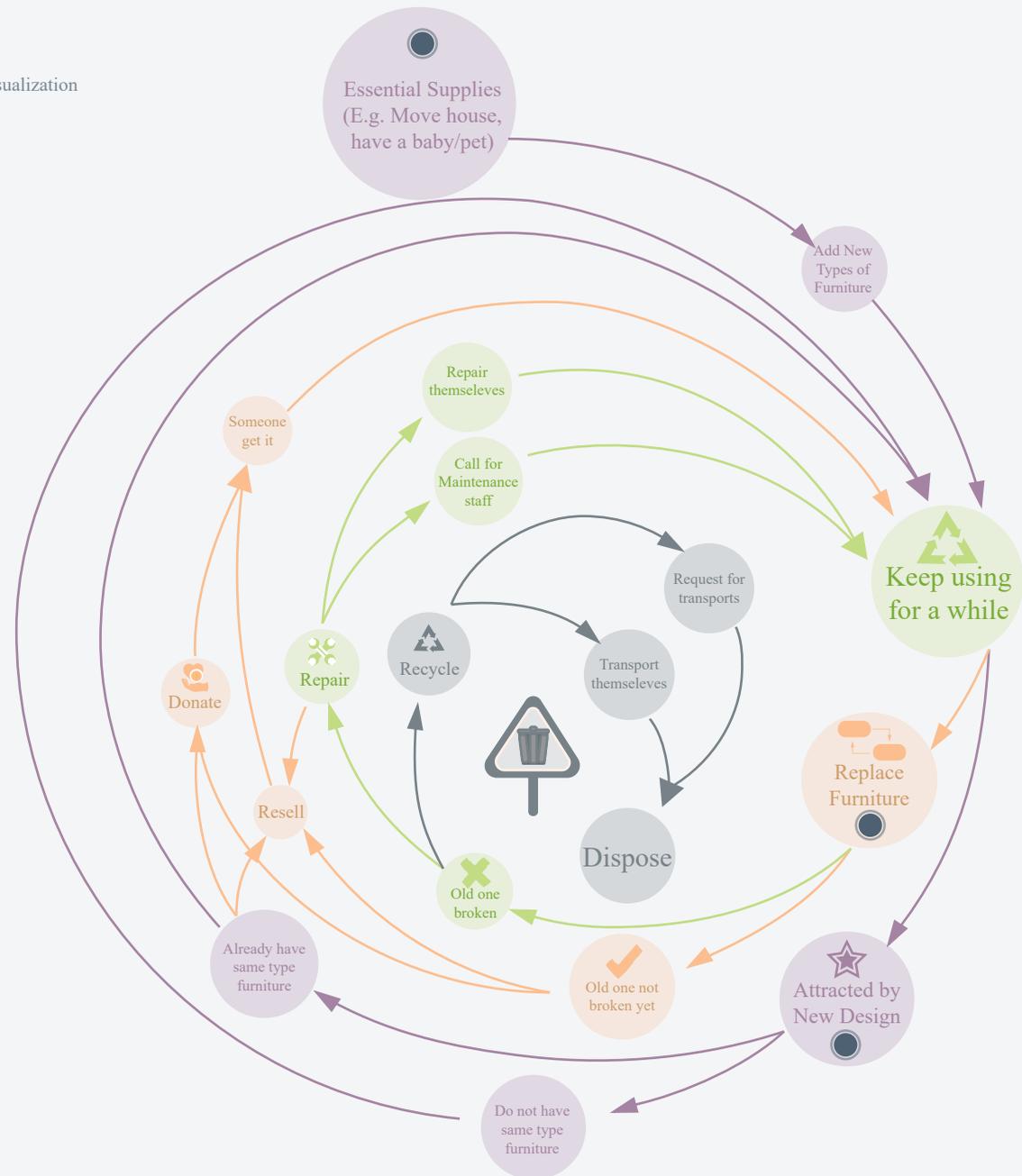
Research Visualisation and Data Analyze

User experience map (showing furniture circulations)

The relationship map between people and furniture



Figure 10.1 Data Visualization



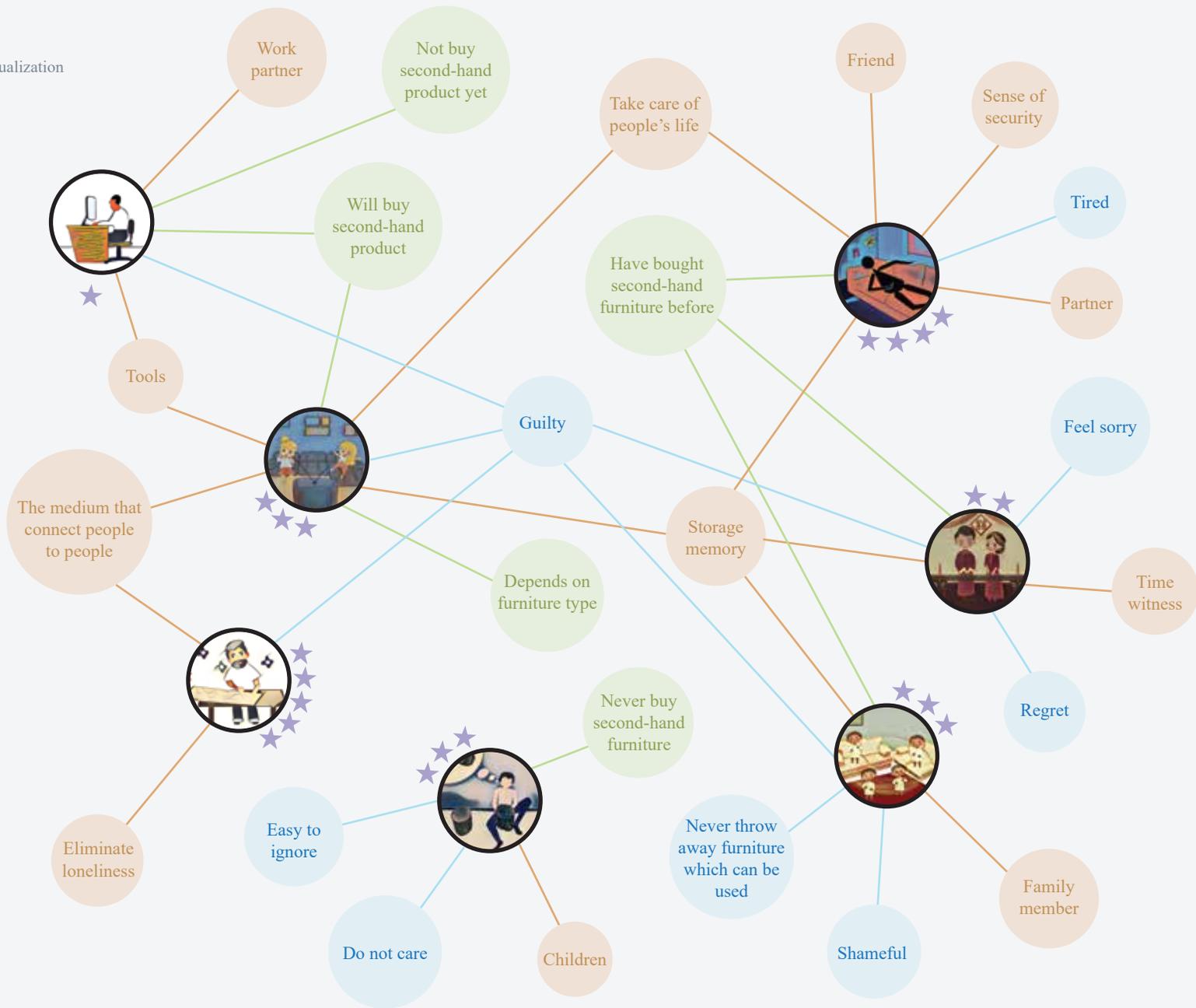
- Reason why people buy new furniture
- The purple route describes the residents' experience: From buying furniture for the first time to buying again because of the new design attraction
- The orange route describes the residents' experience: From buying furniture for the first time to buying again because of the furniture replacement needs (Replace the old furniture which not broken yet)
- The green route describes the residents' experience: From buying furniture for the first time to buying again because of the furniture replacement needs (Replace the old furniture which already broken but can be repaired)
- The grey route describes the residents' experience: From buying furniture for the first time to buying again because of the furniture replacement needs (Replace the old furniture which already broken and need to be disposed)

