

***Designing Healthy Aesthetics:***

**Exploring 'lived experiences' of women with Raynaud's Syndrome to  
inform fashionable knitwear that support agency and wellbeing.**

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## ABSTRACT

This thesis reports on research that used knitted fashion and textile practice to explore the wellbeing of women living with a disability, specifically Raynaud's Syndrome, contributing to the current discourse on re-addressing disability and fashion design. Raynaud's is triggered by the cold or a drop in atmospheric temperature, high levels of anxiety or stress, causing the narrowing of the blood vessels in the extremities. Such an 'attack', causes numbness, pain, fatigue, dexterity, and mobility issues. Raynaud's is usually managed by keeping warm using appropriate clothing, however, this research has identified a range of 'design issues' within existing clothing products. Some fail to mitigate the effects of cold and poor circulation effectively and others have limited appeal in terms of style, colour, pattern, and texture. The study investigated how the condition affects the women's wellbeing in relation to clothing and fashion, in terms of self-presentation, social interaction and 'feel good' factor. The findings from this human-centred research informed the development of the *Re-dress* capsule collection of fashion knitwear garments and accessories, designed to meet the requirements of the participants, and support their agency.

This thesis acknowledges the disability studies perspective that disability is multi-factorial, and should be addressed in terms of its biological, psychological, and social aspects. It further proposes that addressing the needs of people who are disabled, also requires an aesthetic dimension and explores the personal and external factors that shape women's embodied aesthetic experiences. The 'lived' body is explored to better understand how participants' bodies shaped their bodily aesthetic, sense of personal style and identity as they negotiate social norms through the lens of clothing and fashion.

The human-centred research design unpacked the multi-dimensional aspects of this negotiation. To comprehend the participant's lived experiences, it used qualitative methods, including in-depth, semi-structured interviews and wardrobe studies, informed by Interpretive Phenomenological Analysis (IPA). Additionally, a workshop/focus group was carried out with ten female participants living with Raynaud's Syndrome using co-design methods to design an ideal outfit that supported both their physical comfort and their aesthetic desires. These findings informed a sequence of designing and making activities to create several items of knitwear, that were assessed both aesthetically and technically. A process underpinned by my tacit and experiential knowledge as a fashion knitwear designer who lives with Raynaud's.



The research highlighted that embodied and external factors interlink to shape women's lived experiences with Raynaud's. Firstly, the subjective experience of living with Raynaud's Syndrome is greatly misunderstood by society. Secondly, the participants showed that the condition shrinks women's ability to participate in personal and public activities. Thirdly, women develop self-management strategies and DIY techniques in their clothing practice to support their physical and subjective wellbeing. Fourthly, 'design issues' within existing products fail to mitigate the effects of cold and poor circulation effectively. Finally, aesthetics is fundamental to enhance wearer's pleasurable and inclusive experiences on a personal and public level.

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## **CHAPTER 1. INTRODUCTION: knitting towards a study for Raynaud's**

## 1.1 INTRODUCTION

*“I usually found if my legs are warm, then it helps my fingers, so I’ve started wearing [laughs] a pair of running jogging bottoms underneath these (trousers), and [laughs] I’m like the Michelin man, but at least I’m kind of warm [laughs] it’s a bit sad really but [laughs]”*

(Jessie, 108-111)

The quote above is from an interview carried out in 2019 with Jessie, a 48-year-old female living with Raynaud’s phenomenon (at the time of the interview), and a participant of this PhD project. Jessie’s testimony is significant, as it provides a glimpse of the complex issue investigated in this thesis: understanding the lived experiences of women living with Raynaud’s phenomenon to enhance their well-being and agency through knitwear developments. Through semi-structured interviews and a focus group, I gained insights into the complexity of living, managing and coping with Raynaud’s. These insights informed my practice of creating knitted clothing designs to support the women’s physical and emotional wellbeing to enhance their agency. An additional note regarding this research project is this PhD study was carried out from the perspective of a female fashion knitwear designer and practitioner, living with the challenges of Raynaud’s phenomenon.

In the sections to follow, I provide my motivation and background for carrying out this PhD project, and how these factors shaped the research area and approach. These included my experiential knowledge as a Raynaud’s sufferer and my expertise of fashion knitwear design. These sections are followed by an outline of the research aims and an overview of the thesis structure. However, prior to this, I need to explain the condition Raynaud’s phenomenon for the reader to understand what it entails and its connection with clothing. Therefore, the immediate section focuses on this before I move on to outline the steps which shaped the research direction.

## 1.2 RAYNAUD’S PHENOMENON AND DISABILITY

Raynaud’s phenomenon is a condition affecting up to 20% of the adult population worldwide. Approximately 10 million of those are in the UK. The disorder affects 1 in 10 women and 1 in 12 men (NHS, 2020). There are two types of Raynaud’s: primary Raynaud’s



and secondary Raynaud's. The cause of primary Raynaud's is unclear, as the condition develops without any known cause, and secondary Raynaud's is associated with an autoimmune condition. People living with Raynaud's phenomenon are extremely sensitive to changes in body temperature. In response to the perceived harm of cold conditions, the human body sets in motion the 'fight or flight' survival mechanism, saving heat by slowing blood flow to the skin through narrowing of the blood vessels, and concentrating blood flow to the essential organs such as the heart. In Raynaud's sufferers, the 'fight-or-flight' response overreacts, narrowing the blood vessels in the extremities more quickly and extremely than normal. The restricted blood supply from an attack can be quite painful, making everyday tasks such as dressing and cooking difficult and frustrating. Usually triggered by cold temperatures, anxiety or stress, an attack causes the affected area to turn different colours, from white to blue, and then red as the blood flow returns. This process can be accompanied by numbness, pain, and the development of chilblains causing irritation and severe discomfort. Keeping warm is essential, not allowing the body to experience a sudden change in temperature is a means to self-manage Raynaud's and prevent the symptoms from occurring. Although medication is available to boost circulation, they are often accompanied by unpleasant side effects. As such, the preferred approach to keeping warm is by way of dressing appropriately. However, people with 'demanding bodies' (Laitala and Klepp, 2019) require extra consideration for selecting clothing, presenting a challenge to find suitable attire. In addition, the fashion industry is a key player in creating a sort of "*lifestyle exclusion*" for large minorities of people, such as those living with a disability (Soares et al, 2016, p. 41963).

According to Ayachit and Thakur, a "*Disability is an impairment that may be cognitive, developmental, intellectual, mental, physical and sensory or a combination of these that substantially affects a person's everyday activities. A disability can be present from birth or can occur during a person's lifetime*" (2017, p.904). And while Raynaud's is not formally acknowledged as a disability (at the time of writing), the research emphasises the disabling aspects affecting quality of life for participants. More importantly, the thesis explores the 'embodied' experience of disability, highlighting the complex nature of living with a 'physical impairment' which goes beyond affecting a person's 'everyday activities', moving into the realm of social, emotional and aesthetical implications. These are aspects which closely align with how we publicly and privately engage with the world through material things. This is particularly true of clothing, as these material objects provide agency in

shaping the types of interaction and experiences of their wearers. For this reason, my interest lay in exploring Raynaud's phenomenon within the context of clothing, fashion and disability as a creative and purposive concept. That is, engaging my creative skills as a practitioner to understand and respond to a group of women who feel neglected by the fashion and clothing industry, due to society's favoured representation of a 'normal' or 'ordinary' body type (Davis, 2013).

Having explained the condition Raynaud's phenomenon and my purpose of investigating this condition within the context of clothing, fashion, and disability, I now move on and outline my motivation and background that shaped my approach to this PhD research project.

### **1.3 MOTIVATION AND BACKGROUND**

The factors discussed in the sections to follow led me to carry out this study. These include my diagnosis journey, fashion knitwear practice and development of my design philosophy. Acknowledging and making explicit these key points is part of my process of adopting a 'reflexive attitude' for the following reasons. As I continue to grapple with my Raynaud's, I practice Reflexivity to balance objectivity and subjectivity when carrying out the research. This is done by critically reviewing my actions to ensure that the research project is conducted with utmost professionalism, rigour, ethical sensitivity and that findings are grounded within the data to guarantee validity. Furthermore, there would be no benefit to ignore my experience with Raynaud's, and Reflexivity recognises the inclusion of my own 'self' pragmatically during all activities of the research. The information in the sections to follow presents the rationale for my authority to carry out this research.

Firstly, I provide a definition of Reflexivity and how I used it as a tool to manage my reactions to the data during the research journey. This leads into making explicit my experiential knowledge of Raynaud's and fashion knitwear design within the industry and the beginning of my research on Raynaud's.

#### **1.3.1 Note on reflexivity**

Reflexivity is a valuable tool a researcher develops to "*turn a critical gaze towards themselves*" (Finlay, 2003, p.3), while conducting qualitative research. It is a skill developed

in the social sciences “*of examining how the researcher and intersubjective elements impact on and transform research*”, and a vital process of “*learning and transformation*” on the part of the researcher (Etherington, 2004, p.19). By acknowledging and making explicit the researcher’s own experiences and assumptions of the phenomenon under investigation, it clarifies their own position and potential bias which informs and shapes the research process (Crouch and Pearce, 2012). Therefore, in keeping with the principle of reflexivity, the following sections explores the factors which shaped and informed this research. This is an activity described as ‘personal reflexivity’ (Willig, 2001). I explain how my experiential knowledge as a Raynaud’s sufferer encouraged a holistic approach to manage symptoms of Raynaud’s and enhance my own wellbeing. By adopting a comprehensive perspective to treat a medical condition, this addressed my physical and emotional health, whilst considering the influence of social factors and the role of aesthetics within clothing and fashion. This holistic approach in turn shaped my design philosophy. My practice showcased the explicit (sensorial aspects of the garment such as the fit, shape and fabric properties) and implicit (emotional and aesthetic) values when designing clothing. I then describe how by undertaking a MA in Fashion Knitwear Design highlighted issues with ‘designer-product-customer’ relationships. I identified the need for further research into developing clothing to enhance a Raynaud’s sufferer’s well-being by adopting a humanistic design perspective.

### **1.3.2 Experiential knowledge of Raynaud’s and fashion knitwear design**

I was diagnosed with Raynaud’s in my mid to late teens. Symptoms first surfaced in the form of painful, red chilblains that covered my fingers and hands. The treatment process followed a biomedical<sup>1</sup> framework. Arrangements consisted of several brief examinations throughout the year and review of medications. However, on one occasion, I requested access to specialist clothing to help manage symptoms. Figure 1.1 shows gloves provided by the hospital to help keep my hands and fingers warm while continuing to carry out daily tasks. Originally manufactured for scuba divers to protect their hands against rocks and cold water, the hospital physician described them as comfortable and warm. Unfortunately, the gloves were ineffective as I found them too restricting in their fit, and the fabric made of

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<sup>1</sup> The biomedical framework is the dominant model of addressing and treating health conditions. The model adopts reductionism and dualism to address illness. Reductionism is a philosophy which reduce complex phenomenon to a single concept while dualism is a mind-body approach, dividing the “*mental from the somatic*” (Engel, 2012, p. 379).

sponge and Nylon felt cold against my skin. As a fastening, Velcro tightened the wrist area, but the fabric attached itself to my clothes, destroying their surface texture. While the gloves were aesthetically pleasing for performance wear, they lacked cohesion with casual wear. Other gloves commercially available were fingerless gloves also seen in Figure 1.1. A similar story to the hospital gloves, the commercial fingerless gloves were unstylish and the ribbing was too restrictive around the wrist area. Unsatisfied, I designed and knitted a pair of fingerless gloves shown in Figure 1.2. The design was stylish, light, lacked ribbing and colourful. Composed of 100% acrylic and elastane, the gloves were warm, inexpensive to make and the acrylic came in an array of colours (see Figure 1.3). The lack of finger panels meant that I could wear rings and could easily pull the gloves down towards the wrist without removing the gloves if needed. When introduced to my women's knitwear collection, to my surprise, the gloves proved popular for all age groups. Younger women enjoyed the fun and quirky character of the gloves, whilst conversations with women over the age of sixty revealed the true value of the design. The gloves were ideal for keeping their hands warm – as they got older, the women felt the cold more – without interfering with dexterity and some women used the gloves to conceal the appearance of old age in their hands which they were conscious about. Furthermore, they adored the softness of the fabric and the lace detail. The gloves were described as stylish and were a fashionable alternative to the thick black fingerless gloves that were on the market. Other designs from my studio practice focused on fabrics for sensitive skin, head pieces for cancer patients and garments for older women who lost muscle mass and struggled to find clothing that fitted their small frame. Hence, through my practice (2009-2015) I progressively recognised both explicit and implicit design values clothing enabled and sought to explore these aspects further by undertaking a MA in Fashion Knitwear Design at NTU in 2015.



(a)



(b)

*Figure 1-1: Image (a) fingerless gloves provided by the hospital to help manage my symptoms; Image (b) commercial knitted fingerless gloves (Photo Lisa Shawgi, 2023).*



*Figure 1-2: Teal, finely knitted acrylic and elastane fingerless gloves designed, made and sold under my label Lisa Shawgi (Photo Lisa Shawgi, 2023).*



*Figure 1-3: My knitted fingerless glove design in an assortment of colours (Photo Lisa Shawgi, 2023).*

### 1.3.3 MA fashion knitwear design

During my MA, I honed my skills in new research methodologies and knitwear technology, with a focus on design for well-being (Brey, 2015; Desmet & Pohlmeier, 2013). In the MA I developed and adopted a user-centred approach (Chamberlain, 2010; Norman, 1986) to explore the relationship between Raynaud's phenomenon and clothing. During the period of the practice-based MA course (ten months), I developed a collaborative relationship with the Raynaud's and Scleroderma Association (RSA), which enabled me to gain insights into other women's experiences with Raynaud's and what they sought in their clothing. I took the opportunity to participate in a group discussion, evaluating an existing product (a self-heating glove) recommended for a Raynaud's sufferer by the RSA (Figure 1.4). The participants, all women with Raynaud's, made clear both the lack of understanding of the physical aspects of the condition, a lack of public awareness of the emotional, social dimensions of coping with it, and a lack of stylish suitable clothing and accessories.



