

**INRD704 Exegesis**

# **Stitch up**

Sustainable fashion app

**Bianca Wood**

# Abstract

This project investigates problems within the fashion industry and its effect on the environment. There has been a turbulent increase in clothing consumption but a decrease in the life span of clothes (clothes worn) in the past 20 years. Fast fashion companies escalate this issue of textile waste being detrimental to the environment. There are opportunities for reducing waste by increasing clothing utilisation and upcycling to expand the lifespan of clothing and reduce emissions.

Throughout this project, I will use the double diamond framework and user to investigate, define, develop and deliver solutions in response to this issue. Using methods of interviewing, user testing and feedback, I aim to provide a service that encourages people to upcycle and utilise their textile waste.

# Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly) nor material which to a substantial extent has been submitted for the award of any other paper or other institution of higher learning.

A handwritten signature in black ink, appearing to be the initials 'BW' in a cursive, stylized font.

Bianca Wood

# Intellectual Property Declaration

I declare to retain copyright in all images and creative work produced and presented as part of this research.

# Acknowledgements

I would like to thank Gerbrand van Melle and Keryn Christiansen on suggestions and advice throughout this capstone project as well as Kei Hoshi on feedback and guidance on my exegesis.

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# Introduction

The fashion industry is renowned for leading cultural trends and used a form of creative expression to one's identity. Our daily decisions about what to buy and wear are influenced by fashion, yet when it comes to consuming goods, we rarely consider what happens to our garments once we throw them out. Every year, 100 billion garments are made to meet the growing demand, but 84% of those garments end up in landfills. Due to the popularity of fast fashion, it has become an increasing concern that people buy more garments than they wear. The conventional methods of the industry today is linear by default and results in a harmful cycle of extracting raw materials for it to be produced into new textiles. This wasteful cycle has been exacerbated by the prevalent rise of fast fashion, luring consumers into a pattern of excessive clothing consumption, wherein goods are purchased with a brief surge in popularity and then promptly dumped in the landfill. Textile waste has emerged as a significant issue in the industry. (Aus et al., 2021) It is now more important than ever to utilise clothing and textile waste responsibly. Research from Ellen MacArthur Foundation shows that increasing the average number of wears on a garment cuts emissions by 44%. Rather than dumping textiles to the waste, there are opportunities for reusing these textiles and reduce excessive waste. Throughout this project, I will investigate provide possible solutions on how we can encourage sustainable practices of utilising unused textiles to my target audience.

# Aim

My project aims to encourage environmentally friendly purchases and disposal practices on clothes. To encourage these practices, I will examine the current patterns and behaviours surrounding clothing consumption and disposal of used clothing.

I aim to cultivate a service that motivates individuals to embrace the concept of upcycling and make use of already existing textiles and clothing items in hopes of reducing textile waste. This opens opportunities to work towards a future of fashion that is more environmentally friendly and be mindful of how we utilise our clothing.

# Positioning the researcher

Every day, we all consume things through what we use, wear, and eat. We are fortunate to have an abundance of resources in our daily lives, but we rarely consider what happens to the things we throw away, including clothes. In my personal observations, I see a rise in interest in thrifting, but the problem of discarded fast fashion clothing is still a significant problem, emphasising the urgency for change.

As a designer and someone who cherishes fashion as a personal passion, I want to be able to express myself freely through my clothing choices while still making a contribution to the more important cause of sustainable responsibility. By actively promoting and embracing eco-friendly practices, I aim to inspire others to adopt a sustainable mindset and make conscious fashion choices myself. Through my creative endeavours, I strive to demonstrate that style and environmental consciousness can seamlessly coexist, implementing a foundation for a more sustainable future in the fashion industry worldwide



# Research Questions

How can we use design as a tool to reduce textile waste

Sub-Questions:

- What is fast fashion?
- How does the fashion industry affect the environment?
- What is overconsumption?
- What makes people over consume?
- What is the current fashion economy?
- What are some methods to keep fashion sustainable?
- What kind of textile waste is there?

# Review of contextual knowledge

## Rise of fast fashion

Fast fashion is low-cost, trendy apparel that is frequently made in a lesser quality and is a copy of high-end clothing labels. The objective is to meet consumer demand when it is at its peak of popularity by getting the newest fashions on the market as quickly as possible. (Rauturier, 2022) With the cycle of fast fashion and consumer culture, items often get discarded after a few wears; this is due to trendy clothes constantly changing and the consumer culture revolving around staying relevant and up to date with the current trends. This cycle leads to an unsustainable system of overproduction and overconsumption. Most fast fashion clothing materials include synthetic fibres that are easy and cheap to produce but hard to recycle and do not biodegrade well in landfills.

## Fashion industry's effect on the environment

Production of clothes alone extracts a huge amount of resources such as chemicals, raw materials, energy and water. A single shirt can use 2,700 litres of water during production so imagine how much wastewater pollution is made from clothing production everyday. The extraction of water has affected the water quality globally. 20% of polluted waters around the world comes from fashion production. (Bailey et al., 2022) These wastewaters contain chemicals from the dyeing process. As a result of mass production of fast fashion '84% of clothing waste ends up in landfills and incinerators'. (Brown, 2021) This waste takes up space in landfills as it could take more than 200 years for textiles to be decomposed in landfills. The fashion industry produces more carbon emission than flights travelling abroad, (Bailey et al., 2022) thus making the fashion industry being responsible for 10% of global carbon emissions at its current pace waste generation. (Geneva Environment Network, 2023) By 2030, emissions are expected to be significantly increased by 50% (Quantis, 2018).

# Review of contextual knowledge

## Overconsumption

The demand for new clothes has grown significantly over the years, and up to 100 billion garments are globally produced yearly (Ruiz, 2023) however, 92 million tonnes of textiles are disposed of in landfills. Merely 1% of the manufactured clothing is repurposed to create new items.

Between 2000 and 2015, clothing production has doubled there has been a growth in clothing sales and a decline in clothing utilisation. It is estimated that more than half of the fast fashion clothing manufactured is thrown away in less than a year.

According to research conducted by Ellen MacArthur Foundation, increasing a garment's lifespan cuts its carbon footprint in half. Thus, cutting emissions by 44% can be achieved by doubling the number of times a garment is worn or reused. (Ellen MacArthur Foundation, 2017)

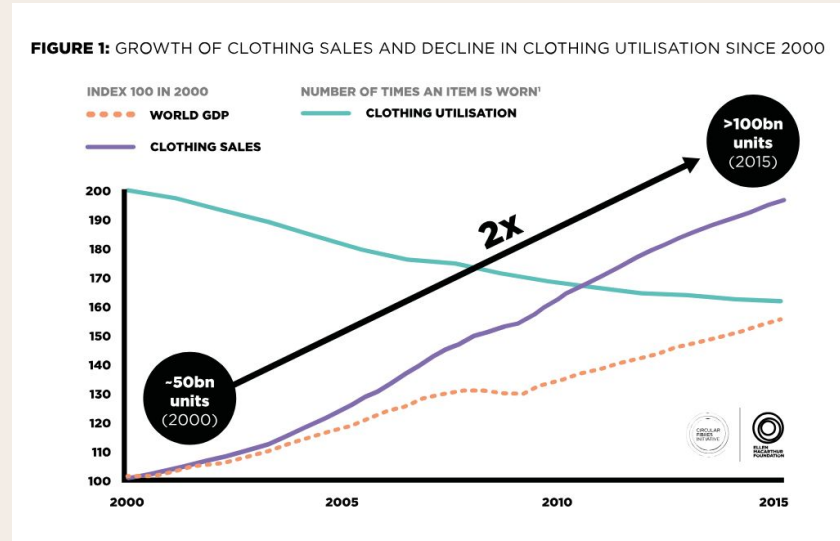


Figure 1: Clothing sales increase and decline in clothing utilisation

# Review of contextual knowledge

## Promotion of Overconsumption in Social media

Social media and internet ads that we encounter on a daily basis impact our purchasing decisions. Fast fashion websites like Shein has a popular digital platform in social media that encourage excessive consumption of inexpensive, trendy clothing. The buy-now, pay-later model is promoted by media ads as well as firms like Laybuy and Afterpay. Fast fashion consumption and its quick disposal has become the standard because of the fast paced trends that rapidly change in the online environment

People are more likely to purchase sufficiently for themselves when they are exposed to less online consumption advertising items, according to a 2020 survey. (Frick et al., 2020)It is possible to stop people from being exposed to promotional content.

# Review of contextual knowledge

## Current fashion industry model

The fashion industry utilises a linear business model to optimise clothing production and consumption. (THE SUSTAINABLE FASHION FORUM, 2023) It excessively extracts resources and is mass-produced for brief use before getting thrown away, and the process gets repeated. Most of the clothes produced for mass production are made out of synthetic material, and makes it harder to recycle.

## What are some methods to keep fashion sustainable?

Circular fashion is a system that uses circular economy where the life cycles of fashion products are extended. It offers opportunities that can help respond to customer demands and help the environment. (Gueye, 2021) This requires a change in the business model from a take-make-waste model towards a reuse-based model. As consumers we can minimise waste, by upcycling, repairing selling or donating their old clothing and consider buying quality items.