Insights

After summarizing the interview information with the residents, the user experience map is obtained. It can be seen from the figure that the residents have a linear model (grey part) from the purchase of furniture to the final disposal of furniture, but there is also a circular mode. In the picture, whether the user is going through the purple, orange or green route, the furniture has entered the circular mode,

Therefore, the key way to reducing furniture waste is to keep the furniture from entering the grey route as much as possible, but go through other colour routes in the circular model. That means as long as the furniture does not enter the grey part, it can be continuously reused. The more step it goes, the longer service life it has.

Figure 10.2 Data Visualization



Insights

I tried to relate all the information that I got and find out that when people have a deeper affection for furniture and more effort to obtain it, the service life of furniture will be longer. So to confirm my thoughts, I combined with the pattern of furniture circulation and designed two videos to engage with participants.

Online Ethnography

After creating two videos, I posted them on the public platform and interacted with participants online. This research method allows me to gather rich information and insights that possible would not to collect through the interview, and evaluate the correctness of my thoughts.



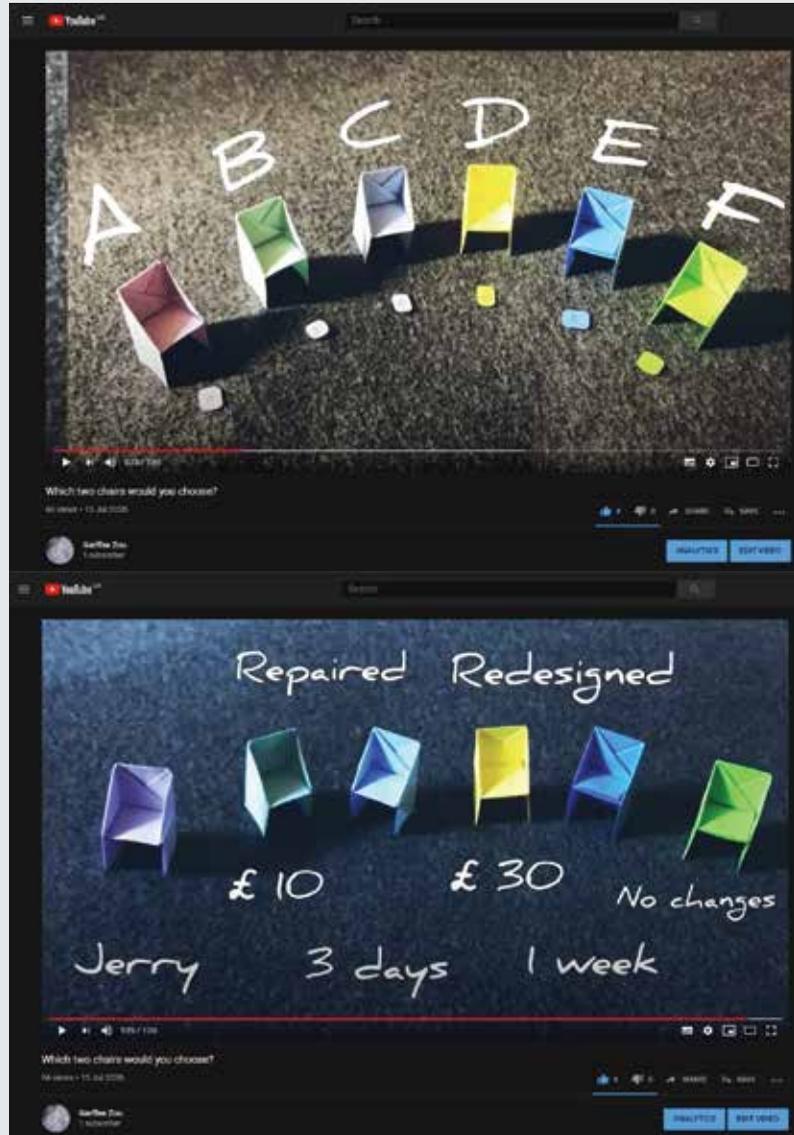


Figure 11.1 Video Screenshot
<https://www.youtube.com/watch?v=c75ws3LXBYc>

Video 1

Scenario

One day, you bought six chairs in one store. They are the same style with the same quality and the same price. Then you put them in the dining room. They are A B C D E and F.

Since you often sit on chair A and watch cartoons Tom and Jerry, you give chair A a nickname: Jerry.

Years later, chairs B and C were broken, you chose to repair them, but you can only repair one chair with the money you have, so you spent 10 pounds to ask the repairman to repair B, and you spent three days to repair C by yourself.

Months later, you need to choose two of the six chairs and put them in the study, but because the style does not match, you need to redesign these two chairs, and your money can only ask the designer to redesign a chair, so you spent £30 asking him to design chair D, and you spent a week designing E by yourself.

Chair F has remained intact.

After going through many things in five years, you have to leave because of force majeure, and you can only keep two of the six chairs. These six chairs are in the same condition. At this time, after careful consideration, which two chairs will you choose?