*Figure 1-4: Astec and Zondo gloves tested in the RSA focus group (Photo Lisa Shawgi, 2023).*

The gloves, manufactured by *Astec* and *Zondo* (Figure 1.4) presented to the focus group for testing resembled ski gloves in their appearance. In fact, they were designed for extreme sports. Described as ‘self-heating gloves’, the gloves comprised of a “*patented heating fleece [that] reflects the radiation from the body in order to raise and maintain your natural body temperature. The polymer metal coated fibres create an excellent circulation of warmth*” (Jagyasi, 2015). In addition, the gloves included touchscreen technology with a grip finish. During the focus group, to test the effectiveness of the gloves, it was suggested that participants step outside the building to encourage our body temperature to drop, before returning to the room, where the heating was turned off, to test the gloves. To measure the results, our hands were photographed before and after with a thermal infrared app on a mobile phone to capture body temperature fluctuations. We (participants) wore the gloves throughout the focus group while discussing our experience of Raynaud’s. In my case, the gloves failed to warm up my hands and I recall placing my scarf around my neck and jacket on my shoulders to warm up once again and observed others following suit. The gloves functioned by reflecting body heat, which escapes from the body, back towards the wearer. However, on reflection, I realised that the facilitators and sales rep failed to realise that during and after an attack, Raynaud’s sufferers rely on an external heat source to relieve the symptoms. The capillaries in the fingers are too constricted to allow the necessary blood flow. As such, we did not have the required body heat for the glove to capture and reflect heat. In addition, the gloves were cumbersome while carrying out tasks such as writing, drinking tea and using my mobile phone. This scenario demonstrated that commercial design for health is focused on a ‘producer-customer’ relationship, rather than a ‘designer-customer’ liaison. This is an issue which often leads to the customer seeing themselves at the end of the supply chain. That is, potential customers are brought in to test the product after it is manufactured, as opposed to tapping into customer’s insights at concept stage before the product is manufactured. Engaging with customers at the conceptual phase, allows designers to produce designs more in keeping with their customers’ needs and desires. For this reason, this thesis adopted a participatory and human-centred approach to re-position the customer at the pre-design development stage to create better informed designs for women living with Raynaud’s.

Moreover, I took part in a networking event hosted by the RSA and circulated a structured questionnaire through the organisation. During the event, I was pleasantly surprised to find out how enthusiastic and willing the attendees were to speak with me about



issues with finding suitable garments to mitigate the symptoms of Raynaud's. A recurring request emerged from the conversations with the members, and that was a desire to consider the aesthetics of a garment. One member explained that she benefited from the use of knitted gloves containing silver but admitted to wearing leather gloves as an outer layer to hide their appearance. Most of the women wore outdoor clothing and found them to lack style being "*too casual and dull*". I was strongly encouraged to include colour in whatever I designed and made. Furthermore, members expressed their thoughts regarding the longevity of knitwear. If they were to pay a certain price for a knitted item, they wished that it would look newer for longer. As a result, the MA concluded with many unanswered questions concerning Raynaud's and clothing. It was evident that the relationship between the women, Raynaud's and clothing was complex and required an in-depth study to fully understand the physical and emotive aspects of living and coping with the condition. This prompted my pursuance of continuing into a PhD concerning this under researched area of specialised clothing design. In addition, as both a Raynaud's sufferer and fashion knitwear designer, the subject offered a unique opportunity to uncover and address issues aligned to my experiential knowledge and skills.

In the following section, I provide a summary of the PhD project, with aims and structure of the thesis, before moving on to the next chapter.

#### **1.4 PROJECT SUMMARY**

This participatory research readdresses the idea of fashionable knitted clothing for women living with Raynaud's to support wellbeing and agency. As highlighted in this chapter, section 1.2, the condition is preferably self-managed by maintaining a comfortable body temperature through clothing. The issue is that mainstream fashion industry works from a mass-market model where the focus is on aesthetics in terms of the style and colour of a garment or accessory, fabrics often without consideration of performance and a generalised approach to sizing for people based on what society deems the 'normal' body (Carroll, 2014). Customers who are differently 'abled', or with extraordinary requirements, are often neglected, leading to issues of accessibility to suitable clothing in terms of fit and comfort, lack of aesthetically pleasing attire to 'fit' in (Klepp and Rysst, 2016), and clothing which accommodates authenticity and 'feel-good' factor. Furthermore, it is through the

interaction of a person and designed objects that disability comes to the forefront as wearers with extraordinary needs negotiate designs which compliment notions of what is considered a ‘normal’ body (Gooding, 2021). To readdress this issue, this thesis adopts a multi-factorial perspective presented within disability studies in terms of addressing a disabled person’s biological, emotional, social aspects, but further proposes the need for an aesthetic dimension. This approach requires an exploration of the lived body to better understand how personal and external factors shape participant’s embodied experience as they negotiate social norms through the lens of clothing and fashion, contributing to current discourse on readdressing through re-dressing disability. Hence my play on the word re-address. By adopting a human-centred design approach, the project designed and produced the *Re-dress* capsule collection to create a multidimensional material experience considering disability in terms of the biological body, emotional response, social effects, and aesthetic values to create more positive meaningful wearer experiences.

The project carried out a series of in-depth, semi-structured interviews (Oct 2017-July 2018) with ten female participants living and coping with Raynaud’s Syndrome. The interview schedule consisted of open-ended questions about different aspects of the women’s experience with Raynaud’s, to understand the meaning of living and coping with the condition: how the condition affected them; what daily challenges they faced; how they self-managed the condition and their thoughts and feelings on topics discussed. Additionally, the inclusion of personal objects, chosen by the interviewee, prompted personal stories of meaningful experiences, making for a more productive interview (Martin and Hanington, 2012).

The research facilitated a design workshop that consisted of individual reflections, group discussions and co-design activities (Sanders and Stappers, 2008) with ten women. The aim was to design activities that would grant participants the space and tools to express, share and design their clothing in terms of functionality and aesthetic needs and desires. Additionally, the workshop enabled the researcher to continue gathering data in a focus group environment, which might give rise to different themes that may not emerge in an individual interview (pooling knowledge, perspectives and views). Therefore, the description of the event was described as a ‘Design Workshop with a Focus on Raynaud’s’.

By considering the identified needs of this group, a range of knitted garments and accessories were developed that respond to user’s practical, social, emotional and aesthetic

requirements. This was achieved by interpreting the data by generating propositions in an iterative process of testing the technical, aesthetic and sensorial design elements of the knitted prototypes.

I now outline the project's aims and activities to successfully carry out the research, with an explanation of the structure of this thesis.

The aims of this research were to:

- Investigate factors affecting a person living with Raynaud's in the context of disability, fashion, and clothing.
- Examine the relationship between garments and people living with Raynaud's, and garments effect on the wearer's daily experiences and activities.
- By adopting a human-centred design approach, explore novel knitted textile developments to help Raynaud's sufferers 'self-manage' symptoms and enhance physical, emotional, social and aesthetic well-being.

### **Thesis structure**

This thesis comprises of nine chapters and the contents of each chapter is as follows:

This introductory chapter provides the rationale for the research, the approach taken and the relevance of my experiential knowledge of being a fashion knitwear designer living with Raynaud's. The chapter concludes with a brief overview of the content of subsequent chapters.

The next two chapters frame the research within the context of disability and the lived body through a phenomenological enquiry, material experiences (chapter 2) and the connections between wellbeing, clothing and fashion with regards to extraordinary bodies (chapter 3).

The following chapter 4 outlines the research methodology. It explains my philosophical stance, the design research and methods used to recruit participants, gather qualitative data, and approach to designing and making of the *Re-dress* capsule collection informed by the research findings.

In chapter 5, I provide insights into participants lived experiences with Raynaud's and clothing. It discusses understandings underpinned with theories discussed in chapters 2 and 3 and provides reflections for implications of the insights.

Chapter 6 outlines the methods used to design and make the *Re-dress* capsule collection. The chapter describes the methods used to select suitable yarns and knitted structures used for the 7 garments making up the collection. These included a pair of socks, jumper, cardigan, leggings, gloves and two undergarments. In addition, the chapter explains how the methods used to develop the designs were underpinned with my tacit knowledge of fashion knitwear design and experience with Raynaud's.

Chapters 7 and 8 explain the individual designs within the *Re-dress* capsule collection. Chapter 7 presents part 1 of the collection, focusing on the design development of the sock, jumper and cardigan designs. It concludes with interim feedback provided by participants. Following this, chapter 8 explains part 2, showcasing development of the leggings, gloves and two undergarments, followed by a discussion on participants feedback to reflect on claims made within this thesis.

The final, chapter 9, concludes the thesis with a summary of the findings and key contributions to knowledge and provides recommendations for future research.

## **1.5 MOVING FORWARD**

In this chapter, my focus was to provide the reader with an overview of the stepping stones which influenced my decision to undertake this PhD research project. I began by defining Raynaud's phenomenon and demonstrating the condition's connection to disability and clothing. To clarify my position within the study, I explained through reflexivity, my experience as a Raynaud's sufferer and how this shaped my design philosophy and research interest. Through my personal day-to-day and studio practice, I identified the need for further research into developing clothing to enhance a Raynaud's sufferer's well-being by adopting a holistic design perspective. I presented the building blocks which led to a brief study on Raynaud's, fashion and clothing under the umbrella of disability and user-centred design undertaken during a MA course. This highlighted many unanswered questions which prompted the need to carry out an in-depth research project following the MA. The chapter concluded with a brief summary of this research project, which covered the aims of the study,

a brief description of how the research was carried out and thesis structure. In the chapter to follow, I begin framing the research project by exploring the interconnected concepts essential to this study: disability, the lived body, phenomenology, and material experience.

**CHAPTER 2. CONTEXT PART 1: exploring the 'lived extraordinary' body**

## 2.1 INTRODUCTION

This chapter discusses the changing landscape of how disability is defined, viewed and addressed, moving from a medical construct to a social and environmental perspective, followed by a multi-faceted approach to consider biological, psychological and social factors. This helps us to understand the need for a phenomenological approach to address disability from a lived perspective, acknowledging the personal experiential dimension of disability. This is a perspective that this thesis adopts to underpin the argument that personal taste or aesthetics from a cultural perspective plays a role in shaping a person's identity, developing confidence and a 'feel-good' factor. This is a dimension necessary to address disability from a holistic approach that was highlighted in chapter 1 section 1.3.2, where, as a fashion knitwear designer, I identified the potential of aesthetic value in my knitwear practice to support the wearer's wellbeing.

The first section provides a brief overview of the changing landscape in how disability is defined, and how people living with a disability are viewed and treated. This lays the foundation to understand the need to address disability, not from a pathological point of view, but from an experiential understanding indicated in chapter 1 section 1.3.3; where to design for a customer's health requirements, a human-centred approach is required for a successful design outcome, treating disabled people as a 'whole' human being. This section also helps us to gain an insight into definitions of disability and the appropriate language. I have drawn on Shakespeare's (2018) argument of using first-person language where the person is placed before their condition, which closely aligns with a human-centred approach: understanding the person's experience of the condition as opposed to concentrating on their symptoms. This highlights the complexity of understanding a person's experience of the condition, as opposed to describing the symptoms of their condition. It also draws attention to the need to re-define disability argued by disability activist Aimee Mullins to see the value of disabled people, which ties in with disability activists to be seen, not as second-class citizens unable to contribute. For this reason, I have drawn on Rosemarie Garland-Thomson's (2017) term of 'extraordinary' to refer to people living with a disability.

The second section discusses how to understand disability from a phenomenological stance appropriate for a human-centred approach. It draws on an argument in disability studies that this thesis agrees with; to acknowledge a person living with a disability as a lived

body, to encompass personal factors alongside external influential structures outlined by the social model, and the World Health Organization's (WHO) biological – psychological – social approach to addressing disability. This underpins the thesis argument to explore aesthetics equally alongside factors such as how the body functions, emotional dimension and social inclusion to enhance a person's well-being, as well as living with a disability. However, that is not to say that the body is forgotten about. On the contrary, as we shall see in section 3 of this chapter, the body is both biological and culturally shaped. In this section, I have drawn on Shilling's (1993) concept that the body is culturally shaped, which ties in with the notion that aesthetics is key to form one's place in society. This leads into the focus where clothing as a therapeutic element comes into play to support the biological, psychological, social, and cultural dimension of the wearer. Here I discuss Leder's (1990) concept of 'telic demand' to work towards the body rather than from it to master one's pain. This leads into Heidegger's (1975) understanding of the world through materials, where a discussion regarding the experiences of materials concludes this chapter, followed by a summary.

## **2.2 UNDERSTANDING DISABILITY**

'Crippled', 'handicapped', 'retarded', 'invalid', 'mad', 'spastic' and 'deaf and dumb'. These words are fashioned and commonly used to describe people with an 'abnormality' or 'impairment' in Western society during most of the twentieth century (National centre on Disability and Journalism, 2018). These are a consequence of the social sciences' approach to analysing disability as a product of an individual's pathology and so people living with disabilities are viewed as people with "*unfortunate problems*" (Shakespeare, 2018 p.10). This attitude stems from the idea that disabled people with physical, sensory and cognitive impairments are "*less than whole*" (Dartington et al, 1981, p.126), dysfunctional and so, unable to contribute to society. Their impairments are perceived as a 'personal tragedy' or 'human disaster' (Oliver, Sapey and Thomas, 1983). People living with disabilities suffer political discrimination, social exclusion and are deemed 'victims' of their conditions as they are unable to enjoy society's material and social benefits. Institutionalised to safeguard them against themselves and offloaded from the burden of society, the disabled are "*written off by society*" and considered "*socially dead*" (Dartington et al, 1981, p.14). This act of segregation restricts disabled people from engaging in everyday social activities preventing



fewer opportunities to “*advance and defend their interests within society*” (Barnes and Mercer, 2003, p.42).