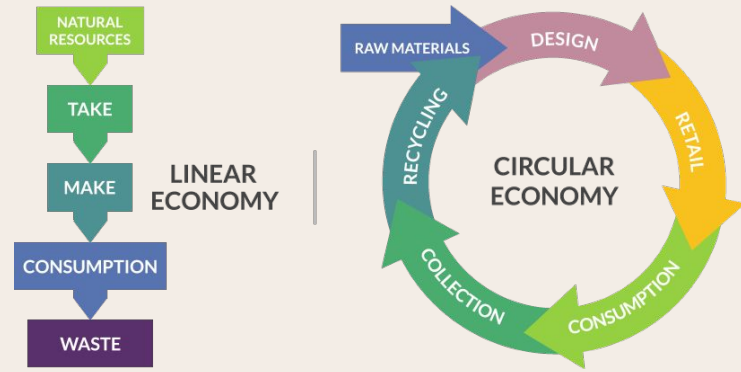


Figure 2: Diagram of linear vs circular economy

# Review of contextual knowledge

## Types of textile waste

Textile waste refers to the material discarded throughout the process of garment production. This can be material thrown during the production or after its been made. Significant amounts of resources, such as water, electricity, and raw materials, are needed for the manufacture of textiles. These resources are wasted when clothing is thrown out rather than being repurposed or recycled. Textile waste can occupy a significant amount of landfill space and, as it breaks down, emit gas emissions. (Ruiz, 2023) Thrown away used clothes is the most known textile waste but there many other types of waste that get due to leftovers or manufacturing errors that could be potentially have the opportunity to be reused.

There are different types of reasons textiles get dispose of as shown below:

1. Pre-consumer waste: leftovers and remnants from the manufacturing process, such as fabric samples and trimmings.
2. Post-consumer waste: Consumers discard these textiles and garments either because they are no longer desired or because they are damaged beyond repair.
3. Deadstock fabric: excess material that wasn't utilised in the manufacturing process and is usually discounted for sale.
4. Misprinted or overstocked items: products that were manufactured incorrectly or that did not sell as anticipated.
5. End-of-life textiles: textiles that have reached the end of its lifespan and cannot be fixed or repurposed.
6. Fast fashion waste: Made for trendy clothes made out of cheap material, yet it frequently degrades quickly and fosters disposable consumer culture.

# Current solutions

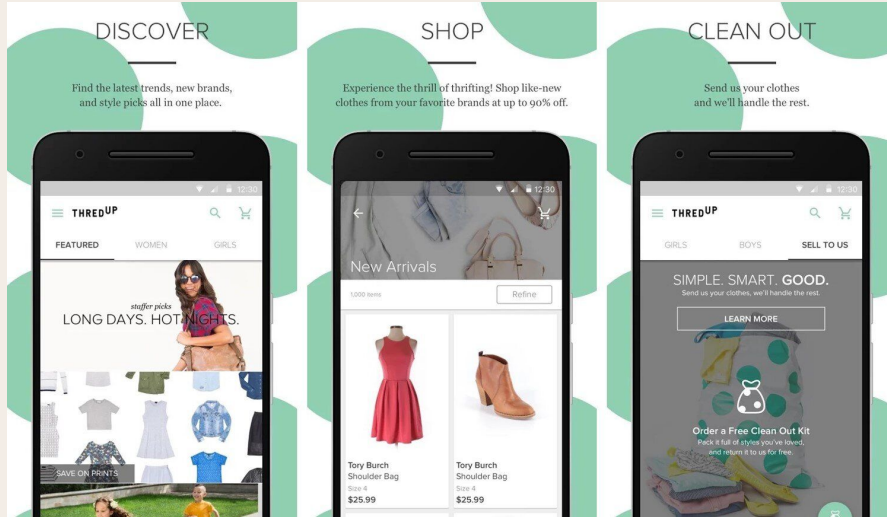


Figure 3: Thredup app interface

## Thredup

Thredup is an online consignment thrift store with the mission to refresh your style while creating less waste. They promote a circular fashion model by encouraging a system that makes customers sell their clothes and purchase second hand on the same platform. While shopping on the site, customers are educated on their environmental impact by shopping secondhand.

### How it works:

Customers receive clean up kits where they can put in their preloved clothing. Once packed and sent to the warehouse, the company does the rest, and you earn money on the side.

There are limitations to this platform as it only caters to womenswear and children's clothes and is not for everyone. Their services are limited to certain countries, not including New Zealand.

# Technologies

## **Magic mirror/ Virtual mirror - Virtual fitting room**

Purchasing products online can be difficult to assess and may require situated experience to easily determine their purchase decision. Retail stores can offer virtual fittings to support their selection process. Virtual mirrors allow users to try on different garments effortlessly and assess fit without physically putting on clothes. (Saakes et al., 2016) The gadget offers video-based augmented reality, which blends digital content with physical reflections such as a camera and display.

This blend of interactive display and digital content shows a seamless way of seeing how people can try on outfit without the effort of physically trying them on.



Figure 5: Virtual mirror



# Technologies

## Mirror mirror - Draw on body T-shirt design system

Mirror Mirror is a t-shirt design system that allows you to customise your designs on a t-shirt through a mirror. (Saakes et al., 2016). A mirror is used to implement spatial augmented reality and provide highly accurate and responsive feedback to the user as they design the shirt on their body in real time. The mirror's reflection would project enhanced visuals onto the reflection. They provide an immersive virtual reality experience by combining projection mapping with a standard mirror.

The design system entails direct body interaction and an interface with a mirror. With a variety of brushes that come in different colours, styles, sizes, and patterns users can use to create designs on the body.. They explored different UI platforms, one being a tablet based that is synchronised with the projector and the other using the tablet as a palette they can draw on the body. After they conducted user testing on both interfaces, they found a tablet interface brings an easier and more intuitive experience for both professional designers and non professionals

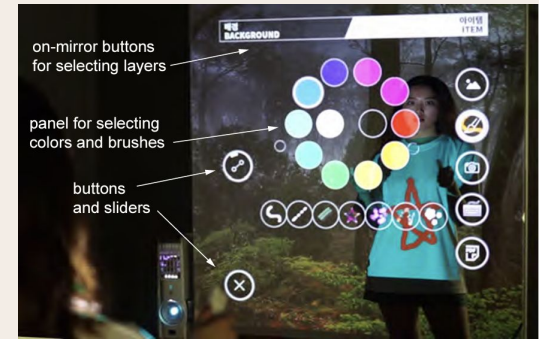


Figure 6: Mirror interface design system

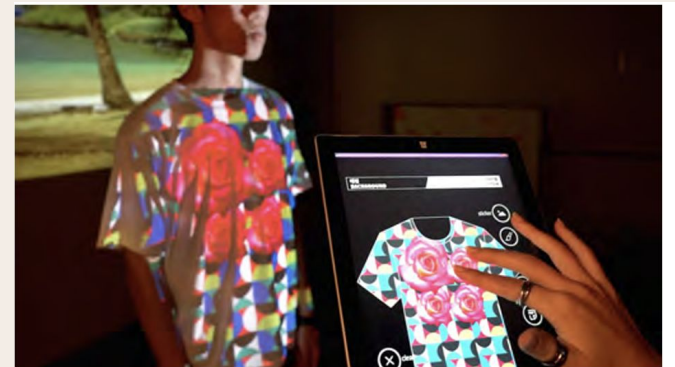


Figure 7: Mirror interface design system

# Target audience

My primary target audience is on people who engage in social media and frequently clothing purchases online, primarily older teenagers and adults. (Oberlo, 2023) Findings show that generation z, specifically people aged 18-24 buys more clothes than older generations. (Weisbrod, 2022) Therefore focusing on this age range would be beneficial to find ways to reduce overconsumption and textile waste. This age group's affinity for fashion presents a unique opportunity to address the issues of overconsumption and textile waste, given their influence on market trends and their receptivity to sustainable fashion practices. Furthermore, thrifting has also become popular among and an increase of interest of sustainability is one of the important factor when buying clothes to gen Z. Catering to a demographic more exposed to online media-promoting consumption would help form insights into their behaviours and create opportunities to minimise their impact of clothing waste.

# Methodology

My project will require understanding the behaviours of consumers. What motivates them to buy clothes and how they dispose their clothes. I will follow the double diamond method to investigate and define the needs of users in order to develop a solution to this problem.

## Discover

In the discovery phase, I will gather contextual research to gain an understanding on my topic and what is currently known about the issues. I also gather interviews

## Define

After gathering information, information mapping and define patterns, establishing needs and framing the problem

## Develop

I form ideas on potential solutions in response to framed problem and produce design solutions and iterate the design from user testing feedback.

## Deliver

Final outcome of the design process and implementation into real world context

## Design Thinking 'Double Diamond' Process Model

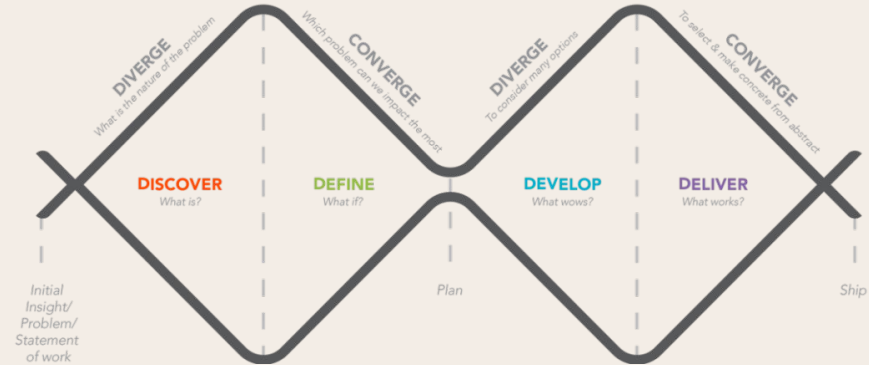


Figure 8

<https://uxplanet.org/quick-steps-through-the-double-diamond-cf2e00b22ba7>

# Methodology

## User centred design

In order to produce a usable and accessible product, user-centered design is an iterative approach that involves designers in including users at every stage, from field research to usability testing. (Le, 2017)

I will carry out the following phases of the user centred design method:

**Specify the context of use:** Define the product's intended usage, including who will use it, for what purpose, and in what circumstances.

**Define the requirements:** Determine any user objectives or business requirements that must be satisfied for the product to succeed.

**Ideate and provide design solutions:** starting with an initial concept and progressing to a finished design.

**Evaluate Design:** Review designs with user testing to determine whether the design aligns with the context of use and user objectives.