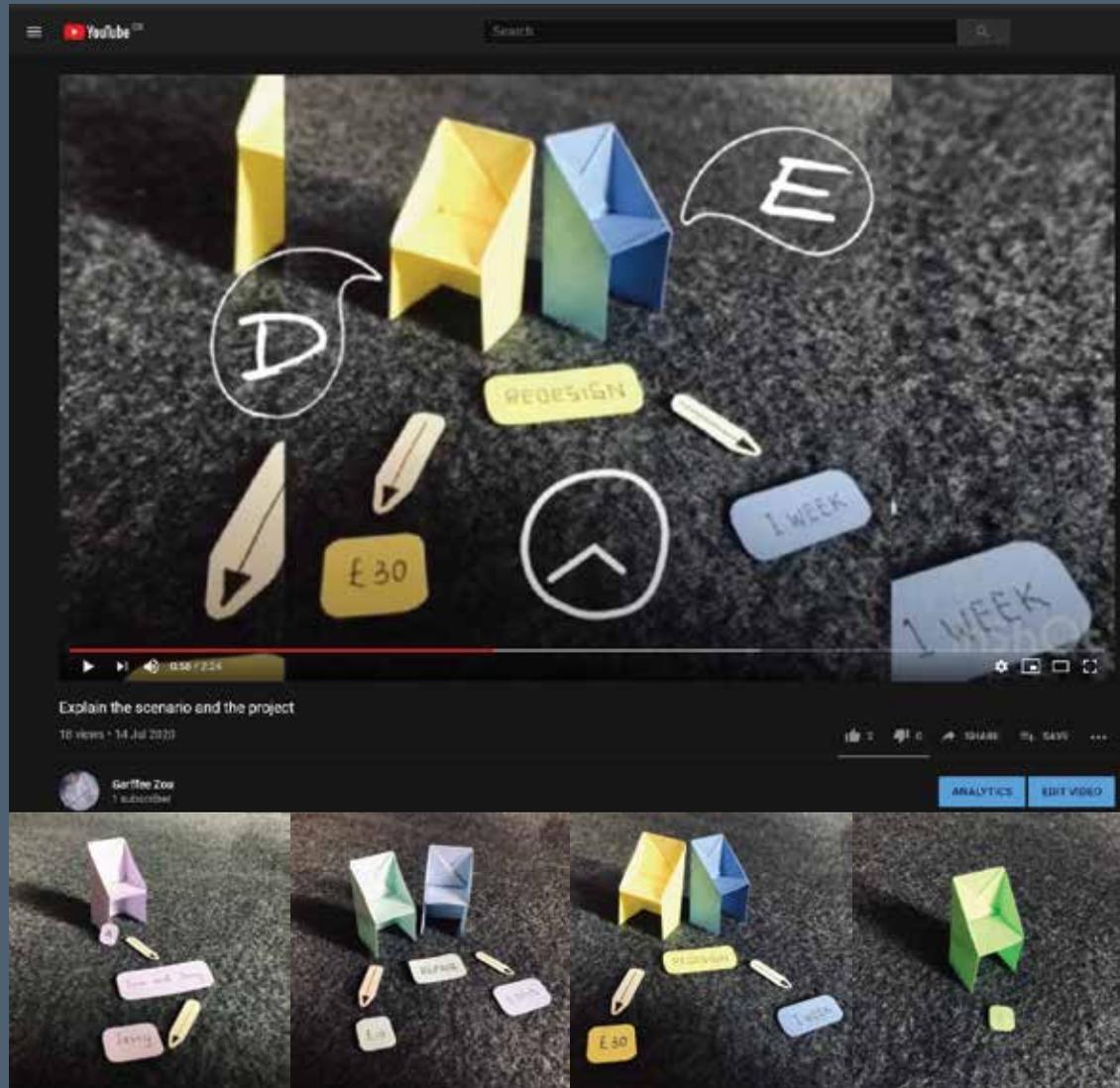


Figure 11.2 Video Screenshot

<https://www.youtube.com/watch?v=GgWOQIFAnEE>

Video 2

In this video, I explain the settings about the scenario and describe my project to let audiences understand the test.

"I named the chair A Jerry because it represents participants defined the relationship between furniture and themselves. Giving a name to Chair A means anthropomorphizing the furniture while giving a memorable memory that makes Chair A unique."

"Chair B and C were broken, participants spent 10 pounds to repair B means they spend more money on chair B, but at the same time they spent three days repairing chair C means they spend more effort on chair C. "

"Chair D and E need to change the style, participants spent 30 pounds means they can get a new style chair D with a professional idea. Redesign chair E by participants themselves means they spent one week time but with their own creativity."

"Chair F has no changes, so it's like a prototype that can compare with those five changes."

People's comments help me proved my ideations and bring me into the next step.

YUCHEN WANG 2 weeks ago
I'd like to choose A and E, the Jerry chair and my own redesigned one, because giving the chair a name makes me feel like it's an old friend, which means we have some emotion bonds, and the chair that designed by myself make it valuable as I spent time and energy...

13G@MoorBenaion13 2 weeks ago
I would chose c because I spent 3 days repairing it so I'd feel attached to it I think, and a the Jerry chair because it never gave me any issues and I'd have good memories of it

Ying Gao 2 weeks ago
For me, I would like to keep A & D. For one, these two chair still retain a good shape and quality after several-month use. So I believe they could stay with me for a longer period of time. Tom and Jerry was a symbol of my childhood life, as well as a representative of a beautiful memory. On the other hand, even though some other similar chairs had ...

boardesign#2 2 weeks ago
Would go for D & E... I would prefer to have my own redesigned chairs so i have something different from others...

Cherry Li 2 weeks ago
I'd choose A & E, because A seems very solid and I shared good memories with it, and I put in some efforts to design E, I imagine I would value it more than some random items from mass production.

Ahmed * 2 weeks ago
I would choose chair E because I redesigned it myself and I would feel proud to keep it. Also, chair F, because there was no changes happened to it since I bought it, and I can keep it for reference purposes when evaluating my redesigned chair E later in the future.

Jia Qing Lee 2 weeks ago
Chair A and Chair E

yao li 2 weeks ago
I will choose C and D , because I should cherish the chairs made by myself. I should also like the new chairs designed by professional designers, because they are different from other chairs

席系丹 2 weeks ago
A & B

Heart63 2 weeks ago
I will choose A&F, because I don't need to spend extra money.

Sunshineeee 2 weeks ago
I choose D and E because it takes more time and money, and the style is more unique.

8456924WWW 2 weeks ago
I choose A and E. When the chair condition is the same, A has his own memory and E puts a lot of energy into it.

Redddddd 2 weeks ago
I choose A and D because A has feelings and D has invested more money.

Peach-00 2 weeks ago
I choose A and E because chair A has a lot of good memories, and E is designed by myself, which fits my own mind.

Tigertooth 2 weeks ago
Choose A and F, the one that can be named is definitely the favourite, and the one that has not changed the style is F. The polished ones may not be what you like.

747169-cf 2 weeks ago
I chose A and E. A is used to it, and it hasn't been broken. It is strong and maintains the style of the original 6 chairs. It should be the favourite among the 6 chairs so I don't want to give up. E is my own design which is also my favourite style.

Kittycatty 2 weeks ago
Choose A and F. A because this is a chair that allows me to name it, and it is accompanied by happy memories. F, a chair that has not changed as a souvenir, it can only be said that its existence is affirmed in the hidden meaning and it is used to its existence.

Figure 11.3 Comment Screenshot

Comment

The results showed that most participants will choose the furniture that they have a deeper affection. Besides, if they pay more efforts to obtain it, it becomes more precious.



How might we?

In the above research and analysis, I gradually formed three ideas.

HMW use storytelling to extend the service life of furniture?

HMW motivate users to preserve furniture after putting in their own efforts?

HMW create a social space to encourage people to discover the old furniture's charming?



Ideation

HMW use storytelling to extend the service life of furniture?



To give the furniture a history book.

This idea was inspiring by the stories that I collected from residents. If the furniture has a history book that describes all the stories that it witnesses, people will easily be attracted by it. And will be harder for people to throw it away or easy for people to resell the furniture.

HMW motivate users to preserve furniture after putting in their own efforts?



To hold an event.