To highlight the ‘reality’ of living with their conditions and voice their right for social equality, in 1966, Hunt edited a book of essays written by disabled people:

*“We are challenging society to take account of us, to listen to what we have to say, to acknowledge us as an integral part of society itself. We do not want ourselves, or anyone else, treated as second class citizens, and put away out of sight and mind”*

(Hunt 1966, p.158)

Society’s challenges that were set forth by Hunt in 1966 echo through the years, and they remain as clear today as they did in 1966, as people with extra-ordinary needs continue to fight for awareness, recognition and inclusion. This is an area that this thesis explores; understanding the ‘reality’ of living with Raynaud’s phenomenon, bringing awareness to the experiential dimension of the condition and the challenges faced when wanting to enjoy society’s material and social benefits. Hunt, one of the first influential disabled activists in Britain, argued that “*the problem with disability lies not only in the impairment of function and its effects on us individually, but also, more importantly, in the area of our relationship with “normal” people*” (1966, p.146). Therefore, when compared to an ‘able-bodied’ or ‘normal’ person, disability is brought into focus in the form of ‘disablism’ or ‘disablement’ as society fails to embrace inclusivity. For this reason, in 1972, Hunt founded the early disability rights organisation the *Union of the Physically Impaired Against Segregation* (UPIAS). Later on in 1976, the UPIAS distinguished between impairment and disability in their manifesto entitled *Fundamental Principles of Disability*, which redirected attention towards defining disability from an individual’s physical limitations to social and environmental barriers as follows:

*Impairment: Lacking part or all of a limb, or having a defective limb, organ or mechanism of the body*

*Disability: The disadvantage or restriction of activity caused by a contemporary social organisation which takes no or little account of people who have physical impairments and thus excludes them from participation in the mainstream of social activities*

(Oliver, 1996, p.24)

In 1980, the World Health Organization's (WHO) (1980) *International Classification of Impairments, Disabilities and Handicaps* (ICIDH) responded to the disability debates by providing a conceptual framework to address the phenomenon of 'disablement'. The ICIDH offered definitions of the following key terms:

*Impairment: 'Any loss or abnormality of psychological, physiological or anatomical structure or function' (p.27)*

*Disability: 'Any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being' (p.28)*

*Handicap: 'A disadvantage for a given individual, resulting from an impairment or disability, that limits or prevents the fulfilment of a role (depending on age, sex, social and cultural factors) for that individual (p.29)*

WHO's 1980 definitions of 'impairment' refers to any part of the body not functioning as 'normal'. While 'disability' focuses on an individual's 'performance' or ability to carry out everyday activities compared to a 'normal' person, the WHO's attempt to acknowledge social exclusion of disabled people lies in its definition of 'handicap'. This is where the impact of impairment or disability creates difficulties for the individual to carry out social roles.

Despite WHO's efforts to tackle social and economic exclusion of disability through the term 'handicap', academics and government researchers criticised the nature of the definitions. Barnes and Mercer (2006) outlined three reasons for this criticism and lack of support for the revised definitions. Firstly, the approach remains primarily within a medical framework with the use of a bio-physiological definition of 'normality'. Secondly, disability and handicap are a result of impairment, which places people with physical problems in a position where they rely on experts to define their needs and support. And thirdly, the 'disabled' person must accept an identity of 'abnormality' or 'defective human being' (Barnes and Mercer, 2006). These criticisms, along with others, encouraged the WHO to produce a new version of the ICFDH in the form of a biopsychosocial model. The revised framework distinguishes four categories of interventions: 'Body Systems and Functions', 'Activities and Participation Domains', 'Environment' and 'Health-related Behaviours'. According to Shakespeare, this is a multi-factorial approach to disability which is greatly needed; *"this means medical and rehabilitation interventions; assistive devices;*

*psychological support; barrier removal; supportive welfare benefits; legal protections; cultural change.*” (2018, p.21). This demonstrates that understanding and addressing disability is complex, as this research highlights. There is no linear approach, as various elements are intertwined. As we have seen from the above various definitions of disability, there is still a current discussion on how disability is defined, and how various disabled groups wish to be treated. This thesis intends to hopefully shed some light on a type of disabled group living with a temperature regulating condition. Furthermore, it adopts a multi-faceted approach through a human-centred design approach by acknowledging all aspects of the person. This aligns with an approach to see the person as a complete ‘whole’ with some extra requirements that are not considered to be ordinarily ‘normal’. The following two sections highlight the need to continue with the discussion of re-defining disability, how people living with disabilities are referred to within this thesis and how Raynaud’s is officially treated.

### 2.1.3 ‘Extraordinary’ people

Aimee Mullins (an amputee of both legs) argues in a 2009 Ted Talk, *The Opportunity of Adversity*, that language affects how we think and how we view the world. In addition, language affects how we view and treat other people. Mullins emphasises that “*Our language isn’t allowing us to evolve into the reality that we would all want, the possibility of an individual to see themselves as capable*” (2009). So, Mullins proposes a “*new and better*” definition to the current thesaurus definition for ‘Disable’ is as follows:

*‘Disable’ (verb) To crush a spirit, to withdraw hope, to deflate curiosity, to deprive of imagination. To make abject.*

*Ant. To make poss-able.*

(2009)

Mullins reminds the audience that ‘disability’ is still predominantly viewed as a medical concept, a construct that is destructive as it encourages people with ‘deviant’ bodies to achieve ‘normalcy’ rather than something of possibility. That is to focus on a person’s strengths and uniqueness of what makes them different to other ‘normal’ people, rather than on their disability as a weakness. For example, Mullins provides an example of how she can alter her height according to what leg design she chooses to wear. Something which ‘normal’

people cannot do! Similarly, Rosemary Garland-Thomson discusses ‘disability’ as an “*embodiment of corporeal insufficiency*” (2017, p.6), as people with disabilities are placed in the realm of pathological concerns where bodies are considered broken, vulnerable, lacking control and identity. To counteract this view, Thomson refers to people living with a disability as ‘Extraordinary Bodies’ to imply a super abundance of something, rather than a lack of something and the generative prospects of ‘disability’. Both Mullins and Thomson adopt a positive approach to addressing disability by treating a person’s ‘wholeness’, a prospect which this thesis engages with. Therefore, within this study, people living with a disability are referred to as ‘extraordinary’ people. More specifically, I have adopted the term to represent my participants as they require additional needs for a more comfortable and happier existence compared to those living without the challenges of Raynaud’s phenomenon. Therefore, the term ‘extraordinary’ person is used for people living with disabilities, which is supported by Shakespeare’s (2018) person-first language. Furthermore, looking at what is possible as opposed to ‘fixing’ a problem, widens our viewpoint on the surrounding environment or context of the issue as well, considering social and cultural implications. Adopting this perspective considers the overall lived experience of an ‘extraordinary’ person. In addition, the women I interviewed for this project have not referred to themselves as disabled, apart from one (Brenda), although as this thesis demonstrates, the condition can be disabling. Ultimately, the women desire agency through more consideration and support to help manage their condition to live a healthy and prosperous lifestyle. Brenda expressed this desire in her testimony below when she spoke about simply parking at a supermarket:

*“It is a disability, you know [...] I wish I could have a blue badge, it sounds dramatic, cos the last thing I would want to be identified with all my other conditions is disabled [...]but I wish that I could have a blue badge, so that I can go to the supermarket and it’s on the other side of the car park and it’s raining and it’s cold, by the time I get in to the supermarket, I can’t function, I can’t talk, my hands don’t work [...] I don’t want to be disabled, but it would be so useful, and I suppose really, I am”*

(776-786)

Brenda’s comment highlights that, while the condition is triggered by atmospheric conditions as discussed in chapter 1, section 1.2, society’s treatment of the person living with Raynaud’s holds a high level of influence in its management. I pause here to highlight how

Raynaud's is perceived with regards to disability in government guidelines, before continuing the discussion on disability and the lived body in the subsequent section.

### **2.1.2 Raynaud's and disability**

The Equality Act 2010 defines "*a disabled person as a person with a disability. A person has a disability for the purposes of the Act if he or she has a physical or mental impairment and the impairment has a substantial and long-term adverse effect in his or her ability to carry out normal day-to-day activities*" (Gov.uk, 2013). In the case of a person living with Raynaud's phenomenon, unless the person suffers from severe gangrene or ulcerations on their hands and toes, making it impossible to perform fine or gross motor movements effectively, they are not considered disabled, and not entitled to support (Disability-Benefits-Help.org, 2023). This is the measurement by which the NHS determines whether the condition is disabling, deeming it viable to provide support/assistance to the sufferer.

This thesis illustrates the situations described by participants which contradict the NHS's view on Raynaud's as a disability. For example, during an attack, carrying out simple everyday tasks is difficult and painful, and at times, the women rely on others to function. This is a situation I would deem to be 'disabling'. Although the women are 'disabled' by their biological make-up, there are situations when the condition is improved or worsened by societal structures in terms of accessing suitable garments and how societies views shape the women's experiences during participation. Furthermore, the Disability-Benefits-Help.org and Gov.uk websites focus on the effect of Raynaud's on the extremities (i.e hands and feet). However, insights produced from this project demonstrates the condition does more than effect the hands and feet. Therefore, as highlighted previously, disability is multi-dimensional, and so this thesis explores the complexity of the lived experiences of Raynaud's outlined in the following section.

### **2.3 ACKNOWLEDGING THE LIVED BODY**

To bring about an alternative approach to how society addressed disability, the 'social model of disability' was created by Mike Oliver in 1983 to highlight that barriers and challenges faced by people living with disabilities are designed and put in place by society.

Therefore, the social model focuses on the “*physical, social and economic disabling barriers experienced by disabled people*” (Barnes and Mercer, 2006, p. 36). The new ‘social model’ brings about an alternative approach to understanding disability from a personal medical issue to a political perspective, with an emphasis on functional structures that immobilise people living with a disability.

However, it has been suggested that disability writers pay little attention to the lived experience of disability from an individual’s psychological perspective (Riddell and Watson, 2003). Criticism of the social model stems from a concern of neglecting the complexity of disability. Scholars caution that to view disability issues as the cause of social barriers, overshadows personal lived experience. Thomas provides a reason for removing ‘the body’ from disability studies:

*“From this perspective any focus on impairment or ‘the body’ conceded ground to the biological reductionism that had been orchestrated for more than two centuries by doctors and other health social care professionals for more than two centuries, a reductionism that lives on in discourses and practices in all social institutions”*

(2007, p.121)

‘Biological reductionism’ is a notion that this thesis argues against, as it overlooks the subjective experience of wearing clothing in terms of an emotional, psychological, social and aesthetic dimension. However, the social model concentrates on external ‘crippling’ factors. As such in 1996, Oliver strongly suggested: “*the social model of disability is not a substitute for social theory*”, where a more comprehensive existence of people living with disabilities is understood in terms of culture, a materialist history and a person’s impairment. Similarly, Shakespeare argued: “*in general, with the exception of the feminist literature on disabled women, there has been little emphasis in disability studies on the realm of identity, personal experience and private life*” (1996, p.179, cited in Riddell and Watson, 2014, p.4). Liz Crow compares the disability movement to other campaigns to re-engage embodiment:

*“We align ourselves with other civil rights movements and we have learnt much from those campaigns. But, we have one fundamental difference from other movements, which we cannot afford to ignore. There is nothing inherently unpleasant or difficult about other groups’ embodiment: sexuality, sex and skin colour are neutral facts. In contrast, impairment means our experiences of our bodies can be unpleasant or difficult. This does not mean our campaigns against disability are any less vital than those against heterosexism, sexism or racism; it*

*does mean that for many disabled people personal struggle related to impairment will remain even when disabling barriers no longer exist”*

(1996, p.58)

Crow (a wheelchair user) expresses her gratitude to the social model for disability and describes the model as her “*proverbial raft in stormy seas*” (1996, p.55). Adopting this framework revolutionises Crow’s understanding of her experiences. Alongside thousands of others around the world, she no longer feels isolated in her belief that it is her body which is responsible for her difficulties. She emphasises that the social model works and is still working to tackle discrimination within social structures and legislation. What it does not do is address disability on a personal level, and there is a danger in thinking that the body plays no part in determining experiences. In turn, this undermines an individual’s ability to cope in everyday life, risking physical and emotional well-being. When UPIAS reconstructed the meaning of impairment and disability, they drew a distinctive line between the two definitions. Impairment becomes associated with bodily pathology and disability results from social oppression rather than illness, severing the link between body and disability. Therefore, as the field of disability studies grow, scholars challenge the key creeds and argue for an approach to understand the experience of disability from a gendered, sexuality, social class and ethnicity perspective (Roulstone et al, 2012, p.4).

I strongly agree with Crow’s argument to strengthen the link between ‘body’ and the ‘self’. As we discovered in Brenda’s experience of parking closer to the supermarket to avoid bad weather, it was her ‘body’ that produced an unpleasant experience. However, Brenda’s overall experience included other societal factors which contributed to her ‘disablement’. On a similar note, the authors Williams and Bendelow (1998) critique the Biomedical constructions of pain and its effects, proposing that pain goes beyond a medical condition requiring scientific treatment and has historical, psychological and cultural dimensions, making pain a multidimensional experience. Williams and Bendelow (1998) argue that the lack of conceptualising pain in sociology theory is the result of pain being ‘medicalised’, ensuing the Cartesian mind-body divide. As such, they advocate for phenomenological approaches to explore pain, enriching existing literature and “*reclaim pain from the dominant scientific paradigm*” (Ibid, 1995, p.141). This thesis highlights how pain and emotions are closely linked with an ‘extraordinary’ condition and manifested through social interactions in terms of physical and emotional discomfort. To do this, the study adopted a phenomenological approach to understand the biological, psychological, social and aesthetic

aspects of Raynaud's phenomenon. This was in keeping with acknowledging individual pain alongside external social influences of disability strongly suggested by scholars such as Crow. In the following section, I explore the philosophical concept of phenomenology to explore the 'body' and the 'self' (Hughes, 2004) when living with Raynaud's phenomenon. Given that the aim of the thesis was to understand the lived experience of Raynaud's, it seems appropriate to adopt phenomenology as the philosophical foundation to the research.

### **2.3.1 Understanding the lived body through phenomenology**

Phenomenology focuses on human experience, with an emphasis on the 'lived body'. Hammington notes that there is "*no brief characterisation of it can capture its depths of analysis*" (Hamington, 2004, p.40). Additionally, Langdridge (2007) highlights that, although all phenomenological approaches focus on lived experience, it is a method which varies in practice. Furthermore, Martin Heidegger, one of the first key contributors to the field, declares that "*there is no such thing as the one phenomenology*" (1975, p.328). As such, I will not present the developmental complexity of the practice but establish the phenomenological aspects relevant to my work, the existential, interpretive strands of phenomenology and the notion and appreciation of 'embodiment'.

Phenomenological perspectives focus on "*the idea that human beings and their consciousness is invariably embedded within the body*" (Nettleton and Watson, 1998, p.9). Merleau-Ponty pursues the idea that human perception and 'being-in-the-world' is only possible through and in relation to our bodies (Merleau-Ponty, 1961/2012). It is an embodied phenomenon. Access to the world and 'meaning' is only possible through our human senses, which do not function independently from the body. A body's experience and how the body influences lived experience cannot be independently studied. The body is, as Nick Crossley points out, is "*our point of view on the world*" (1995, p.48). Furthermore, as Hughes and Paterson suggest, "*phenomenology interrogates the 'felt world' in which the carnal, the emotional, the cognitive and the cultural are indistinguishable*" (1997, p.336). This further supports this thesis position that the 'lived experience' of Raynaud's is multi-dimensional.