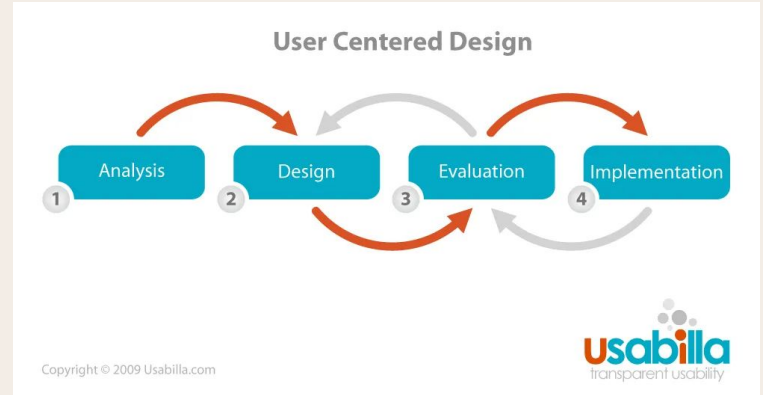


Figure 4: User centred design framework

# Interviews

I've conducted interviews on friends and family on their on where and how they purchase their clothes.

From my interviews, i found that people often shop online due to convenience and they tend to buy clothes that are timeless to them and rarely regret the clothes they buy.

For repairing and disposing clothes, they have good practices of donating their clothes into the clothing bin though not many upcycle except for one person

Figure 9 & 10: Interview notes

How often do you purchase clothes?	Where do you find clothes to buy?	When you buy clothes do you go for cheap or expensive clothes and why?	out of the clothes you own, how many do you wear actually?	How do you find the clothes you like (ads, in store etc.)
1 once a month every 6 weeks	online mostly through instagram influencers	expensive - feel good last longer, quality good, cost per wear last longer	80-90% of clothes i wear	see someone on insta wearing clothes
1 month or every few months	always looking for pants	buy more expensive less frequently	rest dont know how to match	pays attention to how it fits - makes or breaks
once every 4 months	online - yes style dont like trying on- online more options	makes you consider what you really need	30% why clothes back up- seasons not right -temp	homepage - photos reverse search both ads onlince
	online sometimel ook in maal	cheap - cuz broke	less than half	look at brands i like, browse shopping sites
		depends - if i want it i get it		

Do you often regret the clothes that you buy? why or why not?	What do you do when your clothes get ripped or damaged?	how do you throw away clothes?	How often do you throw away clothes?
not often	turn them into rags - or put into clothing bin	clothing bin	once every 6 months
bought - testing style - changing weight - really like but dont fit	would consider -so worn out depends on condition	donate clothing bin	1once every 5 years
not often - like buy timeless	turn it into something else - upcycle	donate, regular bin if beyond repair but - not often	not often - 1 every 4 years
not often - buy timeless	throw away		

# Interviews

When I asked about their experiences with second-hand shopping, they find it tedious because they browse through cluttered items in all sizes yet can't find their size and trying on items can be a hassle. People often go thrifting without knowing what they'll get, adding to the browsing time.

From my interviews, people find it tedious to look through second hand clothes because they can't find their size and would rather look online at new clothes. People determine what they buy based on how it fits on them so incorporating a fitting feature would help encourage people to buying clothes in general. There is still a problem with the lack of reusing clothes, too many of second-hand clothes available are not in people's sizes making it harder to shop sustainably, this possibly leads to a cluttering problem in thrift stores.

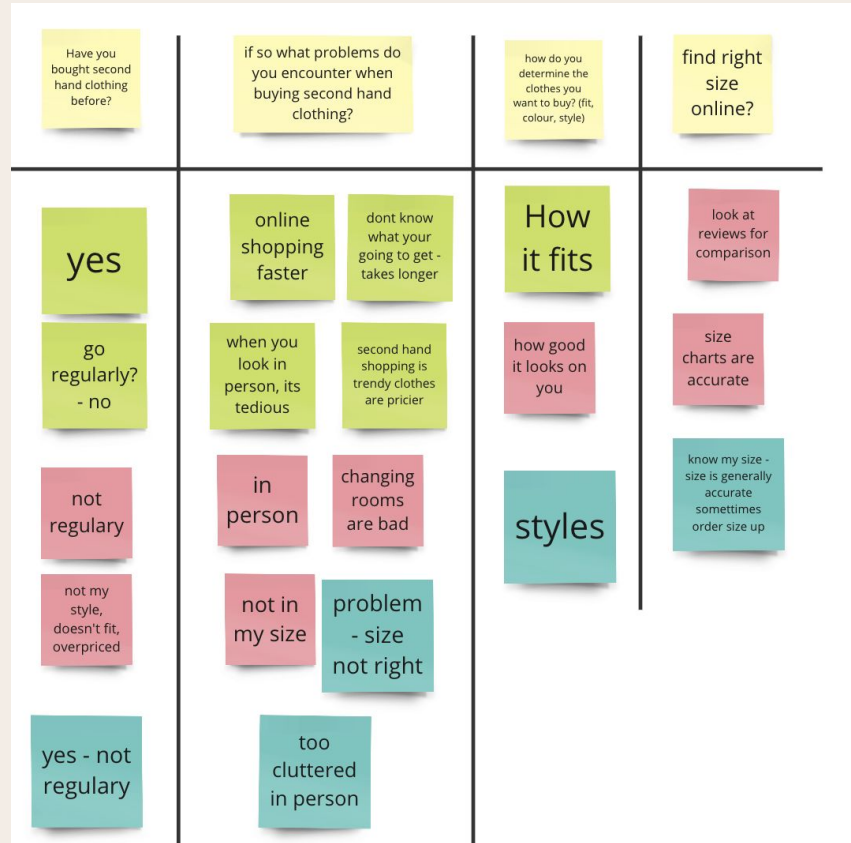


Figure 11: Interview notes

# Persona 1

Figure 12: persona avatar



## Tayla

20 years old

Marketing

University student

## Description

Tayla is motivated by the desire to express their individuality and creativity through her wardrobe has a deep appreciation for unique and personalized clothing.

## Scenario

Tayla is on the lookout for unique clothing pieces while on a budget. She doesn't have time to go thrift in stores, so she browses online. She finds it tedious having to sift through multiple filters to find her preferred clothes and ones that would be in her size and fit her well. She wishes there was a way to have clothes customised to her fit while being sustainably conscious.








## Goals

- Wants personalisation and creative freedom to find a sustainable way to buy clothes
- Actively engage with the community with similar interest of fashion like herself
- See how the clothes fit on her to confidently make purchase decisions

## Pain points

- Can't find items her size whenever she shops second hand
- Trying on clothes or finding out their size can be tedious

# User Journey : Tayla

	Discovery	Onboarding	Design Selection	Customisation	Assessing	Confirmation	Loyalty
Action	Discovers app through a friends recommendation and on the app store	Explores the app's features	selects item to design, enters size measurements and textile source	Selects the materials she wants on her clothes	checks fit on model	Add to cart to order	Updates on order, Share customised creations
User Goal	Looking for clothes tailored to her	Assess whether the app is right for their needs	Have the clothes correctly tailored to them	Personalise the clothes to their liking	Assess if the clothes suit to their measurements	happy with the fit and purchases the item	Receive updates and share creations to inspire others
Feelings							
Touchpoints	google search, app store search	introduction to the app's features, feed page	Measurements, textile source	Textile selection, filters, recommendations	View on model	add to cart, confirm order	order page, Feed page



# Persona 2

Figure 13: persona avatar



## Brandon

27 years old,  
Working from  
Home

### Description

Brandon is a workaholic that likes a simple lifestyle passionate about sustainability live minimalistically

### Scenario

Brandon has a lot clothes in his wardrobe that he no longer. the clutter of his own wardrobe inspired him to declutter and donate clothes that were in good condition but were no longer part of his daily rotation. He has tried selling his clothes online but to no avail in getting rid of them. He wishes there is a simple donation service that can be flexible around his schedule

### Goals

- Wants an easy and flexible way to donate clothes allowing to schedule
- Wants a sustainable service that

### Pain points

- Hard to get rid off clothes when he is stuck working at home most of the time and can't go out as much