This idea is based on the organization's business model (E.g. Waste Busters). The event might last for a few days, people can repair and redesign the furniture in this event. Any organization which would like to hold this event needs to offer the place. People spend a little bit of money to get a ticket and can share their creative ideas. After repairing or redesigning furniture, people can choose either donate it or barter with others, or bring back home. The organizer can get the service fee as the profits.

HMW create a social space to encourage people to discover the old furniture's charming?



To build a local website.

The site is a social space for people to discover the charming old furniture. There are three main parts on the website. First, people can post images and share stories or ask for repair suggestion with the public. The second is a furniture resale part which might help them resell old furniture and let people know about the furniture conditions and the reason for resale. Besides, thirdly the co-design part collaborates with designers and experts who probably easily help residents repair and redesign the furniture.



Prototyping

Prototyping is the most intuitive way of presentation, and the initial prototype can allow participants to easily understand the solution. While showing the prototype, stakeholders can design and modify together, and make suggestions.

I was confused about which idea should be as a prototype, so I created three of them and later would invited stakeholders to have a discussion.



Furniture History Booklet

This booklet is printed by the furniture company and delivered to customers along with the new furniture. The booklet could record stories about furniture (E.g. The pet cat at home was in a bad mood one day, so he scratching the armrest of the chair and leaving paw prints.) also it could record the condition of the furniture and how customers feel about the furniture. Three views and perspective views could simply mark the parts that need to be described.

The significance of this booklet is that when the furniture has been used for many years and people want to throw it away, by reading the stories, they might recall many of the times it has accompanied them. At this point, one of five sustainable design strategies 'Reduce' is used: Designed for longer life (e.g. emotionally durable design). This booklet is through emotion to maintain the life of the furniture.

When the furniture needs to be resold, this booklet might attract the next customer to understand the time experienced by the furniture, know that this is a piece of furniture with stories. Also, they could understand the previous owner's mood and the conditions of the furniture, instead of just the old and new appearances to determine whether to buy.

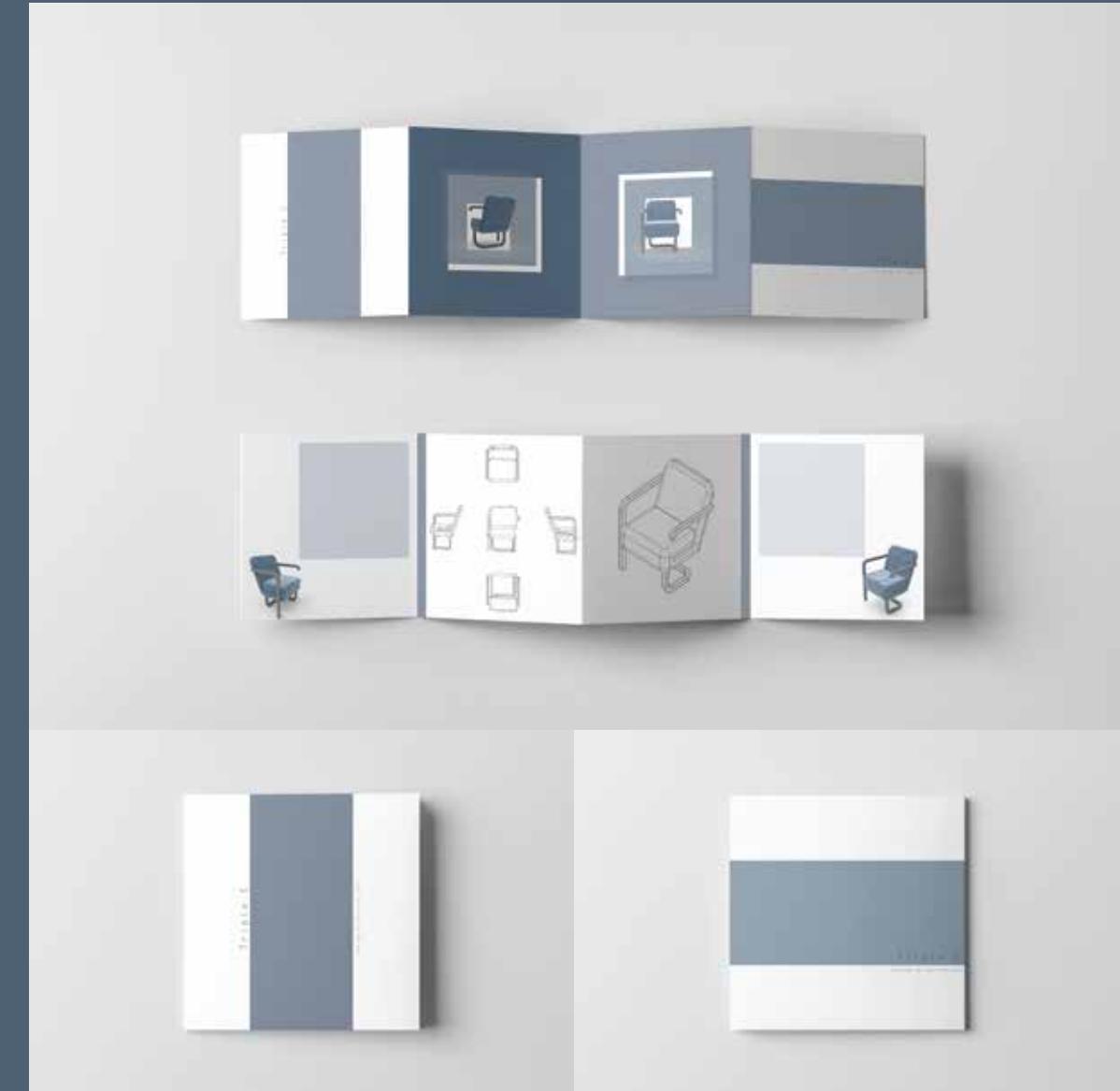
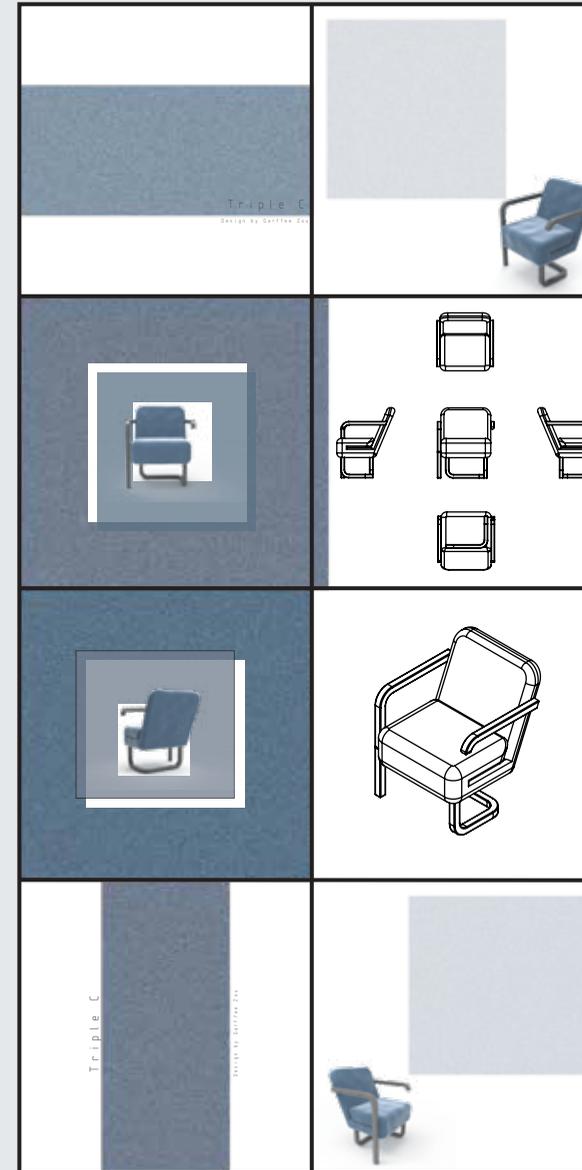