While the conscious body and objects are central to Merleau-Ponty's phenomenological concept, to understand 'lived experience', Nettleton and Watson (1998) argue that people are not always conscious of carrying out everyday activities. We are not always aware of



placing one foot in front of the other while walking, and just how often are we made aware of our own breathing? These activities are usually carried out unconsciously or in a semi-conscious state. As such, they argue that the body is often “*taken for granted*” (ibid, p.10), making the body disappear. On a similar note, Leder (1990) perceives that the body often disappears from our consciousness:

*“Human experience is incarnate (...) [the] bodily presence is of a highly paradoxical nature. While in one sense the body is the most abiding and inescapable presence in our lives, it is also essentially characterized by absence. That is, one’s own body is rarely the thematic object of experience. When reading a book or lost in thought, my own bodily state may be the farthest thing from my awareness. I experientially dwell in a world of ideas, paying little heed to my physical sensations or posture (...) the body, as a ground of experience (...) recede(s) from direct experience”*

(1990, p.1)

Leder explores the concept of the disappearing body. He argues that awareness of the body only comes into play at times of ‘dys-function’ when we experience pain, disease, death or uncomfortable social situations. On these occasions, our bodies ‘dys-appear’. ‘Dys’ is a Greek prefix, which suggests impairment, illness, poor or inadequate. At the point of experiencing dys-comfort “*we then experience the body as the very absence of a desired or ordinary state, and as a force that stands opposed to the self*” (Leder, 1990, p.4). Therefore, when the body experiences pain, it dys-appears, that is, the body appears in a dys-functional state. We then find that we may suddenly “*feel dys-embodied, alienated and betrayed by our bodies*” (Williams and Bendelow, 1998, p.142). This is certainly the case during a Raynaud’s attack, as many of the women referred to parts of their body as something ‘alien’ and belonging to somebody else when they lose mobility and the affected area become useless. Leder (1990) suggests that physical pain dys-appears the body, but David Morris points out that “*Pain, that is, rules us not only when it appears in full regalia (...) but also when it remains behind the scenes, more or less invisible*” (2010, p.8). With Raynaud’s, it is the emotional dread of pain which dys-appears the women’s body as well. People living with Raynaud’s do not have to feel the pain to be aware of their bodies. A body with Raynaud’s is in constant ‘flux’. The slightest drop in body temperature such as eating an ice cream or drinking a cold glass of water can trigger an attack. Coupland and Gwyn (2003, p.8) declare that “*the body is itself not a stable phenomenon*”. From birth, the body ages and therefore is constantly changing. The body grows stronger as it develops, and yet weakens as it grows

older. It has the capacity of achieving great things, yet vulnerable to disease. Those bodies who are disabled have the added challenge of *“learning from each other’s strength and endurance, not against our[their] bodies and our[their] diagnosis, but against a world that exceptionalises and objectifies us [disabled people]”* (Young, 2014). People with specific needs must figure out a way of living other than what society deems ‘normal’.

Shilling (1993, p.45) explores the notion of the ‘body as a project’, where the body is *“an unfinished biological and sociological phenomenon which is transformed, within certain limits, as a result of its entry into, and participation in, society”* (p.11). Shilling proposes that the body is a constant project to be worked at, reshaped for improvement to accomplish self-esteem. This would suggest that we are far more conscious of our bodies than Leder implies. However, Leder (1990, p.73) *does* propose that the effect of pain or illness is an *“intentional disruption and a spatiotemporal constriction”* to our lives, resulting in a *“telic demand”* from the body, composed of hermeneutical and pragmatic components. The *“telic demand”* separates the ‘body’ and the ‘self’. At the hermeneutical level, pain gives way to a quest for meaning, interpretation and understanding. While pragmatically, the telic demand of pain is to master one’s suffering and ‘get rid of it’ by working *towards* the body, instead of acting *from* the body. This is certainly the case with Raynaud’s. On a hermeneutic level, the women attempt to make sense of their Raynaud’s experience, while on a pragmatic level, they seek to manage their bodies. This research carries out a hermeneutic analysis via phenomenology to understand their interpretation of their experiential Raynaud’s but there is also understanding the practicality of managing the condition on a daily basis, which is the difference between acting through the body and acting on our body. This is similar to Heidegger’s (1962) distinction between *Zuhandenheit* (ready to hand-ness) and *Vorhandenheit* (present at hand-ness). According to Heidegger, we experience the world through three modes. The first is that we engage with the world through entities or tools that are ready-to-hand. When a tool is being used, us as subjects do not contemplate the object, as it disappears from our thoughts, while we focus on the task or context at hand. If we experience difficulty while using the tool, the user focuses on the material elements that make the tool dysfunctional, it becomes unready-to-hand, and our experience changes. The third is when the tool malfunctions, drawing our attention by disrupting the flow of activity, it becomes present-at-hand, and the human significance and value becomes apparent. The object then stands in the way of what the user is concerned with accomplishing. This means that our being-in-the-world is bound up within a world of things, linked together. We

experience the world through materials, and how well these materials perform in terms of human significance and value, creates pleasant or unpleasant experiences. This leads us onto the next section, regarding how materials are fundamental in the design of things, to provide human experiences. This means not only designing for the usability or aesthetic, but for meanings which materials may evoke. A concept referred to as ‘materials experiences’ by Karna et al (2008a), which points to the relationship that people have with and through materials.

### **2.3.2 Shaping a lived body’s experience with and through materials**

According to Hekkert and Karna (2014), there are four characteristics to experiences when interacting with a product. The first is that experiences are inherently subjective and are quite often difficult to articulate. The person experiences the product in both the mind and through the body, and so may be difficult to verbalise. The second is that experiences are evoked from our interaction with a product. This is referred to as user experience. The third is that experiences are shaped by the user’s personal and situational factors at the time of use. The fourth relates to how experiences change or develop over time of a product’s use. The combination of these characteristics does suggest that, overall experiences are individual, personal, context sensitive and in constant flux. Our lived experiences are greatly shaped by how we live with and through materials. Laughlin and Howes propose that *“notions of how a material might function are not simply to do with scientific values of performance but notions of meaning and more qualitative attributes”* (2014, p. 40). Materials play a fundamental role in designing for meaningful user experiences, and designers have the challenging task of selecting and working with materials to create such a scenario.

Schifferstein and Wastiels (2014) suggest that designers can enhance the scenario through the sensory modalities of a product stimulated in the interaction with the product for a more holistic experience. By considering multiple sensory modalities during the design process, this potentially produces richer experiences when engaging with the product through intrinsic and extrinsic properties of materials. The intrinsic properties refer to, for example, the type of fibre, which cannot change. The extrinsic properties can be manipulated when the material is shaped by the designer and when materials are combined. This means

that sensory perception is generated by both the objective properties of the materials and subjective responses from the user, based on the designer's design of the product, creating a multisensory experience. One which *"is related to not only to the material properties, but also to the context in which the materials are used, the intentions of its user, and any cognitive associations that are evoked"* (Schifferstein and Wastiels, 2014, p.24). This is reminiscent of my experience with testing the self-heating gloves discussed in chapter 1, section 1.3.3. The objectiveness of the materials described by the manufacturers strongly suggested that, when used, the gloves helped keep a person's hands warm. However, when worn by a person living with Raynaud's, the gloves were unsuccessful. While the objective, or technical aspects of the materials potentially provided thermal comfort when used, the subjective experience of wearing the gloves created unpleasant experiences of 'present-at-handness' and 'unreadiness-to-hand', as presented by Heidegger (1962) in the previous section. For this reason, products need to be lived with and through to understand their true value. Using a product focuses on the technical qualities in isolation. When a product is worn, it encompasses a holistic approach of understanding the well-being of the wearer in terms of how it feels and how it makes the wearer feel. For this reason, participants in this research project are referred to as wearers rather than users, which is a perspective now often adopted by researchers exploring disability to move from a clinical or patient scenario. The Hands of X project argued that materials played a key role in researching the relationship between prosthetics, disability and fashion. The notion was that prosthetics could be worn as fashion accessories as opposed to just being used to fix a person's limb deficiency underpinned by practical functions, as Pullin and Cook explained:

*"This shift in perception elicits a very different design response. Wearing, whether talking about prosthetic hands or clothes, implies a certain synergy between the body and the item being worn. The two together are indivisible, perceived as a whole. Wearing also implies choice and intent on the part of the wearer, with a heavy subtext of intentional visibility. Patient and user don't, to our ears, imply any of this."*

(2020, p.115)

Overall, the Hands of X project realised a sense of ownership on the part of the wearer, as participants referred to the prosthetics as *their* hands. Hands of X was an example of a research project where materials played a key role in shaping an 'extraordinary' body's agency, by providing choice in their wardrobe, making them feel good through touch, self-

expression and identity of marrying materials they associate particular meanings to, aligned with their personality.

The Hands of X project demonstrates how the disabled's experience with a product is multifaceted. The authors Hekkert and Karna (2014) distinguish three types of experience when interacting with a product. The aesthetic experience refers to the pleasure created through sensory perception. The second is the emotional experience produced when engaging with a product, such as joy or fear. And the third is the meanings produced by the materials, which is context sensitive, quite often closely associated with cultural connotations or via relationships. This aligns with the disability perspective of how both social and individual or personal factors affect an 'extraordinary' individual. Furthermore, within the Hands of X project, materials play a key role in supporting wearer's agency by offering a selection of materials to allow for self-expression. In addition, the materials provided were that of familiarity to the wearer such as wood and leather. The use of everyday materials is important as the majority of prosthetics are produced in a flesh-coloured silicone rubber material, mimicking a skin-like aesthetic, which portrays an attempt to conceal an impairment to appear 'normal'. It also highlights how "*disability objects, are prescribed to the wearer based on consultation*" (Cook and Pullin, 2023, p.72) with a focus on functionality, lacking an understanding of the cultural, social and emotional aspects of a design in terms of materials. Therefore, the Hands of X project aimed to use familiar and everyday materials to give a sense of a Super Normal design, as specially made items often draw attention for wrong reasons. The idea of creating a design which is extra ordinary, allows for objects to blend into people's lives comfortably (Cook and Pullin, 2023) and deliver "*unsensational-looking objects that perform in a sensational way*" (Fukasawa and Morrison, 2007). According to Wilkes (2005), the scientific practice of creating materials fail to contemplate the senso-aesthetic material properties, as they overlook the cultural aspects of materials. Wilkes argues that it is now on the shoulders of industrial designers and artists "*to have an intuitive expertise in understanding people's sensual, tactile, aesthetic and emotional needs, and the materials that fit those requirements*" to improve the human condition. Similarly, Leach emphasises the fact that scientists of materials and new materials, no longer understand their "*social needs*" (2005, p.147) as there appears to be a separation between the material and its wearer or consumer and the potential for social significance. This project takes into the consideration of the cultural, social and emotional implications of

wearing a design for an ‘Extraordinary’ person, alongside the technical performance of the materials.

## 2.4 SUMMARY

This chapter offered a discussion surrounding disability and phenomenology to underpin this thesis approach to understanding an ‘extraordinary’ lived body. The social model of disability drew society’s attention to barriers preventing the disabled from participation and becoming a valuable contributor to their community. This act of discrimination was a result of how a person living with a disability was treated in that their ‘impairment’ was something which needed fixing to ‘fit’ into society’s ‘normalcy’, rather than focusing on issues within society which required solving to create a more inclusive way of living. However, disability scholars and activists criticised the social model for neglecting the role of the personal body when addressing disability. This led to the WHO presenting a multi-faceted approach to understanding of how to address disability and people living with a disability. This is a perspective that this thesis adopts by arguing that Raynaud’s phenomenon goes beyond merely experiencing cold hands and feet, and encompasses emotional, social and cultural aspects which affect the person living and managing the condition.

To understand disability from a multifaceted dimension requires a phenomenological perspective to explore a lived body, as proposed in this chapter. It means exploring an ‘Extraordinary’ person’s experiences from a holistic point of view. Rather than observing and analysing the world separately from the body, we must understand a phenomenon through the world and our engagement with materials. This closely links with the concept ‘materials experiences’ presented by Karna (2014), where experiences are understood via aspects of aesthetic, emotional and meanings produced from a user’s interaction with a product. It emphasises the role products have in creating pleasant experiences to enhance well-being and agency of an ‘extraordinary’ person. However, as people living with Raynaud’s interact with predominantly clothing items or accessories, this interaction needs to be understood within the framework of *wearing* the product. This moves us from associations of patients using a product to fix an ‘impairment’, to a dimension of supporting agency of a wearer through their wardrobe, enhancing their well-being through fashionable clothing. This perspective brings in questions surrounding aesthetics and how this dimension

affects an 'extraordinary' person. Therefore, it is important I explore the terms well-being, clothes and fashion to define how they are addressed in this thesis. In the following chapter, I discuss the concept of well-being in terms of design experience. I explain clothes to be understood as pragmatic tools to manage the body's physical well-being, while fashion as a concept enters a realm of interpretations and meanings. For this reason, clothes and fashion are not interchangeable, but are intertwined and linked at touchpoints when understanding and addressing a lived body with Raynaud's.

**CHAPTER 3. CONTEXT PART 2: connecting well-being,  
clothing, fashion & the body**



### **3. 1 INTRODUCTION**

In order to address the research aims, I must comprehend the complex relationship between ‘extraordinary’ people and the relationship between their bodies, clothing, fashion (as a concept) and the fashion industry. This lays the foundation to understand the factors which shape an individual’s experiences of acquiring and wearing clothing that suits their requirements and meets their preferences. In addition, it provides the building blocks to developing the research’s methodology discussed in the following chapter, 4.

As chapter 2 set out, this thesis takes a phenomenological approach to understanding and addressing ‘extraordinary’ persons. By adopting this approach, the lived experience of my participants was investigated, where disability was considered to be multi-faceted, an advancement on the Disability Movement’s social model and WHO’s treatment of disability. Exploring the lived experience of ‘extraordinary’ persons places emphasis on the human being with multiple and complex dimensions of how their condition affects them physically, psychologically, socially and culturally in terms of aesthetics. The research’s direction avoided addressing disability within a medical construct which centres on fixing an abnormality and the social model where external barriers is the cause of disability. This was important as it allowed the research to bring the body back into the equation and a person’s personal experiences alongside external factors.