# User Flow

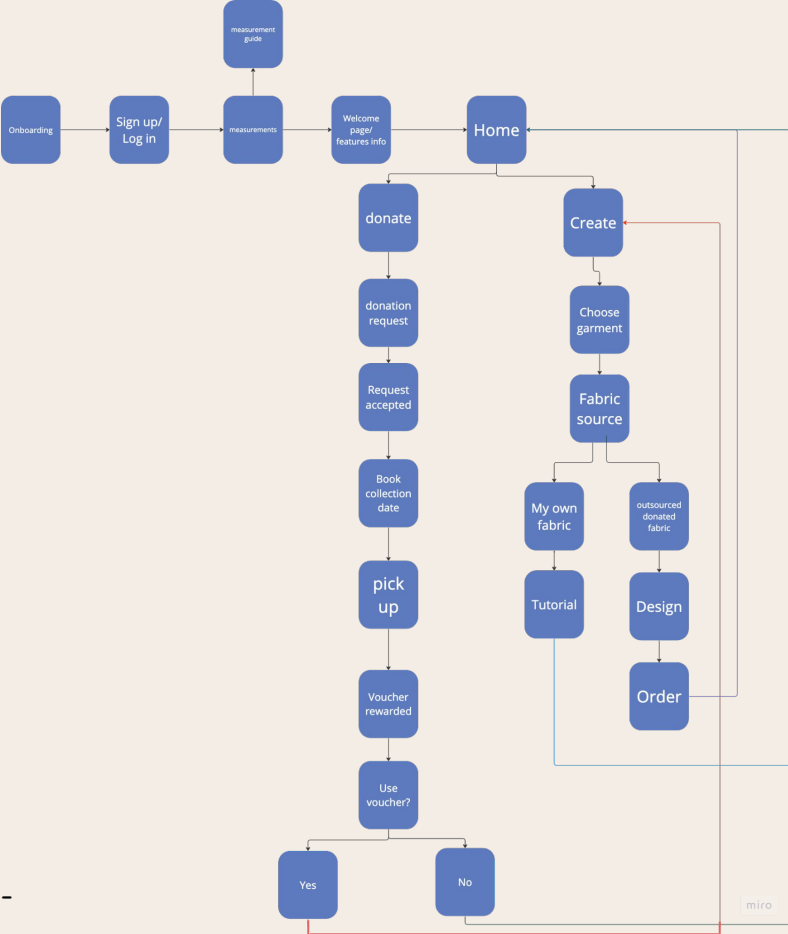


Figure 13: personal work - user flow

# Wireframes

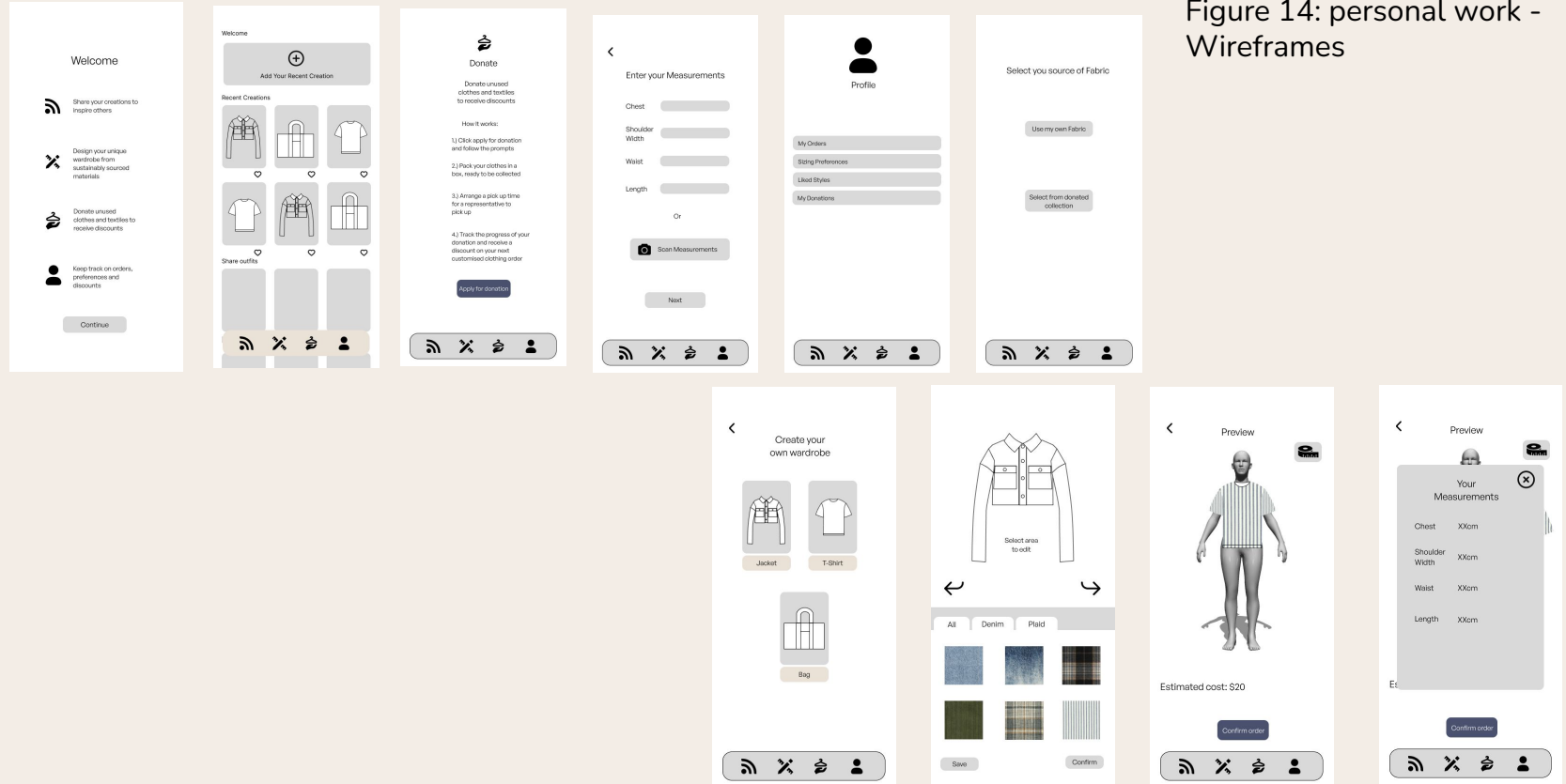
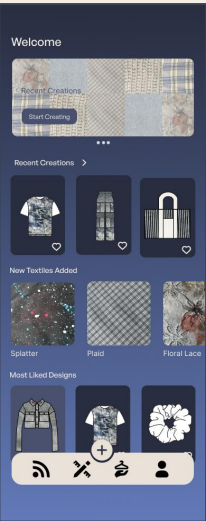
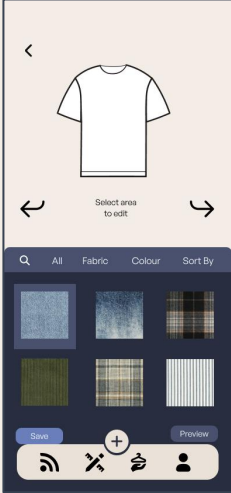


Figure 14: personal work - Wireframes

# Mid fidelity prototype



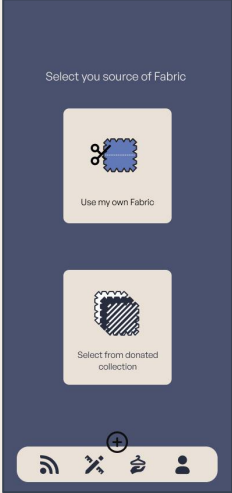
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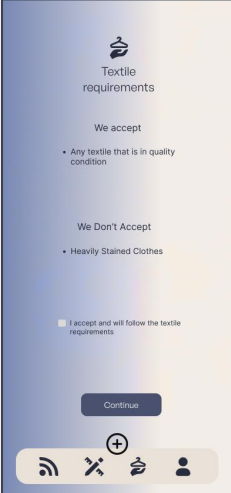
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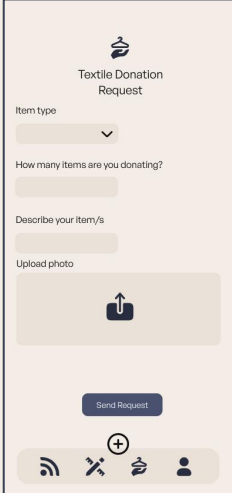
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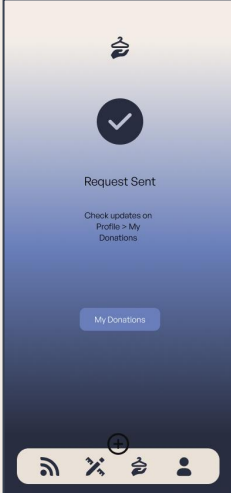


Figure 15: personal work - mid-fi prototype

# Feedback and user testing

During studio workshops, I received feedback on my mid fidelity screens e, colours and some gradients and colours used were too harsh and contrasting. And icons weren't translating to what I intended them to be such as the people mistaken the feed button and reducing

I've also conducted user testing on my work in progress prototype when it came to the s conducted to to gain feedback on usability. From my observation on user testing, I noticed that people got confused on the material selection on the design garment page. (figure 15b) It lacked the indication of whether the mather was selected or not.

From peer feedback and user testing, it gave me direction on what I need to iterate next.



Figure 16: studio work - feedback session

# Solutions and key outcomes

I propose a solution to address the waste issue in fashion by introducing a service that promotes a sustainable, circular model of clothing consumption. This service would repurpose old textiles to create new garments, reducing the environmental impact of the fashion industry. To encourage consumers to participate, we would advocate for practices such as upcycling, donating, and reusing clothing while bringing social awareness around these initiatives.

The key outcome of this project is to offer a service that motivates individuals to make sustainable fashion choices, emphasizing the importance of upcycling and receiving custom-made clothing tailored to their preferences. This approach not only extends the lifespan of existing textiles but also significantly contributes to reducing textile waste. Through the implementation of this service, I hope to pave the way for a more sustainable future in the fashion industry, one that values responsible clothing consumption and prioritises environmental considerations.

# Design Solution - Stitch up

## Features:

### Donation

Users can donate their unwanted textiles to the app and receive discounts on their next designed garment purchase. Donations can be any materials whether it's clothes, blankets, rags or any fabric scraps that can be repurposed into a new product. Most donation centres offer drop off centres or clothing bins. This service offers pick ups from your for con. When we throw away our clothes, we often don't know where exactly our clothes go and so by providing this donation this brings forth transparency to where our clothes go and how it gets repurposed once we donate them.

### Design your Garments

The platform can provide services to users by providing tools to customise clothes to their fit and providing the materials sourced from donated clothes or fabric through the app. Donated material can also be repurposed into bags, blankets and accessories. This service helps encourage upcycling practices by sourcing materials from existing fabrics, minimising waste.

### Virtual fitting

A Virtual fitting that helps determine fit for the users, this could be accompanied by augmented reality to take user measurements. Providing a virtual fitting would help determine purchase decisions for users.

### Upcycling

If users would like to use their own material they can follow a step by step tutorial on how they can upcycle themselves. From peer feedback, people showed interest in wanting to know how they can upcycle themselves so by incorporating

### Sharing

A feed page that allows you to share creations of your customised clothes to inspire others to do the same and vice versa.