Figure 12.1 Prototype Booklet

Figure 12.2 Prototype Service Blueprint

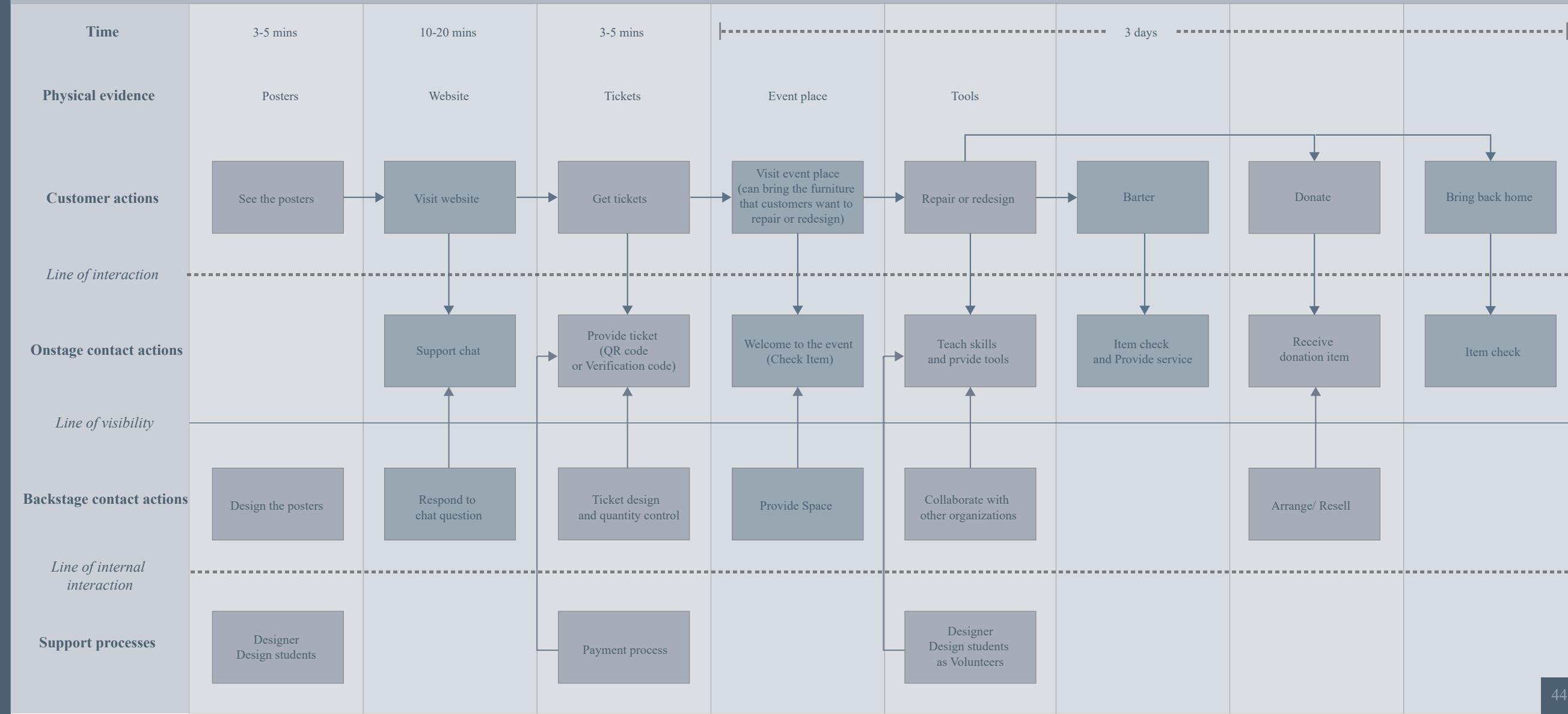
Service Blueprint

The Event

Dear Furni

This is an event that encourages everyone to repair or redesign the furniture by themselves, in order to extend the service life of the furniture. Participants can bring damaged furniture or furniture they would like to redesign to join this event. Here, the staff will share repair and redesign skills and provide corresponding tools. After the repair or redesign is over, participants can exchange their furniture with others, or donate it to the event organizer, or of course, they can take it back home. The staff will assist throughout to ensure the safety of the furniture. In the event, participants can invite friends and family to learn skills and be creative together.

The significance of this activity is to provide people with a social place to communicate and get a creative piece of furniture while learning and improving their hands-on ability. According to the research results of Online Ethnography, people will cherish what they get through their own efforts. So after the event, the service life of this furniture might be extended.



Tickets and Posters Design



EVENT

Date: 01-03, September
Location: 07 Road
Contact No: 07579857200

Dear Furni

Dear Furni

Date: 01-03, September
Location: 07 Road
Contact No: 07579857200

EVENT

EVENT

Ticket

Verification Code
0000-0598-3658-5100



Date: 01-03, September
Location: 07 Road
Contact No: 07579857200

EVENT

Ticket

Verification Code
0000-0598-3658-5100



Date: 01-03, September
Location: 07 Road
Contact No: 07579857200

EVENT

Ticket

Dear Furni



Figure 12.3 Prototype Event

Event Website Design

The website for people check the event details and buy tickets.