In this chapter’s first section, I consider the relationship between well-being and fashionable clothing for ‘extraordinary’ people, to explore the role that clothing and fashion play in supporting the wearer. In doing so, I draw on literature within the area of design and well-being to understand well-being as a concept, what dimension of well-being the research aims to enhance and the argument for an experiential approach to design, which this research adopts by taking a human-centred design approach, to create meaningful artefacts. This aligns with the discussion on creating ‘material experiences’ in chapter 2, section 2.3.2. The second section moves on to discuss clothing and fashion and their effect on the body in a broader sense; physically, mentally, socially and culturally. This underpins the research’s approach to fashioning the body within the context of Raynaud’s phenomenon. This is to move away from clothing designs which are ‘functional’ or ‘adaptive’ associated specifically with

disability within the apparel industry and focus on the potential of design from a holistic perspective, to treat the wearer as a ‘whole’, a perspective which was argued in chapter 2.

### **3.2 WELLBEING**

In an editorial of the special Fashion Practice issue from the international conference for fashion and well-being, Lucy Dunne comments on the conference proceedings that *“the most important theme which emerged [...] is the importance of addressing the needs of the whole person; not necessarily just the specific condition, impairment, or disability that distinguishes the person or the person’s state from other persons”* (2013, p.5). Other requirements of an individual such as aesthetic and expressive needs alongside functionality elements for clothing and accessories *“can be equally influential on overall well-being”* (Dunne, p.8). In addition, embracing a person’s disability can motivate designers to investigate *“unique design potential”* (Dunne, 2013, p.6). An example of this is Radvan’s (2013) research which develops inclusive knitwear designs for women living with disabilities, inspired by the participant’s physical disability to complement their body shape, rather than to camouflage their body ‘abnormity’. Radvan’s (2013) project highlights that aesthetic and desirability are just as important as wearability and comfort. However, the project’s focus is on producing three-dimensional, seamless knitted garments and aesthetics is a sub-category of the process. The aesthetic dimension investigated in this thesis, evolves through many years of my designer expertise. This means that expressive and aesthetic values (or cultural) in clothing hold equal weight to biological, psychological and social factors as discussed in chapter 2, to enhance the well-being of people living with disabilities.

In the following section, I discuss the concept of well-being and what it means within this thesis, to establish a firm foundation for what the project looked to achieve through the knitted designs created for ‘extraordinary’ women living with Raynaud’s.

### 3.2.1 Subjective Wellbeing

The WHO defines wellbeing as “*a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity*” (2012, p.4). But there is no one definition of the term wellbeing. Bok (2010) uses *happiness* and *life satisfaction* interchangeably with *wellbeing*. Ryan and Deci (2001) describe two distinct perspectives on wellbeing: hedonism and eudaimonism. The hedonic approach, also referred to as subjective well-being, relates to individuals seeking a pleasurable experience, fulfilling one’s appetite for life satisfaction by achieving a happier mood and avoiding pain or discomfort. The eudaimonic perspective concentrates on psychological well-being, and a drive for the “*realisation of one’s true potential*” (Ryff 1995, p.100). Ryff and Keyes (1995) emphasise a clear distinction between psychological well-being (a meaningful life) and subjective well-being (a pleasant life) and present six distinct aspects of human potential: autonomy, personal growth, self-acceptance, life purpose, mastery and positive relatedness. Max-Neef (1992) developed a human scale listing nine basic needs, “*essential attributes related to human development*” (1992, p.204): subsistence, protection, affection, understanding, participation, leisure, creation, identity and freedom. The New Economics Foundation (2009a), presents qualities across three dimensions of a person’s life necessary for wellbeing: personal, social and work. Personal wellbeing focuses on having vitality, resilience, self-esteem, autonomy, feeling competent, engaging and having meaning and purpose, and satisfaction from positive life-evaluation. Social well-being means having a sense of belonging and supporting relationships to build connections with other people, and wellbeing at work, refers to work satisfaction in terms of work-life balance, emotional experience and working conditions. While the New Economics Foundation (2009a) set out three categories, it is clear that well-being is quite broad and encompasses all aspects of a person’s lifestyle to ensure quality and satisfaction. Quite often, in relation to wellbeing and disability, the quality of life is measured against an able-bodied person as it is measured from a medical perspective, of how well the body can function or perform. Therefore, in the social sciences, scholars often refer to some one’s health *and* well-being (Laitala and Klepp, 2019; Bush, 2015; Moller and Kettle, 2017).

Within this thesis, the subjective well-being is more of a priority, to provide pleasurable and positive experiences through clothing. This is the hedonic approach. There is an awareness that the clothing provides meaningful artefacts which addresses the valuable experiences of wearing the garments in certain social and cultural contexts – for example, participating in social activities of simply answering a phone call, going out to dinner or taking part in outdoor activities. In terms of cultural examples, it is attending a wedding. This is why the focus is on fashion and clothes as equal elements: fashionable clothing. But it is fashion in terms of aesthetic appeal, referring to the style of a garment. Many studies explore the social and cultural importance of aesthetics in relation to acceptable appearance and communicating individual identity. In this thesis, another dimension is highlighted, and that is the personal aesthetics of feeling feminine through material experiences and simply enjoying the pleasure of various textures.

In the following section, I provide an overview of how well-being is approached in design, followed by fashion and textile studies which adopt two different approaches to address different levels of well-being for ‘extraordinary’ people. The sections to follow discuss clothing and fashion and why they are considered as equal, what they are when considered individually, and the relevance when combined.

### **3.2.2 Design for well-being**

Mair (2018) argues that society no longer strives to survive as a community, but has become more individualistic in nature as each of us seeks to boost our own quality of life. Mair explains that *“seeking an enhanced quality of life coupled with an individualistic approach means there is more demand for greater personal happiness”* (2018, p.20). This has led to an increased interest in well-being on a global scale among governments, educational institutions, organisations and has become an important research topic across multiple disciplines (Petermans and Cain, 2019). For example, Desmet and Pohlmeier (2013) explore how to design for ‘subjective wellbeing’ or ‘happiness’ to promote human flourishing. A ‘positive design’ framework was developed to encompass three components of pleasure, personal significance and virtue needed to design for subjective well-being. Peters, Calvo and Ryan (2018) explore the importance of ‘psychological wellbeing’ using technologies

and present the METUX model (Motivation, Engagement and Thriving in User Experience) to evaluate users' wellbeing impact. Hassenzahl focuses on an experiential approach to fulfil users' 'psychological' requirements known as Experience Design, as user experience is becoming more prominent for the "*focus on well-being and not performance as an outcome of human-product-interaction*" (2008, p.4). Jordan argues that "*pleasure-based approaches to product design consider all of the potential benefits a product can deliver – those of practical, emotional and hedonic benefits*" (2000, p.12). McDonagh-Philip and Lebbon (2009) emphasises that the potential for products to generate 'psychological' wellbeing or 'happiness', increases the strength of the relationship between product and consumer. Despite many interpretations of how to design for well-being, there are many commonalities across perspectives. And it is evident that there is potential in products to generate psychological happiness as well as stimulating physiological well-being (Demirbilek and Sener-Pedgley, 2003). Desemt and Kamp emphasised that:

*"In general we seem to move from solving problems and avoiding or eliminating negative emotions towards creating possibilities and looking for positive experiences to make life of individuals in specific and the world in general better"*

(2014, p.2510)

This aligns with Aimee Mullins' (2009) desire to treat people living with a disability as something of possibility, providing more positive experiences. Within the field of disability studies, Shakespeare argues that "*we cannot reduce the complexity of disability to either a biological problem, a psychological problem, or a social problem. We need to take account of all the factors and intervene at all the different levels to benefit and include disabled people*" (2018, p.21). All elements should be given equal weight leading to a multi-faceted approach towards understanding disability and must include a person's biological, psychological and social preferences when designing for health and well-being (Bush, 2015; Moller and Kettley, 2017). In the article, *Dressing a Demanding Body to Fit In*, researchers Laitala and Klepp (2019) follow Shakespeare's recommendation to understand strategies of their participants when finding suitable clothing to 'fit' their skin disease *and* to 'fit' into society. Their project highlighted a "*general lack of knowledge about clothes in everyday life for people with different bodies, socioeconomic levels and physical and mental challenges*" and "*believe to be an unexplored field at the intersection between medical research and*

*clothing research*” (Ibid, 2019, p.133). The authors urge further research into other conditions and diagnosis, gaining valuable knowledge in aspects of living with different bodies, in turn contributing towards discussions in health and wellbeing for a “*worthy and comfortable life*” (p.133). One of the intentions of this thesis is to explore stylish garments through aesthetics in an attempt to feel included by ‘fitting’ into society and to instil pleasure and personal happiness through material experiences. There is the notion of participants needing to fit into certain contexts, but also a personal desire to feel feminine and get enjoyment out of wearing materials which suit their biological condition. The research could not have understood this aspect if it was not for a phenomenological stance, where the lived body is explored.

In the following section, I discuss research studies investigating clothing for people living with disabilities. This thesis’ participatory and human-centred design approach is discussed in more detail in chapter 4 section 4.3.2.

### **3.2.3 Design for ‘extraordinary’ well-being**

In researching knitted garment design for health and well-being, Gault (2016), a knitwear designer, alongside a health practitioner and engineer, create products to meet the body temperature regulation needs of someone with diabetes by maximising the latest innovation in nanotechnology and the integration of Phase Changing Materials. Li Li et al (2014) investigate the combination of knitwear technology, medicine and Chinese acupuncture, to develop a novel therapeutic method for healthcare through dressing. The project's aim is to replicate TENS therapy using conductive yarn, textile electrodes and a battery within a garment pleasing to the eye, providing the wearer the chance to self-manage their pain relief more effectively. In the ATRG (Advanced Textiles Research Group) at NTU (Nottingham Trent University), Mbise (2015) experiments with integrating heating elements with knitted structures to improve moisture removal. Dawit et al (2021) explore the effectiveness of knitted structures suitable for electro-thermal, with sensor function knitted gloves, specifically for Raynaud’s patients. The project’s results are sophisticated technology embedded within a textile artefact; however, their fundamental interest is how the product functions, downplaying the human experience. Furthermore, they are examples of the ‘designer-producer-customer’ relationship as the customer is positioned at the end of

the design process during testing phase. For example, in the case of Mbise (2015) the knitted heated gloves are recommended for relieving the symptoms of Raynaud's post-manufacture, as the gloves produced heat using copper wires within the yarns, which were connected to a battery. Whilst the gloves work in a technical sense, they are not tested by Raynaud's sufferers and upon inspection, the heated elements do not cover the whole of the fingers. Another potential issue is the wearing of the batteries to heat the gloves on the wrist, and as explained by Sandra, the women of this research project are self-conscious of drawing attention to themselves through what they wear:

*“They’re just bulky because you have to wear on your wrist or your forearm, a battery [...] I was beside myself, because, you know, I didn’t want people looking at me”*

(93-95)

The technological developments take priority over the wearer's requirements as an individual human being with complex emotions and everyday experiences. Furthermore, the products produced are *made to fix* a person's symptoms, rather than *made to fit* a person holistically. This approach is similar to the medical construct Aimee Mullins (2009) argue against. For this reason, Bush (2015) emphasises a need for a better understanding regarding subjective well-being, personal identity, emotional experience and social engagement when designing for garments/accessories with a therapeutic function. Bush adopts a biopsychosocial model (opposed to a biomedical model) to co-design orthopaedic wrist supports that address participants biological, psychological and social requirements. Bush engages with customers at the generative stage, and the data gathered from the patients informs the design process for wearable medical devices within a contemporary jewellery framework. Bush's research approach means that the products are *fit* for purpose and *fitted* their 'extraordinary' needs.

In the subsequent section, I discuss clothing and fashion and what both stand for in this thesis and their role in supporting the body.

### 3.3 CLOTHING AND FASHION

Throughout history, clothing shapes the body in healthy and unhealthy ways (McDowell, 2013; Vincent, 2009). As Rummel puts it “*clothing in a way is the body’s body*” (1990, p.108) and “*their[clothes] role in general is to assist*” (Harvey, 2014, p. 21). Clothing can enhance the body’s performance via selective fibres (Laing and Sleivert, 2002), act as a tool for therapeutic recovery (MacRae, 2011), and provide comfort and protection (Jussila et al, 2010), and “*clothing acts as a fashion item with aesthetic and transformative powers*” (Carroll, 2009, p.1). Yet, our choice of clothing is determined by a “*socially or culturally approved way of doing something*” (Bernard, 2014, p.17). In these scenarios, fashion often determines what is acceptable. Harvey suggests, when “*we move from materials to made-up garments, we enter the dangerous domain of fashion*” (2014, p.100), while Ingrid Loschek (2009, p.136) states that “*clothing is dependent on the initiative of the designer, while fashion depends on the acceptance of the observer and the wearer*”. I expand on Loschek’s statement in the following sections to clarify between clothing and fashion in this thesis.

#### 3.3.1 Clothing and it’s relation to the body

It is unknown when clothing was introduced to the human body, and historians can only speculate as to the original function of clothes. It is suggested that fur was the first ‘textile’ used to clothe the body, as a form of protection against the cold, which implies that clothing was essential for physical well-being (Horn and Gurel, 1981). Therefore, we can comfortably make an assumption for a function of clothing, which is its use in a utilitarian sense to manage the body’s welfare. Joanne B. Eicher (2010, p.151) defines the term “clothing” as follows: “*Clothing*” as a noun refers generally to articles of dress that cover the body. “*Clothing*” as a verb refers to the act of putting on garments”. Eicher (2010) then provides examples of clothing articles from different countries and cultures such as skirts, blouses, kaftans and sarongs, including accessories such as gloves, hats, turbans, sandals and shoes for the head, hands and feet. Eicher’s (2010) definition of clothing is simple and straightforward and shows diversity in articles worn specifically to cover the body.