Figure 17: Personal work, Phone mock up prototype



# Critical commentary

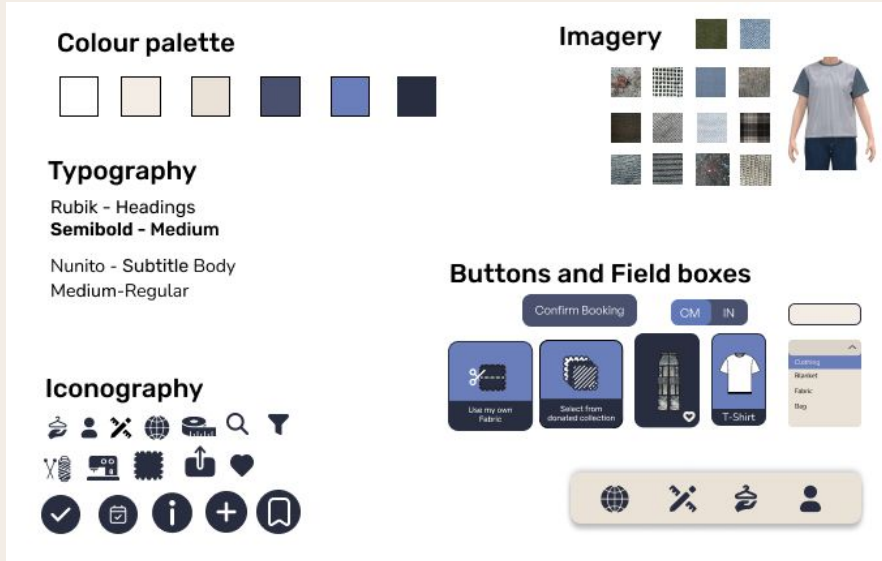


Figure 18: Personal work,  
Design system

## Design system

I keep design is minimal since its focus is on textiles and its patterns.

## Colour palette

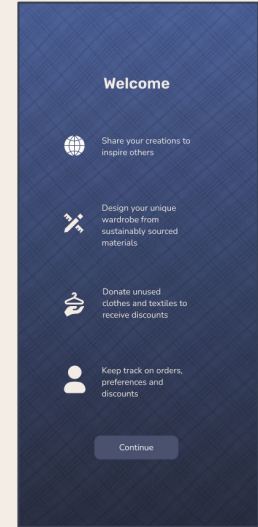
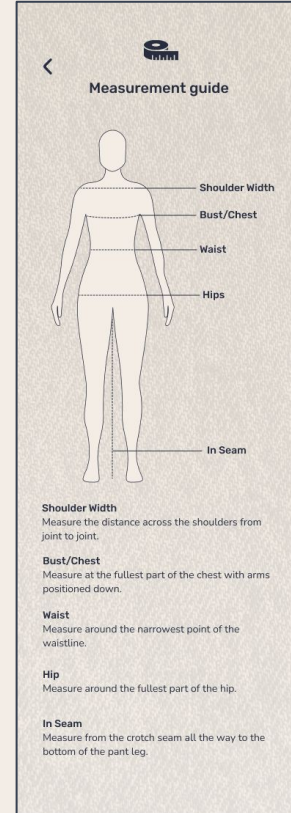
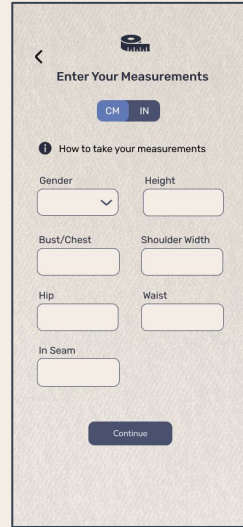
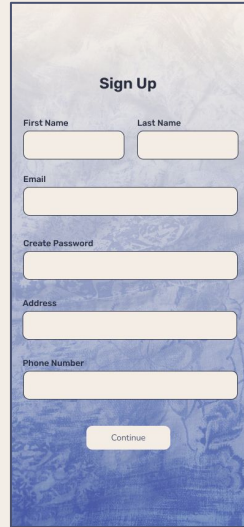
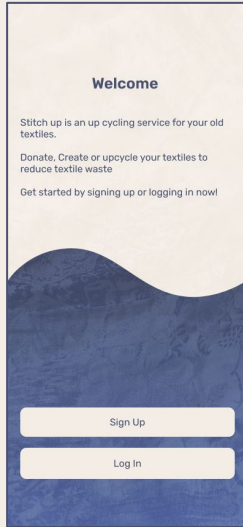
I used colours of indigo and beige white, for creativity and intuitiveness

## Imagery/Textures

My main focus on the design is around textiles so incorporating imagery of patterns and textures made from textiles images of these textiles



# High fidelity Prototype - Onboarding

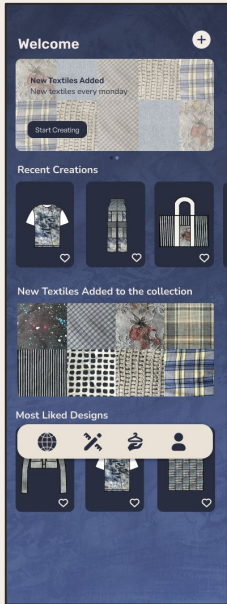


Onboarding introduces the app to the user, Signing up involves putting in address, phone number and entering size measurements for the purpose of personalised fitting and tailored patterns. Providing information at the onboarding process would save time and have ease of having pre saved info for ordering and donating. The welcome page introduces the icons used for the home bar for the user to understand its features and functions upon joining.

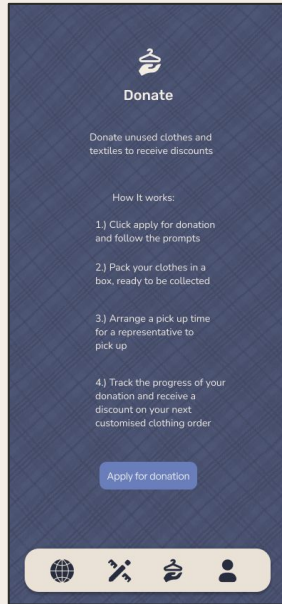
Figure 19: Personal work, Onboarding prototype

# High fidelity - Main pages

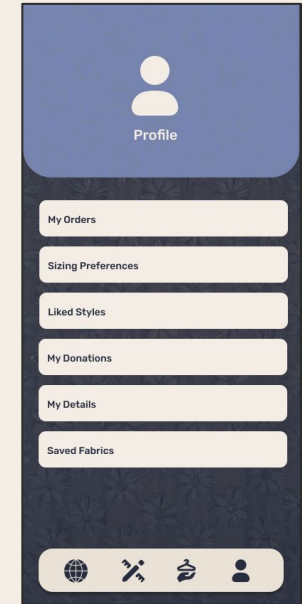
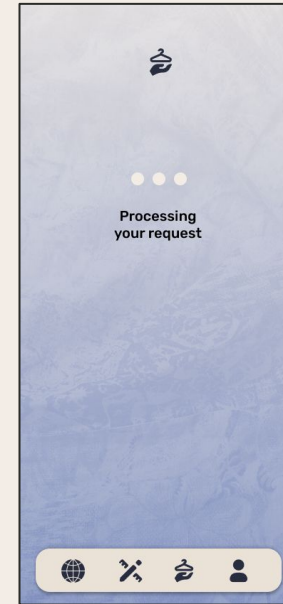
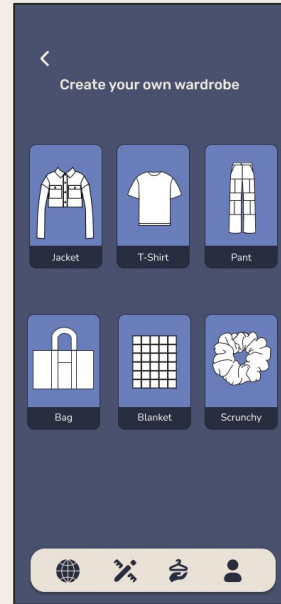
Figure 20: Personal work, prototype



Home screen displays recent creation made by other users on the app as well as recently added textiles and most liked designs users have created

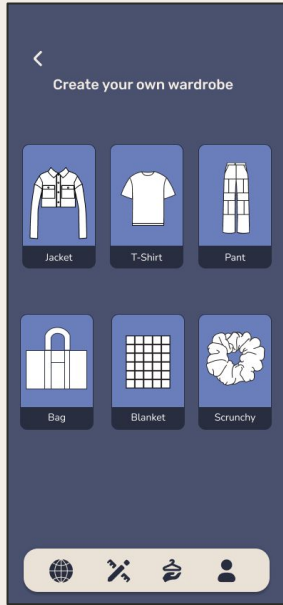


Donation screen talks through how the donation process works before proceeding.

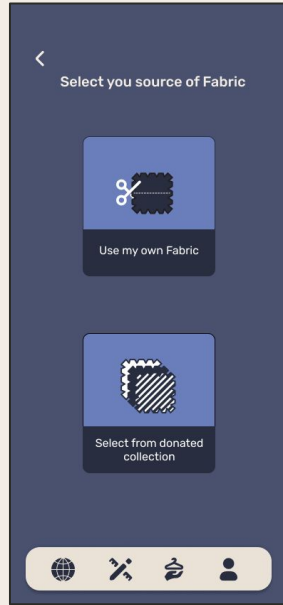


# High fidelity - Designing Garments

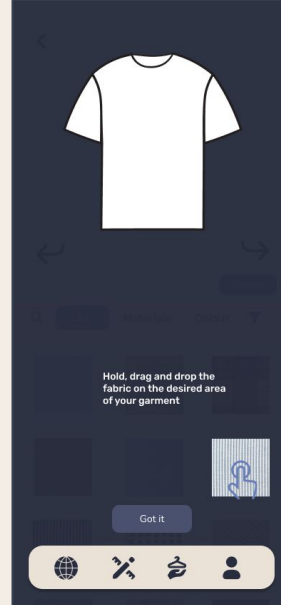
Figure 21: Personal work, prototype



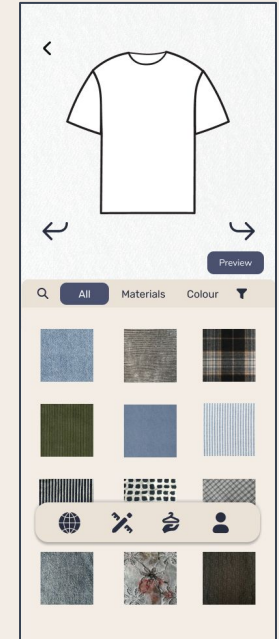
The page above lets users create and customise from a selection of items.