Detailed URL is on page 53

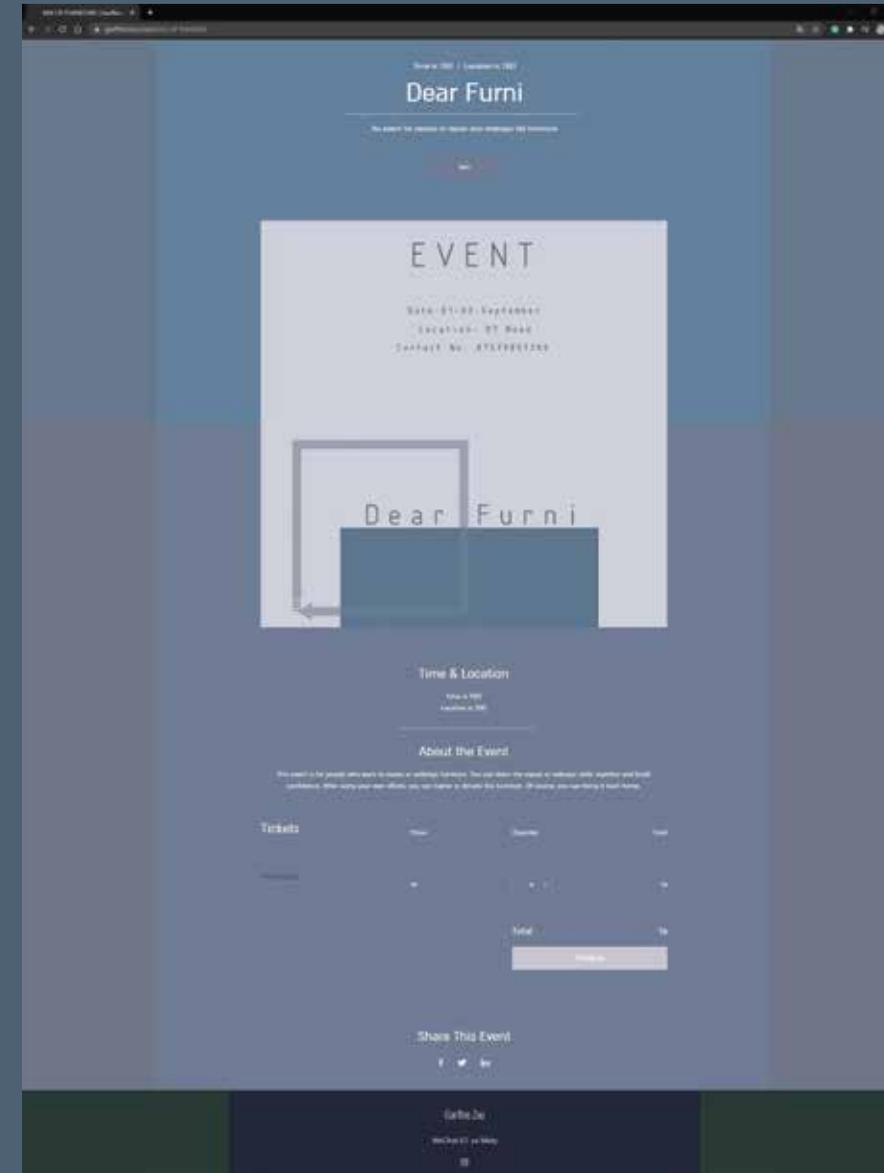


Figure 12.4 Prototype Event

The Local Website

xxx of Furniture.

This site is a social space for people to discover the charming old furniture and extend the service life of them. First part is for people who might have interested to post old furniture images and share stories or collect repair advice with the public. The second part is the furniture resale part, it might help people resell old furniture and let customers know about old furniture conditions and the reason for resale. The last part is co-design which collaborates with designers and experts who probably easily help people repair and redesign the furniture.

The significance of this website is to establish a public platform that allows more people to exchange stories and ideas about old furniture online. This solution can extend the service life of the old furniture that people already have and stimulate people's interest in furniture.

Detailed URL is on page 53

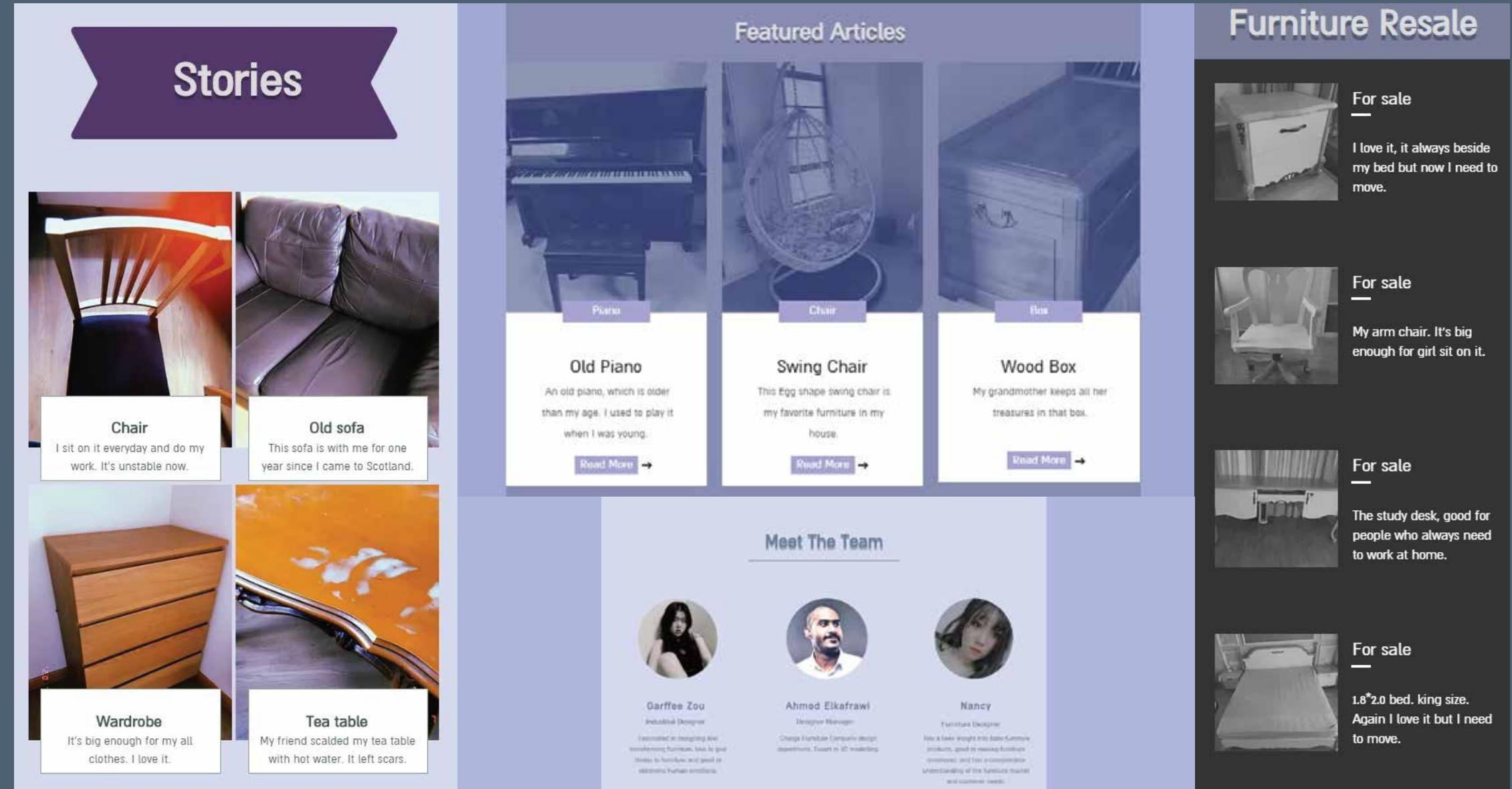


Figure 12.5 Prototype Website

Case Study

D&DEPARTMENT

I appreciate to my colleague Xidan Tu for recommending D&DEPARTMENT, a Japanese furniture store.

The founder of D&DEPARTMENT, adhering to the design concept of long-life design, opened several stores in remote sections. He hopes to rediscover the existence value and use the space of old objects, which is very similar to my thoughts. So I referred to the website of D&DEPARTMENT and found that every piece of old furniture on the website gave the design concept and history. However, most of the furniture is well-designed by designers, not for ordinary furniture.

So I had the idea of building a website and continuing the design concept of long-life design, but the main target was ordinary furniture. The unit price and quality of ordinary furniture are not as good as that of high-end furniture, and it is more likely to be wasted, so it needs more attention.