According to the historian Johansen, clothing only becomes significant when placed on the body. Johansen asserts that “[clothes] true significance only becomes apparent when we consider how they are related and adapted to the body” (1968, p.56). Moreover, to understand clothes, they must be seen in action, which requires reflections on why humans wear clothing from social and cultural perspectives. As such, wearing clothing means dressing to meet social expectations and cultural beliefs and values. With this non-utilitarian aspect of clothing, we move into the realm of embodying a conscious effort to *fit* in or be *seen* by society, or to subconsciously communicate principles and identities. For example, theories such as modesty, decoration, costume and custom are presented to explain why humans wear clothing (Johnson et al, 2003), all of which have nothing to do with protecting oneself from their environment. For that reason, according to Turner (1985), all human beings are ‘dressed’ bodies, be it through clothing, body modifications, tattoos or cosmetics. It all depends on the culture and social contexts within that culture.

Returning to Johansen’s approach to understanding the true significance of clothing, the author refers to clothing as artefacts used in everyday activities. In the same breath, he comments that:

*“[H]uman nature being perverse, styles do not always echo the body framework. If the body does not suit a certain style of dress then it is the clothes and not the body which should be modified”*

(1968, p.5)

Johansen’s observations and statement strongly resonate with the aim of this thesis, to design clothing suitable for women living with Raynaud’s, without compromising on biological, psychological, social and cultural elements. We all engage with clothing, ‘dressing’ ourselves in articles every day to sustain a good quality of life. In Maslow’s (1970) Hierarchy of Needs, a pyramid model showing the motivations which drive human behaviour can further explain the function of clothing. Maslow (1970) argues that human motivation for achieving satisfaction can be placed into two stages. After achieving our basic need to satisfy hunger, thirst, warmth, shelter and security, humans are then motivated to achieve complex psychological needs, such as social belonging, self-esteem and self-actualisation. Maslow’s (1970) theoretical pyramid renders clothing as a basic management tool to regulate the body’s temperature, making it feel comfortable and protected from the surrounding environment. Clothing, therefore, is

vital to maintain and support oneself at a basic level. Although, as we move up Maslow's pyramid, into the realm of achieving satisfaction, clothes are an everyday artefact which play a role on our social acceptance, confidence and identity. For this reason, Bovone recommends we study clothing in terms of 'material culture', referring to clothing as:

*“Numerous artefacts we use in our everyday life, which mostly have a function connected to our needs-namely subsistence, home, work-but that are specifically chosen and appreciated by us because they enrich our lives by giving them meaning”*

(2012, p.79)

Bovone highlights that clothing items are explicitly chosen and therefore appreciated because of how they *“enrich our lives by giving them meaning”* (2012, p.79). However, as Bovone highlights, *“For all of us, clothing is a duty; for some of us, a pleasure; and for many of us, a problem”* (2012, p.67). Similarly, Laitala and Klepp argue that *“some bodies are more difficult to dress than others”* (2019, p.124). At the start of *Dressing a Demanding Body to Fit In*, Laitala and Klepp discuss strategies of people living with chronic skin diseases, highlighting that a lack of suitable attire prevents participants from joining in social activities, as they would appear inappropriately 'dressed'. Living with these conditions proves challenging in everyday life, as participants live with the side effects of the disease *and* social implications. For people living with a chronic skin disease, clothing plays a vital role in concealing their bodily 'defects' to 'fit in'. This implies an implicit function which clothing provides.

I understand this as the 'fashionable' dimension of clothing or the implicit associations of clothing to and from the body. Therefore, the term 'clothes' or 'clothing' are used in this thesis as textile articles to support the body's physical or biological wellbeing of the wearer. This practical aspect of clothing keeps the biological body in this research as suggested in chapter 2, section 2.3.1 as the body is brought to the forefront from the experience of pain. Therefore, the functional aspects of clothing such as choice of fibres, shape and construction of a garment are important to sustain physical comfort. Fashion as a concept supports the personal and social implications of clothes. Both affect the emotional dimension of the wearer. The following sections explore the term 'fashion' and the fashion system, to gain a deeper understanding of how they impact the body and wearer.

### 3.3.2 Fashion and fashioning the body

Malcolm Barnard (2014) notes nine different meanings for the term ‘fashion’. As a noun, ‘fashion’ means a ‘style’ or ‘manner’ of something, and as a verb it means the action or manner of making, producing or constructing something. Indeed, Barnard indicates that it is ‘fashion’ as a noun which creates confusion in comprehending what the term constitutes. Barnard (2014) explains that the reason for this confusion is that ‘fashion’ is used interchangeably with ‘dress’, ‘style’ and ‘adornment’. In addition, consumer goods appear to be synonymous with the word ‘fashion’, adding business elements such as production, manufacturing and consumerism, which makes clarifying ‘fashion’ more complex. In this vein, Barnard refers to Anne Hollander’s definition of the term ‘fashion’ for clarification:

*“Everybody has to get dressed in the morning and go about the day’s business... [w]hat everybody wears to do this has taken different forms in the West for about seven hundred years and that is what fashion is”*

(Hollander, 1994, p. 11)

Barnard goes on to explain that Hollander’s idea of fashion includes everyday clothing, be it uniforms, designer wear, high-street attire or sportswear, specific to the West. However, Barnard points out that clothing is often considered separate from fashion, as something which is mundane and uninteresting, and goes on to explain that fashion evokes glamour, sophistication and a sense of excitement. This suggests that clothing are mere functional tools to protect the body against the environment or to achieve modesty, whilst fashion produces clothing which are aesthetically exciting and a pleasure to wear.

Welters and Lillethun (2016) define fashion as *“changing styles of dress and appearance that are adopted by a group of people at any given time and place”*, which implies that fashion represents the zeitgeist of the times (Jenkyn, 2011). From this perspective, by choosing to wear certain items of fashionable clothing, one would ‘fit’ in and create a sense of belonging with ‘a group of people’, sharing attitudes, values and beliefs. Furthermore, the use of the word ‘appearance’ suggests a desire to make

oneself visible to others. It appears that ‘fashion’ goes beyond the simple practice of clothing oneself to go about daily business. If this is the case, ‘fashion’ moves from mere clothing styles to emotive and experiential dimensions. The research project ‘Emotional Fit’ (Townsend et al, 2016) explores the importance of matching the emotional needs to the technical materials when designing for mature women: women who feel neglected by the fashion industry. The concept of fitting in as well as style and comfort are explored as both implicit and explicit qualities are considered important within a garment.

Keeping with this line of enquiry, Barnard refers to Entwistle’s (2002, in Barnard, 2014, p.18) argument of the ‘fashioned body’, indicating that “*while fashion may be about the body [...] one is obliged to understand not a natural or Edenic body but a ‘produced’ and therefore ‘cultured’ body*”. In this sense, ‘fashion’ as a verb ‘to make’ or ‘to produce’, creates a meaningful body capable of communicating shared understandings. Adding to the complexity of understanding and determining what ‘fashion’ represents, Ingrid Loschek (2009) poses the question of when, how and why do clothes become fashion? Loschek describes clothing as products which are ‘concrete’, objects we can touch that permanently contain us. On the other hand, ‘fashion’ is abstract and to understand the concept requires examination of “*the social constructs of communication, time, space, meaning and gender, via which innovation – and, with it, new fashion – is accepted, modified or rejected*” (Introduction, p.1-4). ‘Fashion’ is therefore developed and validated by negotiation within a society. Classical theorists suggest that fashion plays a role in social distinction in terms of class identification and segregation (Simmel, 1957), freedom of self-expression due to countless choices offered by the ‘empire of fashion’ (Lipovetsky, 1994) and a mechanism to enable society to move forward in an orderly fashion way towards a modern world referred to as ‘collective selection’ (Blumer, 1969). In contrast, Baudrillard (1989) identifies fashion as a contributor to an individual’s false or short-lived happiness in the form of consuming meaningless objects. However, Entwistle states that “*fashion structures much of our experience of dress. In articulating the latest aesthetic, and in making available certain kinds of clothes, fashion provides the ‘raw material’ of daily dress*” (2015, p.1). Entwistle emphasises the non-ephemeral role fashion as a concept and system plays in the experience of ‘clothing’ and ‘dressing’ a body.

Crane (2012) suggests that fashion signifies a juxtaposed perspective of various disciplines. As such, fashion theory as an interdisciplinary academic practice includes contributions from the medical and social sciences, humanities, anthropology and historical studies. And yet, with such a substantial body of work, defining fashion remains complex. In keeping with a multi-dimensional perspective, Crane provides four different concepts of how 'fashion' manifests itself. The first is fashion as a form of material culture by decorating the body with articles that communicate 'one's perceptions of one's place in society' through various goods, the second is through semiology where clothing styles act as signifiers, the third centres on organisations of the fashion system from creation through to dissemination and lastly, are the hypothetical effects of fashion such as social identity. It is evident that there are multiple perspectives of what 'fashion' encompasses and how it is represented, however, what is a common interest or belief is that 'fashion', in whatever form, is not trivial or an ephemeral phenomenon.

*"Textile and fashion practice have long attended to the physical body and there is now also a well-established tradition of theoretical scholarship focused on the many way in which cloth and clothing intervenes with and shapes the body"*

(Entwistle and Townsend, 2020, p.289)

Early fashion studies have focused on the 'social fabric' of dress and it is the link between a person's 'self' and culture. However, *"as research linking bodies to cloth and clothing continues to grow it demonstrates the difficulty in knowing where anatomy/nature ends, and its fabrication via cultural constructs begins"* (Entwistle and Townsend, 2020, p.289). For this reason, as outlined in chapter 2, disability is a multi-faceted approach which needs contextualising from a biological – psychological – social – cultural perspective. I accept that fashion plays a critical role in understanding and addressing participants lived experience. In this thesis, the term fashion represents 'aesthetic' experience, as a lens through which to understand the subjective dimension of living with Raynaud's; the fashioning of the body, rather than fashion as a concept. In the following section, I shall discuss how this approach to fashioning clothes and not Fashion for the wearer fits in.

### 3.3.3 fashion and not Fashion for the Extraordinary body

As discussed, aesthetics in fashion design plays a key role in a garment, allowing the wearer to express their identity and build confidence in projecting a persona. However, Gwilt (2014) argues this approach is ‘superfluous’ and overlooks users’ lived experiences, daily issues and contexts.

Mainstream fashion is competitive, driven by economic, commercial and popularity factors, often prioritising aesthetics over ‘human value’ (Risatti, 2007). Designers predict customers’ preferences through relatively superficial market research that overlooks the user’s wants and needs (Popovic, 1999). As a result, disabled people face challenges when acquiring clothing to suit their needs. It is only since the 1950s that designers and scholars have attended to clothing needs of people with ‘special needs’<sup>2</sup> (Corbett, 1996) and such apparel design was and still is referred to as “*functional clothing or functional fashions*” (Lamb et al, 1992, p.42) or ‘adaptive clothing’ (Ayachi and Thakur 2017; Kabel et al, 2017). While ‘functional’ or ‘adaptive’ wear accommodates people with specific needs, accessibility remains an issue, alongside the challenge of acquiring clothing considered ‘stylish’ (Scheier, 2017). There is a void which needs bridging between functional and stylish approaches, which among others, this thesis addresses. But what is the best way to do this?

In recent years, there has been a move towards tackling ethical, sustainable and wellbeing issues, which have driven designers to explore alternative approaches to design, with a desire to make a positive contribution to society (Gwilt, 2014). This side of fashion is a changing landscape, one described in Karolinski’s (2015) work titled, *Anti Fashion: a manifesto for the next decade*, as a prediction to move away from the ‘individual star designer’ and a throwaway society, to a need for the resurrection of the couturier practice. As a couturier, one follows a philosophy where the focus is on textiles and garment-making, and not a pret-à-porter concept. Karolinski (2015) argues that fashion as a concept will become obsolete and the system will become outdated. Fashion will only survive if approached from an

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<sup>2</sup> According to The Warnock Report (1978), ‘special needs’ was short hand for ‘Special Educational Needs’. Although, according to Corbett, the ‘specialness’ was purely for educational requirements to enhance employability opportunities for people living with physical and mental disabilities, and not meant to be generalised about the community.

anthropological and humanist perspective. Karolinski's Anti Fashion proposition prompted the exhibition titled *fashion after Fashion*, at the Museum of Arts and Design (MAD). Designers were invited to shift their focus from the current Fashion (uppercase) system, to an industry where fashion (with a lower case 'f') is "*a slower, more thoughtful design process [...] could augur the way towards a more democratic, participatory, and social conscious industry*" (Freedman, 2020, p.114). Similarly, Bruggeman calls attention to this changing landscape in fashion and states that "*Fashion finds itself in an identity crisis and that the established fashion system is outdated. As a counter movement, some designers choose to speak in terms of clothes instead of fashion*" (2018, p.8). The notion of fashion, as opposed to Fashion, underpins this thesis approach to designing fashionable clothing with a lower case 'f' for 'extraordinary' women. This means that the knitted designs are based on classic styles rather than short lived trends. The project recognises Fashion as an important concept; however, the direction is towards the creation of clothing and a holistic experience when engaging with textiles and technology. And how by adorning these items of clothing affects the wearer's subjective experience. And as a unique approach to the making, flat patterns were not used, but as development progressed, the human body was always the measurement used to gauge the success of the samples. Furthermore, the project adopted a human-centred, phenomenological approach to fashioning the wearer's experience through the design of functional and stylish knitwear, developed to meet the needs of women with Raynaud's.

### **3.4 SUMMARY**

This chapter has offered insights into the changing landscape of design for subjective well-being of 'extraordinary' people within the context of well-being, clothing and fashion. Well-being is a topic which has come to the forefront of researchers within the field of design, with various interpretations. Within this thesis, the well-being of participants encompasses their physical, psychological, social and cultural life elements. For this to happen, designers must create products which enhance the experiential dimension via a holistic approach as opposed to giving priority to an object's functionality and usability. There are various approaches to design for well-being, but all have a common interest; to consider the humanistic

dimension. This aligns with addressing disability from a multi-faceted direction, considering human complexities in the design process.

Clothing and Fashion play fundamental roles in shaping an individual's well-being. Clothing is key to provide physical comfort to humans but having the appropriate clothes to wear in certain contexts is determined by social etiquette. Both clothes and Fashion creates a sense of belonging. Fashion, in terms of aesthetics empowers the wearer to develop their visual identity and communicate beliefs and values. Fashion reflects social and cultural zeitgeist and is in constant flux. However, Fashion as an industry fails to include 'extraordinary' bodies. Clothing in this area is developed within a medical and outdoor context where performance of materials is important to maintain physical health, qualities fashionable clothing need to adopt to support various types of bodies. As outlined within the Anti-fashion manifesto, the Fashion landscape is maturing where designers converse through clothes instead of Fashion. Recognising the importance for an alternative approach to design involving consumers at concept stage to create more meaningful products. For this reason, this thesis adopted a human-centred design approach where wearer's experiences informed the design process. In the following chapter, I outline this thesis's methodology and methods adopted to accomplish this approach.