From previous feedback, instead adding fabric to the garment tapping, adding an animated demonstrator drag and dropping fabric onto the garment



Tapping on the material would bring up information about the material



# Prototype - Preview and order

Once you finish designing your garment, you're able to preview your design in a 360 motion video in a 3D model. The model represents your body measurements and gives you an idea of how the garment will fit on you. The details below show what materials you used for each panel of the garment and the price breakdown of the materials you've used. Once design is confirmed they taken to the next steps of ordering and confirming their payment and address details for delivery.

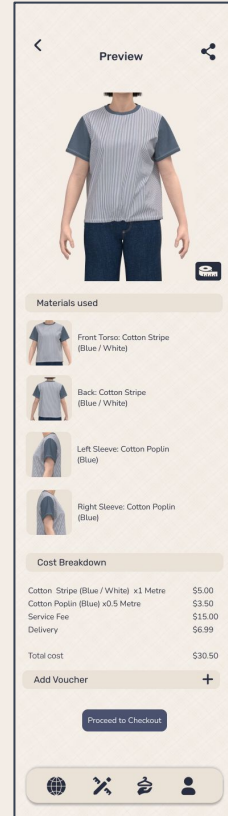
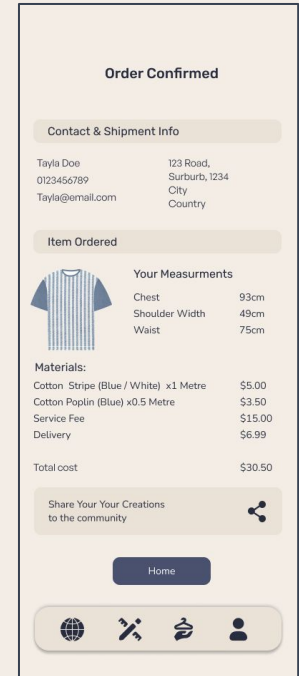
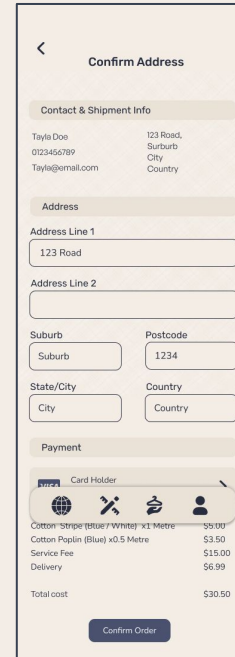


Figure 22: Personal work, prototype



# Prototype - Upcycling

**Create A T-Shirt**



View Pattern

**What you need**

- 1.37 Metres of fabric of your choice
- 0.5 Metres of ribbed fabric
- Thread
- Sewing Machine

**Level: Beginner**

Materials are calculated based on your measurements



fabric, and pattern easily accessible. Unfurt your

fabric on your work surface so that it lays flat and is not hanging over the edge. The wrong side (or underside) of the fabric should be facing up. If needed, place a mat underneath it to protect your work surface from pinpricks, cuts, and scratches.

**2. Pin and cut out the pattern.**

Cut out your pattern pieces, lay them out on your fabric, and pin them down. Use tailor's chalk to trace the pieces onto the fabric, and cut them out according to the pattern, leaving a half-inch seam allowance on all sides. View measurements of your pattern and do





**3. Sew the shoulder seams.**

Lay the front piece of the shirt on top of the back piece so that the edges are in alignment and the inside of the fabric is facing out. Pin the shoulder pieces together. Using the sewing machine, sew the front and back of the shirt together to connect the pieces.



**4. Make the neckline.**

Sew the strip of fabric you cut for the neckline so that it makes a loop. Open your now-connected front and back pieces like a book and lay them flat so that the neck hole makes a complete circle. Pin the neckband onto this hole. Sew the fabric all the way around the neckline to attach.




**5. Add sleeves.**

Keep your T-shirt open and flat on your workspace so that the neckline still makes a complete circle. Pin one sleeve to the appropriate shoulder so that it lies flat like the rest of the shirt. The seam allowance on the sleeve should be underneath the shoulder to hide raw edges. Add pins to attach either side of the sleeve to the front and back pieces, stopping at the armholes. Repeat for the other sleeve. Sew the sleeves in place where you added pins.



**6. Finish the sleeves and close the sides.**

Pick your shirt up and fold it in half at the neckline so that it resembles a finished T-shirt, and the front panel is lying stacked over the back one. The inside should still be facing out. Leaving the armholes open, add pins from the underarm to the bottom of each side of the shirt. Sew along the right side to add a side seam. Repeat for the left side.



**7. Hem the bottom and sleeves.**

Fold the bottom edge of your T-shirt under twice to hide the raw edges. Use an iron to press. Straight stitch the bottom hem of the shirt. Repeat this process for each sleeve to complete the project. Turn the shirt right-side out.

Finish

**T-Shirt Pattern**

Seam Allowance

- Please allow 1CM for Seam allowance
- Pattern is folded to ensure evenness on both sides






**Cutting Guide**



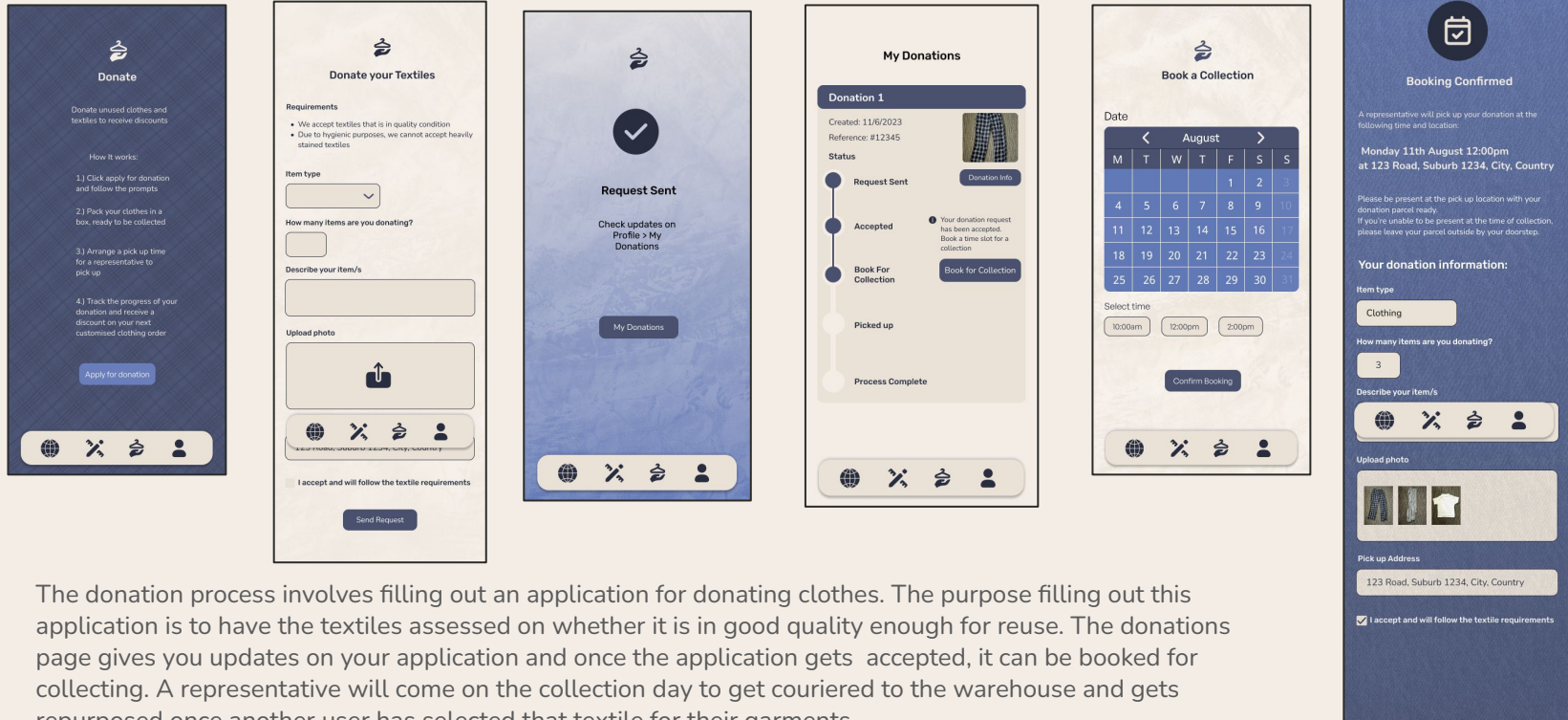
Download pdf Send to printer

Upcycling can be done when you have your own materials you can source. The app provides a step by step tutorial on the garments you want to create and it provides measurements tailored to your size.

Figure 23: Personal work, prototype

# High fidelity prototype - Donation

Figure 24: Personal work, prototype



The donation process involves filling out an application for donating clothes. The purpose filling out this application is to have the textiles assessed on whether it is in good quality enough for reuse. The donations page gives you updates on your application and once the application gets accepted, it can be booked for collecting. A representative will come on the collection day to get couriered to the warehouse and gets repurposed once another user has selected that textile for their garments.