<https://www.d-department.com/>

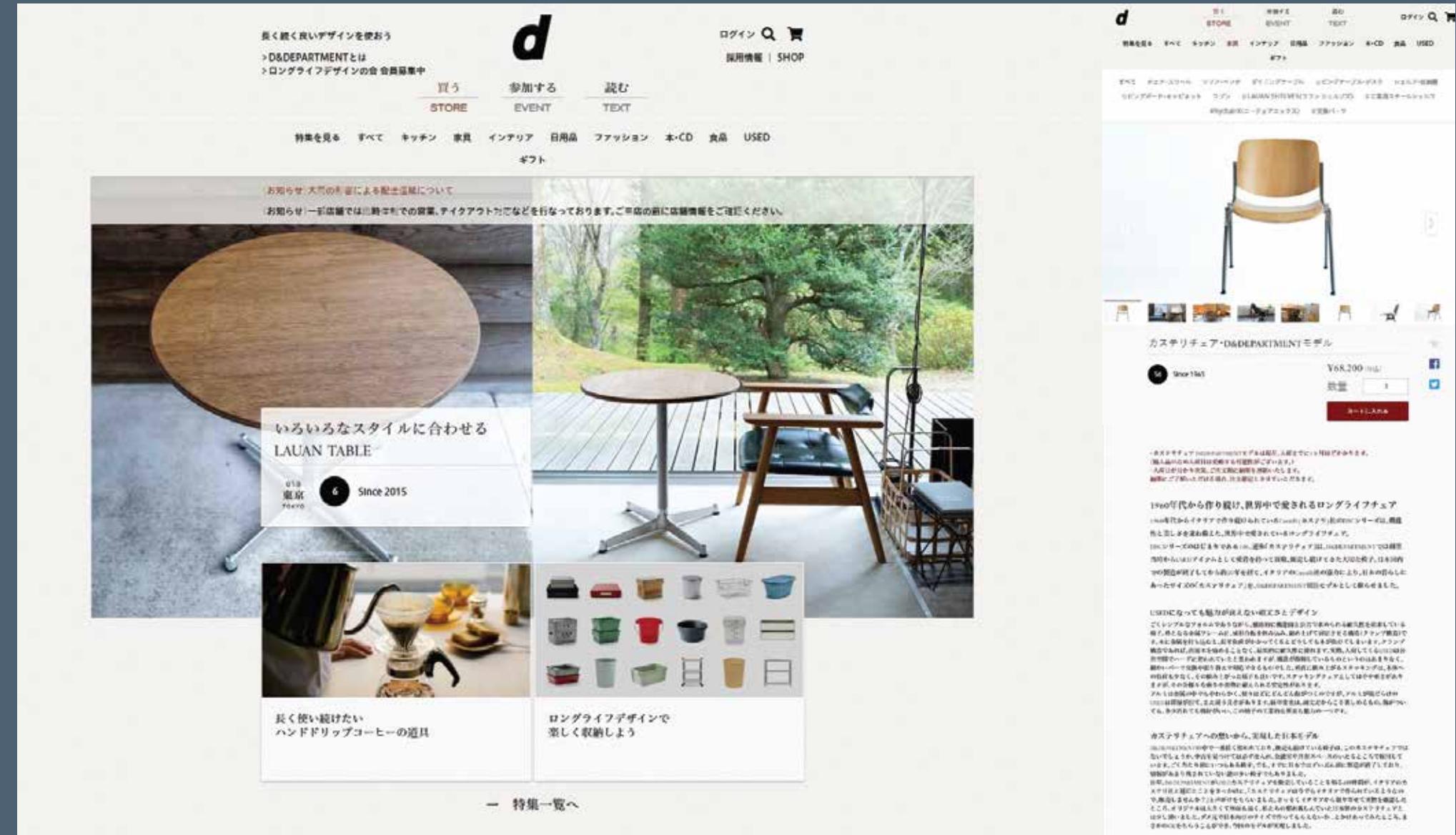


Figure 12.6 D&DEPARTMENT

Evaluative Research

Evaluative research involves the testing of prototypes by real potential users in design development.

Therefore, I invited potential stakeholders which including local residents, furniture company designer, manager and organization related member to discuss my prototype and criticize it.



The History Booklet

Nicole (Residents): She thinks it is really good about the 'furniture history booklet' ideation. People can write stories on it and share it with others, especially for old people. If she is in a second-hand furniture store and sees this history booklet about furniture, she will be attracted to it. It makes her feel like she is not buying second-hand furniture, but historical stuff. However, she thinks it's difficult to keep a booklet for such a long time. People will easily lose it.

Phil (Waste Busters): He loves this idea, and this looks good for Waste Busters selling second-hand furniture. He thinks that people can also stick photos on the booklet and make it more like a real book.

Nancy (Furniture company designer): She thinks that is a good idea for sustainable development, but furniture company would do that because they would like to sell furniture as much as possible. If the service life of the furniture has extended, the company would lose profits. So maybe need to create a new way to let the company accept this idea.

Ahmed (Design manager): He never saw this idea before in the furniture stores. So he thinks it might be good way to attract customers. Maybe the booklet can add some instruction to lead customers to record the stories.

The event

Nicole (Residents): The event processes are clear and easy to understand. She thinks it easy for people to know about this event and join it and it sounds really interesting. But, she doesn't know if the event has location limited or not, what if someone wants to join the event but it's hard for him to bring the furniture. If the organizer can offer some damaged furniture for us to learn the skills that will be better.

Phil (Waste Busters): The event can become true. He told me that Waste Busters have a similar event and it was really successful. He thinks maybe after Covid-19, we can test the event and see if it is work or not.

Nancy (Furniture company designer): She said the event sounds good. People can learn skills together. If the event can contact some local designers and join with residents it will be more perfect.

Ahmed (Design Manager): He thinks that maybe the furniture companies don't like this kind of event. If people always join this kind of event and repair the furniture. They might lose the job.

The local website

Nicole (Residents): She likes the website idea because she loves to post pictures. She doesn't have too much advice about this website.

Phil (Waste Busters): He thinks the website can help people record stories online as the first idea. So maybe can combine them together. He was worried about the sales part because it looks difficult to arrange delivery. Maybe the website staff should help them and can get a service fee as the profits.

Nancy (Furniture company designer): She loves this idea. As a designer, she thinks if this website has a lot of stories about old furniture, she absolutely will join it. The stories are the source of inspiration, that is a good point to attract designers.

Ahmed (Design manager): He thinks this idea is good for furniture lovers. They can check the reviews here and know more about furniture. Also, that is good for the furniture company to target a marketing selling point. He thinks these three ideas can be connected in some ways and maybe it is better to combine them.



Figure 13.1 Testing Screenshots

Conclusion

After testing the prototypes with participants, I asked the tutors' advice. I appreciate Fergus and Iain gave me a lot of suggestions.

I thought the final result should be combined these three ideas because they all have connections, but each of them cannot be a complete system. Under the premise that there is not the only one stakeholder, the interests and actions of all must be considered.

Therefore, I intended to integrate them together and let them form a completely logical business model system, and thus realize the sustainable development of furniture.



Final Result

The entire process is based on a website named 'xxx of Furniture'.