## **CHAPTER 4. METHODOLOGY**

## **4.1 INTRODUCTION**

The aims of this chapter are to explain the philosophy that has shaped the research approach, to describe the methodology adopted and methodological components of the research design, and outline concepts which have underpinned the methods used to attain the participant's experiential knowledge to carry out design and making activities.

The start of this chapter outlines my philosophical position, sitting between a constructivist and critical theorist framework. The study was committed to attaining experiential data which could only come out of human interaction (social constructivism) with 'extraordinary' people. This data was later applied to practical knitted explorations to investigate and support social change for the real world (critical theory). The chapter continues by explaining the type of research carried out (research *for* and *through* design) to gather rich qualitative data to understand 'extraordinary' women living with Raynaud's to design wearable, meaningful and purposeful material artefacts within a participatory project. As elements of the project were participatory in nature, the section which follows explains how the research acknowledged the value of 'extraordinary' women living with Raynaud's as experts of their lived experiences. The subsequent section discusses the human-centred design methodological approach adopted to understand and design for all aspects of the 'extraordinary' participants within the context of clothing, fashion and disability. The chapter continues by outlining the 3 stages of the research design. These include methods adopted to understand participant's lived experiences and create knitted garments and accessories to support their well-being. The latter is further discussed in more detail within chapter 6, where designing and making activities were underpinned by my experiential knowledge as a fashion knitwear designer and a woman living with Raynaud's. The final section outlines the value of the feedback interviews carried out for participation validation and to capture their reflections on the designs in relation to their condition and clothing. The chapter ends with a summary of the main points discussed throughout.

## **4.2 MY PHILOSOPHICAL STANCE**

To begin, it is important to establish the paradigm of inquiry that I worked in - sitting between a constructivist and critical paradigm for two reasons. Firstly, as discussed in

chapter 2, the study set out to comprehend ‘extraordinary’ people as a ‘whole’ by exploring their lived experience. To carry this out, the research needed to look beyond participant’s ‘impairment’ and draw out the human complexities of living with their condition. This approach was indicative to working within a constructivist paradigm. Secondly, the investigation critically transformed this data into knitted prototypes via a holistic approach to support the wearer’s physical, emotional, social and aesthetic well-being. To achieve this goal, I drew on research studies arguing for designers to focus on creating experiential dimensions within artefacts, when designing with well-being in mind, laid out in chapter 3, section 3.2. With these two perspectives in mind, the research sought to understand and shape participant’s reality using knitted designs. Therefore, the paradigm of inquiry was constructivist and critical, which I expand upon in more detail in the following two sections.

#### **4.2.1 Constructivist paradigm**

According to Denzin and Lincoln (2003), working within a constructivist paradigm emphasises understanding as a phenomenon in the human sciences, as opposed to explaining the phenomenon under investigation indicative of the natural sciences. What this means is that the object or subject under investigation must be understood within their context and not explored in a controlled environment. In relation to people living with a disability, explaining how their condition affects the body is not enough. This aligns with this thesis’ approach to adopting an experiential perspective, which is the need to understand how the person lives, manages and copes in various contexts, as argued for in chapter 2 section 2.3.

Gray and Malins argue that theoretically “*experiential learning*” (2004, p.2) is learning constructed in response to an individual’s experience and prior knowledge, through active exploration in the natural world and the space where people socially interact. Within a constructivist paradigm, knowledge is constructed by individuals through human interaction and with the natural world to create the realities which we experience (Williams, 2016). This means that it follows a realist ontology, where realities are context sensitive and experientially based, which take the form of “*intangible mental constructions*” (Guba and Lincoln, 1994, p.26). Reality cannot be accessed mechanically or separately from the individual experiencing the phenomenon at hand in real situations (Robson, 2016). For this reason, knowledge of the phenomenon is co-created between researcher and participant, and

to understand the phenomenon under investigation requires a subjective epistemology. This subjective interaction involves interpretation of an individual's perceptions and experience of the phenomenon using a dialectic and iterative process (hermeneutic methods). Hence, a constructivist viewpoint was consistent with the development of an in-depth understanding of a participant's lived or experiential experiences, achieved through interactions with and between participants. This fits in with the research's human-centred design approach discussed in section 4.3.2 within this chapter, where design focuses on a consumer's requirements as opposed to a designer's creative or artistic vision. Furthermore, while the research investigated 'extraordinary' fashionable clothing, the study concentrated on women living with Raynaud's phenomenon. For this reason, as a qualitative researcher, I was able to take an emic approach associated with investigating the cultural norms from the perspective of my sample group. In addition, this approach was appropriate, as it fitted in with drawing from not only my participant's subjective experience through interpretations of the data, but also from my own experiential experience to underpin my subjective decisions during the making phase where I transformed the data into fashionable clothing.

#### **4.2.2 Critical paradigm**

Asghar refers to the nature of a critical paradigm as having an "*inherent reformative fervour [which] strives to reform a better world*" (2013, p.3121). Through transformative inquiry, critical theorists challenge discriminatory actions of social institutions which formulate the social system. Historically related, reality is shaped over time by social, political, economic, ethnic and gender factors into a series of structures that are now seen as 'real'. These structures often discriminate against groups within society, such as people living with disabilities. Hence, a critical paradigm is concerned with balancing the power relations and advocates, emancipation, equality, and inclusivity for all members of society. This is in keeping with my philosophical stance as a fashion knitwear designer, that clothing and fashion have the capacity to transform the lives of 'extraordinary' people. Crouch and Pearce support this principle that "*design is transformative*" (2012, p.7), as designers "*contribute towards the creation of objects and systems that facilitate change*" (2012, p.7). Change in this respect is that of acknowledging 'extraordinary' women and their desire for fashionable clothing to support their well-being.

Having explained the paradigm in which the research sat, the following section explains what type of design research the project carried out in line with acquiring knowledge through a constructivist viewpoint, to inform the critical design process of producing fashionable clothing and support social change for ‘Extraordinary’ women.

#### **4.3 DESIGN RESEARCH**

There are various categories of design research. Frayling (1994) provides three differentiations of art and design research: ‘research *for* design’, ‘research *into* design’ and ‘research *through* design’. The first relates to carrying out research for the purpose of developing a design product. The research needs to lead to a design outcome. The second type of design research refers to the analysis of a design process. This is popular within education as designers compile and analyse their materials to learn how best to develop or improve a design process. So, the design is the subject under investigation in this category. The third design research category focuses on creating prototypes for learning which without would be impossible to produce knowledge. For example, carrying out user studies allows people to interact and handle ‘things’ to test them to provide feedback and insights which would be impossible without having the design at hand to experience it.

This PhD project engaged with participants at the ‘pre-design’ or ‘fuzzy’ end (Sanders and Stappers, 2008) of the design process to understand their *lived* experiences and inform the making of knitted prototypes in an effort to support their holistic/subjective wellbeing. Participants were also involved after the creation of the designs to gain feedback on the knitted garments and accessories. According to Frayling (1994), this approach of using the data gathered to inform the design process firmly places this study in the category of ‘research *for* design’. However, as Mehmet Aydin Baytaş (2020) point out, due to rapid iteration, boundaries are blurred between research *for* and *through* design as products are constantly evolving. This research project certainly gathered research to inform fashionable clothing developments, but I also adopted the principle that Candy sets out, about the potential for a practice-based approach to research, to help me understand women’s lived experience by using design-based methods. This research through *design-ing* moves into the realm of research *through* design. In this sense:

*“An original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice. Claims of originality and contribution to knowledge may be demonstrated through creative outcomes which may include artefacts [...] Whilst the significance and context of the claims are described in words, a full understanding can only be obtained with direct reference to those outcomes”*

(2006,p.3)

Without direct reference to the knitted garments and accessories, the subjective/embodied experience of touching, feeling and wearing the pieces could not have been investigated further. In addition, the practice-based element of this project generated knowledge through the practice of designing, manufacturing and producing knitted garments and accessories to understand how to meet the biological, psychological, social and aesthetic aspects of ‘extraordinary’ bodies. As Candy (2006) argues, without the design-based element of the research, I could not have fully understood the women’s lived experience of managing and copying with symptoms through fashionable clothing. Without engagement with the material things, meaning could not be attributed to them. In addition, the challenges and issues encountered by fashion knitwear designers when designing for ‘extraordinary’ bodies. This aligns well with understanding and shaping ‘extraordinary’ realities discussed in the previous section 4.2. As Bill Moggridge emphasises *“the only way to experience an experience is to experience it”* (In Suri, 2004, p.16). For this reason, a participatory approach within the research process was required to include and value wearer perspectives on fashionable clothing, which is discussed in the next section.

#### **4.3.1 Participatory research**

This study engaged with ‘extraordinary’ people throughout to develop a stronger ‘designer-consumer-product’ relationship paradigm within the context of disability, clothing and fashion as discussed in chapter 1, section 1.3.3. And to *“regard people as agents rather than objects”* (Cornwall and Jewkes, 1995, p.1667), the study acknowledged participant’s knowledge as essential and valuable contributors to fully comprehend the embodied experience of living with Raynaud’s. Cornwall and Jewkes (1995) classify this type of research as participatory research (PR), which they characterise *“as being reflexive, flexible and iterative, in contrast with the rigid linear designs of most conventional science”* (1995, p.1668), indicative to qualitative research. The three characteristics presented by Cornwall

and Jewkes (1995), were advantageous for the following reasons. Firstly, as discussed in chapter 1, section 1.3.1, through personal reflexivity, I presented my previous experiences to clarify my position which may have shaped the research design. And through reflexivity in action, I was able to investigate any preconceptions regarding Raynaud's phenomenon, Rheumatoid arthritis and Diabetes to focus the project's direction, provided in section 4.5.3 of this chapter. Secondly, being a flexible researcher allowed room to negotiate complex data synonymous with qualitative data and adapt to challenges of analysis and other issues in the research process, for example, working around Covid-19 restrictions (for more details, please see Appendix 14). And thirdly, iteration allowed me to progress via trial and error and adjust from information learned. It is Reason and Bradbury's definition of participatory research which I found useful:

*“Participatory research is action-oriented research activity in which ordinary people address common needs arising in their daily lives and, in the process, generate knowledge. [...] Participatory research differs from both basic and applied social science research in terms of people's involvement in the research process, integration of action with research, and the practice-based nature of the knowledge that is entailed. It sets itself apart even from other forms of action-oriented research because of the central role that non-experts play”*

(2006, p. 83)

This definition describes two key aspects of participatory research indicative to this project. The first is the inclusion of 'ordinary people' or 'non-experts' and the second is acting on the 'practice-based nature' of participatory research. Firstly, Reason and Bradbury's definition aligns with this study's integration of participants at key stages to stay true to a human-centred design approach. While they refer to participants involved as 'ordinary', this refers to non-experts, rather than able-bodied people. However, although this study's participants were not expert clothing or fashion designers, I considered them experts of their 'lived experiences' in relation to Raynaud's phenomenon. And so, participants were coming *“to the research process with knowledge and experience to contribute”* (Maguire, 1987, p.39) by sharing their lived experiences as 'extraordinary' women using clothing to manage their condition. Secondly, this research generated knitted prototypes created in response to participant's knowledge and experiences, making the project practice-based in nature as mentioned within Reason and Bradbury's definition of participatory research.

As there is a diverse range of participatory research, and the fact that the research practice is in its infancy, emerging in the 1940s, Halskov and Hansen (2015) suggest that researchers

make explicitly clear the definition of participation in the project to help the reader understand the level of participation involved during the research. I have followed this advice and articulate the level of participant's involvement within the project in section 4.4, where I outline the research design. Prior to this, I define the methodology that I adopted for the research design; a human-centred design approach. This methodology guided the selection of qualitative methods to attain rich experiential data to understand Raynaud's phenomenon and to design knitwear underpinned by my own experiential knowledge as a fashion knitwear designer and as an 'extraordinary' woman.

#### 4.3.2 Human-centred design

Human-centered design (HCD) first emerged in the field of ergonomics and human-computer interaction (HCI). The International Organisation for Standardisation (ISO, 2019, n.p) define human-centered design as follows:

*“Human-centered design is an approach to interactive systems development that aims to make systems usable and useful by focusing on the users, their needs and requirements, and by applying human factors/ergonomics, and usability knowledge and techniques. This approach enhances effectiveness and efficiency, improves human well-being, user satisfaction, accessibility and sustainability; and counteracts possible adverse effects of use on human health, safety and performance”*

The ISO's description of human-centered design portrays a sense of emphasis on the functionality, usability and efficiency of a product or service. This is due to HCD originating in an engineering and computational context with a focus on human-machine-systems interaction. Although terms such as well-being, satisfaction and sustainability are included, they refer to a person's physical interaction with a device's functional elements. HCD soon evolved *“from a focus on physical ergonomics, usability, context of use and user goals, to a focus on emotions and user experiences”* (Bijl-Brouwer and Dorst, 2017, p.8). HCD's true potential emerged when product designers were encouraged to incorporate factors of functionality, usability *and* emotions (Overbeeke & Hekkert, 1999) or pleasure (Jordan, 1999). The latter category is the new challenge for human factors as it focuses on *“products that are not merely tools but 'living objects' people can relate to”* (Jordan, 2002, p.5). In pursuit of designing pleasurable objects, Jordan (2002) refers to a framework presented in Tiger's book *The Pursuit of Pleasure*, in which four types of pleasure are identified –



physical, social, psychological and ideological. The first aligns with tactile properties in relation to the body, the second refers to how a product facilitates social interaction, the third connects to the person's cognitive and emotional responses and the fourth pertains to people's values. It is a multidimensional design framework which is similar to the discussion in chapter 2, section 2.3, where to address disability, one must consider the biological – psychological – social aspects of disability. With an additional understanding of the true value design can add to an 'Extraordinary' person's quality of life through aesthetics, which this project explored.