# Conclusion and Reflection

In conclusion, my project has been dedicated to addressing the pressing design problem: how might we encourage user to reduce textile waste? A significant issue in the fashion industry and a primary contributor to environmental pollution. While I'm not an industry expert, my approach involved extensive investigative research and user interviews, allowing me to synthesize insights and employ user experience design principles. Through this process, I've developed a user-centric solution.

This project had its challenges throughout the semester. The fashion industry is actively working on sustainability, with a multitude of ideas and solutions circulating. As an individual, it's daunting to tackle such a broad and well-discussed issue. However, with the invaluable feedback from my peers, I've managed to create a unique app that could potentially drive change in the way we consume and dispose of clothing.

Looking ahead, if there was more time to develop this project there are several opportunities to enhance this project. Based on my research into fashion-related technologies, incorporate features that streamline the fitting experience and leverage augmented reality to provide users with an immersive mixing and matching clothes using their phone's camera. The aim is to continue developing and refining the solution to make ease on the tailoring experience of the app.

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# Ethics user experience forms



**GRAD703 - INRD702/704 —Research Plan**  
**—User-experience research**

Date 18 August 2023

**Paper Name**  
INRD702 - Interactive Design Studio V - INRD704 - Interactive Design Research IV

**Project Title**  
Designing a service or a tool for extending the longevity of clothes

**Your contact details**  
Bianca Wood, [fp9201@auckland.ac.nz](mailto:fp9201@auckland.ac.nz)

**What do you have planned for your design project?**  
My design project is researching on overconsumption and excessive clothing waste. There is an increase of clothing consumption than clothing utilisation among consumers in the past 20 years. The aim is to establish design opportunities that exist in this area and in response, create a design output that add value to the user and minimise the problem. At this stage, I think my design project will be reducing clothing waste by increasing clothing utilisation. My intention is to make thrifting or second-hand purchases more accessible and easier to users. My possible design format would be creating an app. My possible target audience would be older teenagers to adults ages 18-50 who are interested in clothes or purchasing second-hand clothing.

**What is the purpose of this user-experience research within your design project? Why is it necessary?**  
I propose running user-experience research sessions including problem framing where participants are asked about their experiences with buying, using, and disposing their clothes. I will also conduct user testing where participants will interact with my design prototypes and provide feedback. These sessions are necessary to my project as they provide input into my research give me direction in my self-directed project and affect the outcome of my design solutions.

**When and where will you be running your user-experience research sessions?**  
AUT campus, date and time is TBC

**What will you be asking your participants to do?**  
For problem-framing, participants will be asked questions about their habits around purchasing, using and disposing and what their attitudes is towards second-hand clothing. For user-testing, participants will be asked to navigate my designed app and give feedback on what features could be improved on.


**What type/s of questions will you be asking?**  
Multiple Choices / Open-Ended Questions.

**What will you be asking your participants to talk about?**  
Problem framing Questions:

- How often do you purchase clothes?
- Where do you find clothes to buy?
- When you buy clothes do you go for cheap or expensive clothes and why?
- out of the clothes you own, how many do you wear actually?
- How do you find the clothes you like (ads, in store etc.)
- Do you often regret the clothes that you buy? why or why not?
- What do you do when your clothes get ripped or damaged?
- how do you throw away clothes?
- How often do you throw away clothes?
- Have you bought second hand clothing before?
- if so, what problems do you encounter when buying second hand clothing?

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Approved by the Auckland University of Technology Ethics Committee on 31 July 2023, AUTEC Reference number 23/220.



- how do you determine the clothes you want to buy? (fit, colour, style)
- When you buy clothes online, is the sizing accurate?
- Have you tried buying second hand clothes online?
- If so, how was your experience?

**User testing**

- How was navigating the platform?
- Is there content that that you couldn't find on the app that you wish was included?
- How was using view on model feature do you find this feature useful? Why? Or why not?
- Does using the onboarding experience make things easier to find what you like? Why or why not?
- Is there anything you found confusing about the app?
- What button did you find helpful or not helpful about the app?
- Out of the search and filter features, which more are you likely to use? (search bar, materials, colours, filters)

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**GRAD703 - INRD703/704**  
**Participant Recruitment Advertisement —User-experience research**

Date Participation Recruitment Advertisement Produced  
18 August 2023

**Paper Name**  
INRD702 - Interactive Design Studio V, INRD704 - Interactive Design Research IV

**Project Title**  
Designing a service or a tool for extending the longevity of clothes

**Introduction**  
Hello,  
My name is Bianca and I am a current Year Three Interaction Design Student at AUT. I am creating a design project as part of my course requirements for INRD702 - Interactive Design Studio V - INRD704 - Interactive Design Research IV, which is one of my required papers and contributes towards a Bachelor of Design degree. I would like to invite you to participate in my communication design project, through user-experience research sessions. Participation in this study is entirely voluntary.

**About the design project**  
My design project is researching on overconsumption and excessive clothing waste. The aim is to establish what design opportunities may exist around this topic and in response, create a design output that delivers positive value to its user.

**Who I am looking for?**  
I am looking for participants that have some interest or experience with clothes and purchasing clothes second hand and are interested and available to participate.

**Proposed participation**  
I will be asking participants to engage with user-experience research sessions. You would be asked to unpack my projects topic (problem-framing) and/or interact with my design prototypes and provide feedback (user-testing). The findings of this user-experience research will inform my decision-making and design development for my design project and may also form part of the content embedded my design artefacts.

**How to volunteer to participate**  
If you are interested in participating in the user-experience research sessions within my project, please let me know and I will send you an Information Sheet with further details and a Consent Form to consider. You can let me know in person or through email.

**My details**  
Bianca Wood, [fp9201@auckland.ac.nz](mailto:fp9201@auckland.ac.nz)

**Paper Leader details**  
Dr Marcos Mortensen Steagall, [marcos.steagall@auct.ac.nz](mailto:marcos.steagall@auct.ac.nz), 09 921 9999 ext. 8516.

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Approved by the Auckland University of Technology Ethics Committee on 31 July 2023, AUTEC Reference number 23/220.

# Etrics user experience forms ontinued



## GRAD703 - INRD703/104 Participant Information Sheet –User-experience research

Date Information Sheet Produced:  
18 August 2023

**Project Name:**  
INRD702 - Interactive Design Studio V, INRD703 - Interactive Design Research IV

**Abstract:**  
Designing a service or a tool for extending the longevity of clothes

**Notes:**  
My name is Bianca and I am a current Year Three Interaction Design Student at AUT. I am creating a design project as part of my course requirements for INRD702 - Interactive Design Studio V / INRD703 - Interactive Design Research IV, which is one of my required papers and contributes towards a Bachelor of Design degree. I would like to invite you to participate in my communication design project. Participation in this study is entirely voluntary.

**What is the purpose of this research?**  
My design project is researching communication and extensive clothing waste. The aim is to establish what design opportunities will be submitted along with a final design output and a project document for assessment. Support of the information gathered during the user-experience research sessions, including questionnaires, surveys, photos and videos may also form part of academic and professional presentations of my design project. These presentations may include class discussions, assessment submissions, an exhibition, professional portfolio, marketing and awards entries—delivered across a range of media including print, TV, film, digital and the internet).

This paper contributes towards a Bachelor of Design degree. The design development process, including user-experience research, will be submitted along with a final design output and a project document for assessment. Support of the information gathered during the user-experience research sessions, including questionnaires, surveys, photos and videos may also form part of academic and professional presentations of my design project. These presentations may include class discussions, assessment submissions, an exhibition, professional portfolio, marketing and awards entries—delivered across a range of media including print, TV, film, digital and the internet).

**How was identified and why am I being invited to participate in this research?**  
You are invited to participate because you have responded to my call for participants in this project. The invitation is based on the premise that you are have some interest in experience with clients and purchasing clothes second hand and that you are interested and available to participate. If these criteria no longer apply to you, please do not respond to this invitation, as you will not be able to be included in the research for this project. This purely due to the aim of the research and not because of any personal criteria. In the event that I receive too many positive responses I may make a selection of participants, based on a first-come, first-served basis.

**How do I agree to participate in this research?**  
Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you. You are able to withdraw from the study at any time. If you choose to withdraw from the study, then you will not be included in any data that is identifiable as belonging to you removed or allowing it to continue to be used. However, once the findings have been produced or included in my design work, removal of your data will not be possible.

**How am I interested in participating in my design project, please respond to this invitation before 1<sup>st</sup> September. You will also be required to complete a sign and consent form from the information presented in the planned user-experience research sessions. Please return your completed Consent Form by either handing it to me in person or sending it to 316231@aut.ac.nz**

**What will happen in this research?**

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If you choose to participate in the user-experience research component of my design project you will be involved in problem-framing and/or user-testing sessions. In order to receive feedback into my research topic and design work, you are invited to share your thoughts and are invited to be named in the report of your experience.

In problem-framing sessions you will be asked to reflect on your user attitudes, thoughts, beliefs and ideas around the given research topic. You may be given a written questionnaire or asked a series of questions. You may also engage in some small creative exercises such as taking photos or sketching (artistic sketch is not required). You will be given all of the materials you need to complete the tasks.

In user-testing sessions you will be asked to use and respond to prototypes of my design work. You may engage with the design work through on-screen testing, or through viewing design options. You may also be given a written questionnaire or asked a series of questions, where you would reflect on your thoughts about and/or your experience of using my draft design work.

For the purposes of analysis, these sessions may also be documented using photography, video and audio recordings. Please note that all forms of data gathered through this user-experience research process may be used for the purposes of contributing to this project and related design artefacts, and that samples of my work included in academic and professional presentations. These presentations may include class discussions, assessment submissions, exhibitions, professional portfolio, marketing and awards entries—delivered across a range of media (including print, TV, film, digital and the internet).

**What are the disadvantages and risks?**  
Every effort will be made to make participation in this study an enjoyable experience for everyone involved. It involves you providing your time and insights, without any monetary compensation. It is not expected that this study will cause you to feel uncomfortable or stressed.