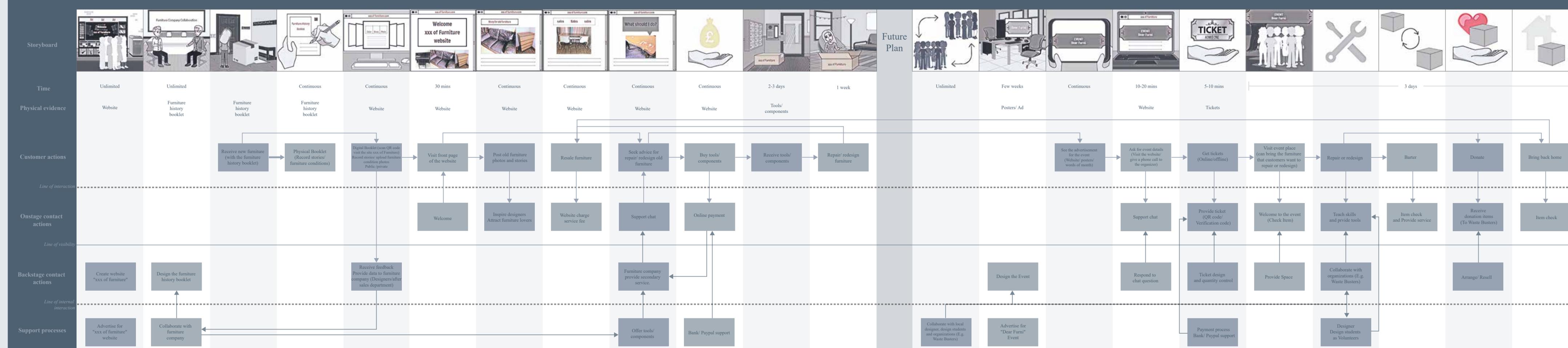
The site should collaborate with furniture companies, which provide the furniture history booklet to the customers. I improved the booklet: add a QR code for customers to scan it. It will bring them to the website and record the data online.

Once people finished stories, the site can collect the data and pass to the furniture company after-sale department or designers which can help them improve their products. When customers go back to the main page, they can try to share their opinions about old furniture and discuss with other furniture lovers. The site team including designers and furniture experts who might help them solve the problems, and if they need components or tools, furniture company can provide secondary service as profits that could stimulate companies to cooperate with the website.

The event as part of the website is a future plan. It is the website offline activity, people who chat online and share stories could meet together in the activity. This can enrich the communication that originally had no sense of reality. Participants might enlarge their socialization and build up their confidence.

Figure 14.1 Service Blueprint

Service Blueprint





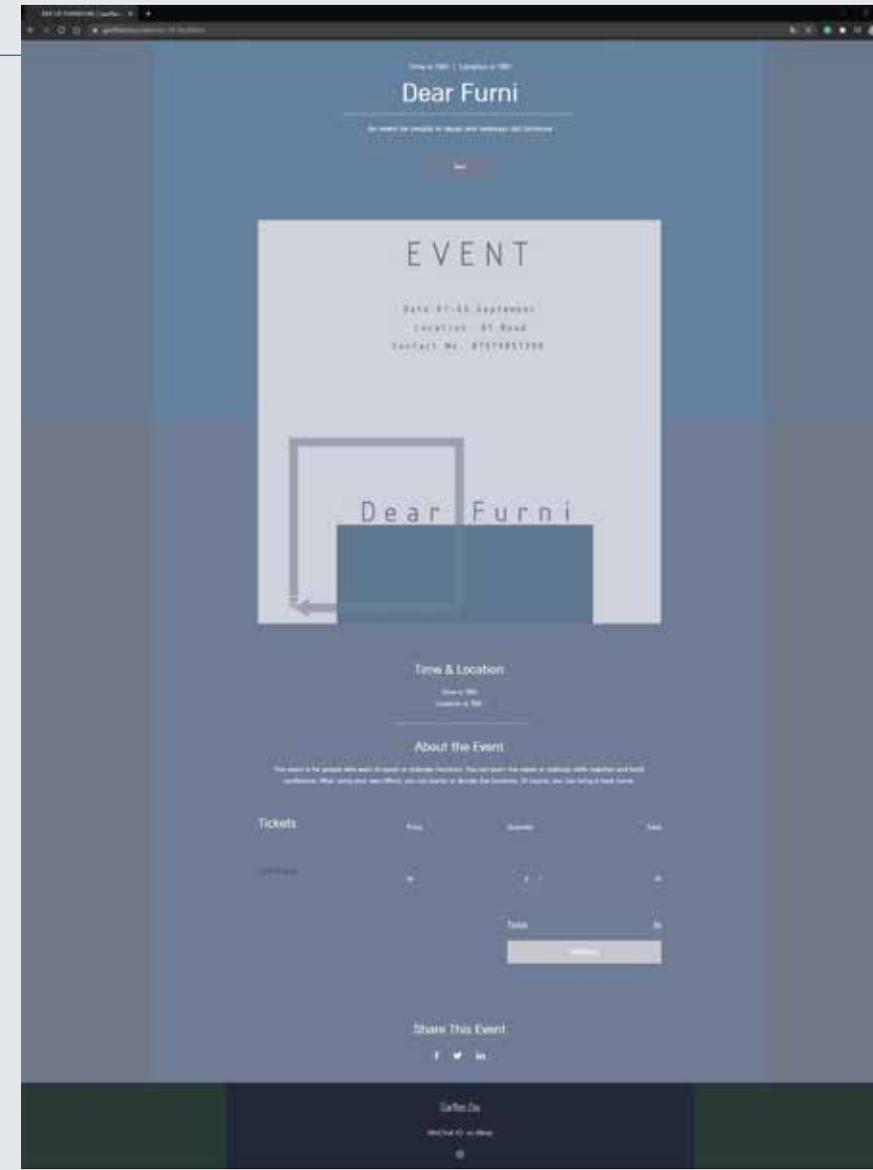
<https://www.garffeezou.com/furniture-history-booklet>



<https://www.garffeezou.com/xxx-of-furniture>



<https://www.garffeezou.com/event-dear-furni>



<https://www.garffeezou.com/event-details/dear-furni>

Here are some touchpoints and physical evidence about the entire process.



QR code: There is a slight difference between the computer terminal and the mobile terminal

Figure 14.2 Website Screenshots



Reflection

During the whole project, there were many times that I was in confusion, but with the advice and encouragement of my mentors and colleagues, I successfully ended the project. Thanks to everyone who helped me.

My favourite part of the project is the residents' interview and the stage of prototyping. With the help of the cordial and friendly participants, I knew a lot of interesting stories and these inspire me with corresponding solutions. In the ideation part, I try to relate all stakeholders and willing them as part of my solution users. Based on my specialism collaborative creativity, engage all participants together and co-design the project is necessary. So I was satisfied with the final delivery which includes all participants' efforts.



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Quota Management System (New Zealand): <https://www.youtube.com/watch?v=DuoXwg9zBpQ>



To my dear furniture,

Hi, how are you?

Thank you for accompanied to me every day, no matter when I am happy or sad. Sometimes, I share happiness with friends but leave loneliness to you. But thank you for staying with me.

In the days, I may have ignored your existence, but you are always by my side. What I can do is to preserve you for a longer time and please spend more days with me.

I will take care of you,
Garffee