**How will these disadvantages and risks be alleviated?**  
As far as time during the process you do not feel uncomfortable about sharing your opinion or certain aspects of your life, you may choose not to do so. You can do this by either remaining silent, or answering a particular question or responding to leave the session. In the unlikely case that you need professional help as a result of participating in this research, the appropriate contacts are below.

AUT Health Counselling and Wellbeing is able to offer three free sessions of confidential counselling support for adult participants in an AUT research project. These services are only available for issues that have arisen directly as a result of participation in the research, and are not for other general counselling needs. To access these services, you will need to:

- drop into our centres at 902/32 or 8/2/4 or phone 921 9992. City Campus or 921 9998 North Shore campus to make an appointment. Appointments for South Campus can be made by call 921 9992
- Be the responsible parent that you are a research participant, and provide the title of my research and my name and contact details as given in this information sheet.

You can find out more information about AUT counselling and counselling on <http://www.auckland.ac.nz/being-a-student/being-a-student/being-a-student/your-health-and-wellbeing/counselling>

**What are the benefits?**  
As stated previously, this research project will form part of my submission for INRD702 - Interactive Design Studio V, INRD703 - Interactive Design Research IV, a paper that contributes to a Bachelor of Design degree. Your participation in the user-experience research within my design project will help me to identify the design opportunities within my design topic and/or support me in developing a research and useful design output. I also hope your participation might provide you with the chance to enjoy researching disciplines, broaden your understanding of my research topic and consider how design outputs could improve in the future.

**How will my privacy be protected?**  
Your personal data and everything disclosed during the user-experience research sessions will be treated with great care, to respect and protect your privacy. Your personal details will not be shared with parties outside of the context of this study, and will only be used to contact you for the purposes of this project, such as to confirm dates for the user-experience sessions.

The files resulting from these user-experience sessions will be stored on my personal computer and backed up on an external hard-drive or password protected online storage. All gathered data will be destroyed/deleted at the course completion, that takes place after the notification of grades by the Registrar. However, once you have participated in my design project or might be included within a design output (eg, an interview included in a magazine), the artefact will not be destroyed. A copy of all the research files will go into the Paper Leader and a USB, which will be locked labelled as the Paper Leader's office, separate to the Consent Forms. The copied set of files held by the Paper Leader will be also destroyed after course completion. The findings of this user-experience research will inform my decision-making and design development for my design project and may also form part of the content that is embedded and shared (indirectly) within my design artefacts. The findings will not be reported October 2023 page 4 of 9 This version was edited in July 2023

Approved by the Auckland University of Technology Ethics Committee on 31 July 2023, AUT/EC Reference number 23/2023.

used in any other future projects without further permission being sought. Material collected during these user-experience sessions may be reviewed by myself, my classmates, my lecturer and my Paper Leader as part of my coursework. Due to the nature of the research your identity cannot be kept confidential, as samples of data, photographs or videos may be displayed in the various presentations and my design work.

**What are the costs of participating in this research?**  
Participation in this user-experience research asks you to be prepared to dedicate about 10 minutes of your time for the problem-framing sessions and/or up to 20 minutes of your time spread across 2 weeks for the user-testing sessions. The exact dates, hours and venue will be confirmed through open discussion. There should be no costs involved and there will be no monetary compensation for participation.

**What opportunity do I have to consent to this invitation?**  
If you are interested in participating in the user-experience research sessions within my project, please respond to this invitation before 1<sup>st</sup> September. You will also be required to complete, sign and return the attached Consent Form before participating in the planned problem-framing or user-testing. Please return your completed Consent Form by either handing it to me in person or sending it to 316231@aut.ac.nz

**Will I receive feedback on the results of this research?**  
If you choose to participate in the user-experience research sessions within my design project, the information and feedback you provide will be used to inform the development of my project and design outputs. The findings will be embedded in the design process and design artefacts, rather than in a written summary. If you would like to receive a copy of the reflective Project Document that I will write up as part of this project, please indicate this in the appropriate field when filling out the consent form, and a PDF will be emailed to you after the written examination date. You are also welcome to come and view my final design output at the end of your exhibition being held in November. Again, please indicate this in the appropriate field when filling out the consent form and exhibition invite will be emailed to you after the official examination date.

**What do I do if I have concerns about this research?**  
Any questions regarding the nature of this project should be notified to the first instance to the Project Supervisor, Dr Marcus Marston Steppell, [marcus.steppell@aut.ac.nz](mailto:marcus.steppell@aut.ac.nz), 09 921 9999 or 8516. Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUT/EC, Dr Carina Marston, [carina@aut.ac.nz](mailto:carina@aut.ac.nz), 921 9999 or 6038.

**When do I contact for further information about this research?**  
Please keep this information sheet and a copy of the Consent Form for your future reference. You are also able to contact the research team as follows:

**Researcher Contact Details:**  
Bianca Wood, [bjw20@aut.ac.nz](mailto:bjw20@aut.ac.nz), 09 921 9999 or 8516  
Dr Marcus Marston Steppell, [marcus.steppell@aut.ac.nz](mailto:marcus.steppell@aut.ac.nz), 09 921 9999 or 8516.  
**Project Supervisor Contact Details:**  
Dr Marcus Marston Steppell, [marcus.steppell@aut.ac.nz](mailto:marcus.steppell@aut.ac.nz), 09 921 9999 or 8516.

## Consent Form User-experience research –problem-framing and user-testing

Project name: **INRD702 - Interactive Design Studio V  
INRD703 - Interactive Design Research IV**

Project title: **Designing a service or a tool for extending the longevity of clothes**

Project Supervisor: **Dr Marcus Marston Steppell**  
Researcher: **Bianca Wood**

I have read and understood the information provided about this research project in the Information Sheet dated 18 August 2023.  
 I have had an opportunity to ask questions and to have them answered.  
 I understand that notes will be taken during the problem-framing and user-testing sessions and that the sessions may also be photographed and/or video recorded. I understand I may also be asked to provide other content, such as sketches or notes, as part of these sessions.  
 I permit the researcher / design team to take photographs, videos and other information created in the problem-framing and user-testing sessions to a part of this project, and any other reproductions or adaptations from them—either complete or in part, either in a combination with any writing and/or images taken exclusively for (a) the researcher's / designer's portfolios; and (b) educational, industrial and examination purposes and related design work; and (c) all forms and media for advertising, trade and any other lawful purposes as stated on the Information Sheet.

I understand the content provided during the interview and/or questionnaire will be stored by the researcher during the research and that all gathered data will be destroyed/deleted at the course completion, that takes place after the notification of grades to the School Exam Board. However, once part of the research material might be embedded within a design output (eg, an interview included in a magazine), the artefact will not be destroyed.  
 I waive any right I may have to inspect or approve the finished product(s) of this design project.

I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without being disadvantaged in any way.  
 I understand that I will withdraw from the study then I will be offered the choice between having any data that is identifiable as belonging to me removed or allowing it to continue to be used. However, once the findings have been produced or embedded in the design output, removal of my data will not be possible.

I agree to take part in the research.  
 I wish to receive a PDF of the Project Document (please tick one): Yes/ No  
 I wish to receive an invitation to the end of your exhibition (please tick one): Yes/ No

Participant's Signature: \_\_\_\_\_  
Participant's Name: \_\_\_\_\_

Participant's Contact Details (if appropriate): \_\_\_\_\_

Date: \_\_\_\_\_

Note: The Participant should/shouldn't bring a copy of this form.

27 October 2023 page 7 of 9 This version was edited in July 2023

Approved by the Auckland University of Technology Ethics Committee on 31 July 2023, AUT/EC Reference number 23/2023.

# Appendices

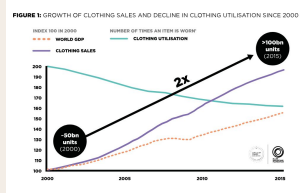


Figure 1: <https://ellenmacarthurfoundation.org/articles/the-trends-and-trailblazers-creating-a-circular-economy-for-fashion>



Figure 2: <https://www.marketvector.com/mvis-onehundred/a-circular-economy-designing-out-waste>

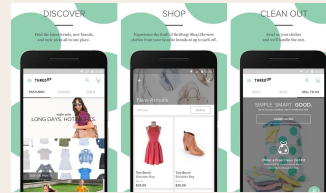


Figure 3: <https://www.attiremedia.com/tips-tricks/buy-and-sell-clothes-online>

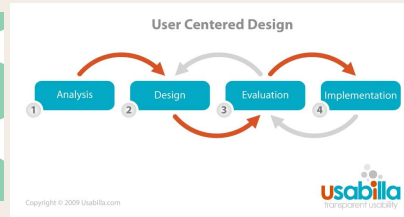


Figure 4: <https://medium.com/redcatstudio/user-centered-design-method-28e3aafc8c8a>

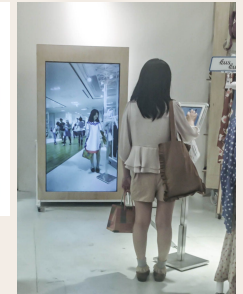


Figure 5: [https://en.wikipedia.org/wiki/Virtual\\_mirror](https://en.wikipedia.org/wiki/Virtual_mirror)

Design Thinking 'Double Diamond' Process Model



Figure 8: <https://uxplanet.org/quick-steps-through-the-double-diamond-cf2e00b22ba7>

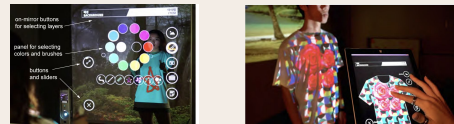


Figure 6 & 7: <https://doi.org/10.1145/2858036.2858282>

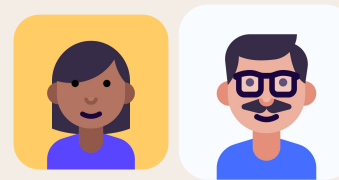


Figure 12 & 13: persona avatars generated from <https://personas.draftbit.com/>