It is Walters' definition of human-centered design for product design which I draw on for this study as *"a creative exploration of human needs, knowledge and experience which aims to extend capabilities and improve quality of life"* (2005, p.9). Walter's (2005) reference to the exploration of *"human needs"* is an aspect followed within this research to gain new knowledge of understanding daily experiences of a person living with Raynaud's to improve their 'quality of life'. Furthermore, it is a critically 'creative' investigation in the methods it adopted to gather data and design knitwear to enhance the wearer's wellbeing. Giacomini goes further to describe the application process of human-centered design, which this project subscribes to in terms of data collection:

*"Today's human centered design is based on the use of techniques which communicate, interact, empathize and stimulate the people involved, obtaining an understanding of their needs, desires and experiences which often transcends that which the people themselves actually realized. Human centred design is thus distinct from many traditional design practices because the natural focus of the questions, insights and activities lies with the people for whom the product, system or service is intended, rather than in the designer's personal creative process or within the material and technological substrates of the artefact"*

(2014, p.610)

I agree with Giacomini's distinguishing the design process of HCD where the designer places consumer requirements before manufacture or production stage of a product. However, I disagree with Giacomini's notion that the designer's creativity, alongside the material and technological aspects which the product is built on, do not come into play. Perhaps this is appropriate for product design, but within fashion and textile design, the type of object such as clothing sits close to a 'person' (in the sense of the human body) and has the effects it has through a combination of cultural (fashion), sensorial (touch/ temperature) and 'mechanical' (thermal/ moisture performance) aspects. Marc Steen's paper on *Tensions in Human-centred*

*Design* discusses this possible danger of focusing too strongly on “*what users say (which) may erode the role of the designer, whose vision and creativity are essential for the design process*” (2011, p.46). To avoid this pitfall, Steen emphasises that designers must balance their own knowledge and ideas with those of the users’, and “*to balance a concern for understanding current or past practices (a research orientation), with a concern for envisioning alternative or future practices (a design orientation)*” (2011, p.47). To do this effectively, Steen advocates reflection and reflexivity on the part of the HCD practitioner to critically reflect on choice of methods, their role throughout the project along with the project’s participant’s role. Being a reflective and reflexive practitioner justifies the decision-making process within participatory research where particular knowledge of stakeholders is privileged over others.

With Steen’s recommendation in mind, the following section focuses on outlining the research design and critically reflecting on the research process through reflexivity to clarify the rationale for the project’s direction. The study established dialogue via semi-structured interviews to encourage communication of stories for interpretation by the researcher into design solutions and recommendations. A focus group was carried out to encourage interaction through discussions and co-design activities. It was necessary to use empathy to have dealt with a sensitive subject and to have created a safe and comfortable atmosphere, important in building a rapport of trust between researcher and participant as suggested with Giacomini’s HCD’s definition. In addition, my creativity as a facilitator meant I designed activities to stimulate and engage the women throughout a three-hour design workshop with a focus on Raynaud’s, providing tools to articulate their experiences. In addition, as a creative designer, I created knitwear to support their physical, psychological, social and aesthetic wellbeing. Wearer feedback on the knitwear was then gathered through the use of a questionnaire and one-to-one interviews. In the following section, I expand on these various stages of the design research. I have already carried out reflexivity in chapter 1, on my own role in shaping this research project. The following section provides more detail on the research design and its stages. I discuss how by adopting reflexivity in action, I made the decision on the direction of the investigation. I then outline the recruitment process, methods for data gathering, data analysis and methods to support the design process.

#### 4.4 RESEARCH DESIGN AND APPLICATION

Figure 4.1 illustrates the research stages of the project. While the research design was not a clear linear approach, it was divided into four stages containing key stages of a standard research process of data collection, data analysis, knowledge production and knowledge dissemination (Crouch and Pearce, 2012). Stage 1 was the explorative phase to help focus the direction of the project. Stage 2 consisted of the collection and analysis of data. Data collection used two methods: semi-structured interviews and a design workshop with a focus on Raynaud's. The first set of interviews were analysed using Interpretative Phenomenological Analysis and the design workshop and feedback interviews via thematic analysis. This was to accommodate the different types of data gathered. For example, understanding and interpreting lived experiences from the one-to-one interviews suited an IPA approach. However, these interviews and workshop produced some practical information needed for designing, which was categorised under separate headings or themes. For the feedback interviews, IPA was not appropriate as the garments were not worn over a period of time to gain real world lived experiences. Stage 3 involved using the findings from Stage 1 to inform the designing & making of knitted garments and accessories. These were returned to six of the original participants from Stage 1, for validation of the outcomes. The final Stage 4 consisted of knowledge production and dissemination.

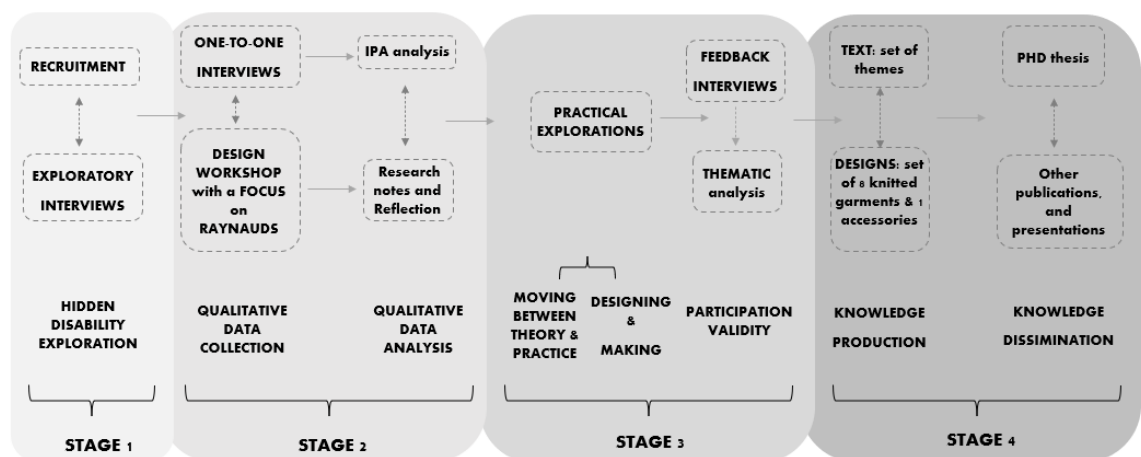


Figure 4-1: Diagram illustrating the four stages of the research design (Lisa Shawgi, 2022).

## 4.5 STAGE 1

The first stage of the research design was an explorative process to ensure confidence in my decision to focus the project on women living with Raynaud's, by applying a reflexive approach to the process.

### 4.5.1 Reflexivity in action

In chapter 1, I explained the personal, professional and academic backdrops which shaped the research topic and my approach, an activity known as reflexivity. In this section, I explain how reflexivity prompted the first explorative stage of the research design. This was an opportunity to address my own pre-conceptions developed from my experience and knowledge as a Raynaud's sufferer and fashion knitwear designer during the MA regarding Raynaud's phenomenon, clothing and fashion. These included a need to develop more aesthetically pleasing clothing, understanding the subjective experience of 'extraordinary' people to design successful fashionable clothing and understanding the personal affect these have on the wearer. Since my goal for this study was to investigate the subjective richness of living with a disability to inform innovative knitwear designs, I aimed to conduct "*discovery interviews*" (Chapman, 2005, p.33), under the umbrella term of 'hidden disability'. I adopted this term as the condition Raynaud's is not always prominent and sought to include similar conditions where clothing played a key role in managing symptoms by keeping warm. Under this term, I aimed to recruit and carry out pilot semi-structured interviews with males and females living with Raynaud's, Diabetes and Rheumatoid Arthritis. The latter two conditions were chosen in response to similarities identified via secondary research. That is, with Raynaud's, the most effective strategy for managing the condition is by keeping warm through clothing, and secondary research highlighted a similar recommendation for diabetics (Gault, 2016, Gonzalez, 2012) and people living with rheumatoid arthritis (Zhang and Verhoef, 2002; Kordasiabi et al, 2019). The explorative stage informed the decision to focus on women living with Raynaud's phenomenon for two reasons; firstly, the response to the project's advertisement for the recruitment process differed between Raynaud's sufferers and the conditions Diabetes and Rheumatoid Arthritis; and secondly, the experiences which emerged from the interviews significantly diverged in the case of Raynaud's when compared to Diabetes and Rheumatoid Arthritis. By applying

and carrying out a reflexive approach and by critically reviewing what emerged from the semi-structured interviews, I explored any pre-conceptions of the thesis topic.

In the sections to follow, the process and outcome of recruitment and sampling in the explorative phase are presented.

#### **4.5.2 Recruitment process**

The recruitment process involved distributing a flyer to organisations that provide support for people living with Raynaud's, Diabetes and Rheumatoid Arthritis. These included the Scleroderma and Raynaud's UK (SRUK) association, Diabetes UK and Arthritis Research UK. In addition, the flyer was circulated via email and social media platforms such as Facebook, Instagram and Twitter. The flyer advertised the research project and my desire to speak with people living with a 'hidden disability' in the context of 'assistive/therapeutic' clothing and designs (for the full text of this advertisement please see Appendix 1). SRUK promoted the project through their website and Twitter account in October 2017. SRUK also carried out an interview with myself as a Raynaud's sufferer and researcher for an article which appeared in their quarterly news magazine, published on the 6<sup>th</sup> February 2018 (Appendix 2), which promoted the project even more and led to an increased number of participants looking to take part in the study. Through Facebook, I contacted the Raynaud's Association USA and the flyer was posted on their Facebook page, discussion forum, Pinterest, online News Board on 4th Oct 2017, and Tweeted on 23 October 2017. Although, this method proved fruitful for recruiting women living with Raynaud's phenomenon, recruitment for people living with Diabetes or Rheumatoid Arthritis was less successful. Due to Data Protection, Diabetes UK were unable to share the flyer with their members. However, the research was advertised on Diabetes UK website. Similarly, Arthritis Research UK were unable to distribute the flyer due to lack of appropriate resources to share information with members. Therefore, I attempted to widen the recruitment parameters for people with Arthritis, which led to circulating the flyer via online platforms such as Twitter, Facebook and email under my own profile.

### **4.5.3 Exploratory interviews**

Phase one of the research design consisted of carrying out semi-structured, exploratory interviews (September 2017 – March 2018) with seven participants. The interviewees consisted of two women living with Raynaud's, one female living with Raynaud's and Rheumatoid Arthritis, two women and one male living with type 1 diabetes and one female living with type 2 diabetes and rheumatoid arthritis. Further to this list, two males living with Raynaud's made contact via email, however, they had no interest in taking part in the study. As the flyer advertised my interest in 'assistive' clothing and fashion, they explained that they kept warm by wearing appropriate clothing and on occasion used medication to manage the symptoms. Although they expressed an interest in participating in an interview, no commitment was made for a time and date. As participation was entirely voluntary, I did not pursue them further. I can only assume that the reason for a stronger female interest was due to clothing and fashion being the topic under investigation. Although, there was no direct evidence to support this assumption due to the sample size being so small and no questions were asked regarding this idea. Although, I did pick up on enthusiasm for the more fashion dimension of the research from the female participants living with Raynaud's. Included in the exploratory interviews were two other interviews carried out with a rheumatologist and a nurse working in the Royal London hospital. In the following section, details of the one-to-one interviews and participant's profiles focusing on Raynaud's are provided.

## **4.6 STAGE 2**

The second stage of the research design focused on designing and carrying out one-to-one interviews with women living with Raynaud's, using an Interpretative Phenomenological Approach (IPA), followed by a design workshop with a focus on Raynaud's.

### **4.6.1 One-to-one interviews and participant profiles**

The semi-structured interview was designed to explore my interviewees' personal perception of their daily activities or practices (Biggerstaff et al, 2008). Following on from

the exploratory interviews, I recruited and interviewed thirteen women living with Raynaud's phenomenon between October 2017 and July 2018. To begin, I interviewed six women individually, of which 5 were online and one in person. Participants were asked about their experience with Raynaud's, how they managed the condition, any challenges they faced, clothing that help prevent or relieve symptoms, clothing they desired, their ideal clothing and recommendations by health practitioners (to view the interview protocol, please see Appendix 4). The 7<sup>th</sup> interview took place in the participant's home and when asked the question about clothing which helped them to manage their symptoms, I was able to view the garments and accessories. This made for a much more productive interview as I was able to gain a more detailed understanding of the qualities within a garment or accessory desired and needed by these women to keep warm, stylish, carry out daily tasks and activities. Moreover, "*with their physical presence they remind the informant about specific considerations, experiences, emotions, etc*" (Klepp and Bjerck, 2014, p.377) and prompted personal stories of meaningful experiences (Martin and Hanington, 2012), which was in keeping with a human-centred approach.

Going forward, the interview protocol was amended, and participants were asked to prepare for the interview items of clothing which they found to be effective, ineffective, adored and disliked. A question around how their relationship with clothing changed was also included. To maintain consistency throughout the data, I returned to the first 6 interviewees to arrange a follow up interview where these additional questions would be asked. All participants agreed, but due to illnesses, scheduling difficulties and other circumstances, I only managed to carry out three follow-up interviews. However, I went on to carry out a further six interviews during this time, which amounted to ten interviews that included the amendments. As ten interviews were a sufficient number for an IPA approach, and due to the data becoming saturated at this number, I did not pursue the three remaining follow-up interviewees and decided not to include the data.

The ten participants' age ranged from 26 years to 64 years of age (at the time of this study). Eight resided in the UK and two lived in the USA. Four of the women were retired; Valeri (64yrs) based in Lincoln and a retired researcher; Louise (61yrs) living in Nottinghamshire and a retired schoolteacher; Margaret (58yrs) a retired data analyst in Lincoln; Brenda (57) a retired schoolteacher based in Essex; and Carol (55yrs) based in Leicestershire and a retired health visitor. The remaining participants were Jessie (48yrs) who worked part time as an estate agent residing in Northamptonshire; Jane (35yrs) who is

working and living in London as a fashion buyer; Mandy (26yrs) an MA student in Fashion Marketing living and studying in Nottinghamshire; Daisy (28yrs) a full-time mum in Las Vegas and finally Sandra (61yrs) a housewife and volunteer based in South Dakota.

#### 4.6.2 Interpretative phenomenological analysis

Interpretative Phenomenological Analysis (IPA) was first developed and advocated by Jonathan Smith (1996), who argue for a qualitative, experimental and experiential approach in psychology, one that endeavours to capture “*a rich and detailed portrayal of personal experiences*” (Smith, 2011, p.56) “*studied through the person’s own perspective*” (Howitt, 2013, p.335) of the topic under investigation. The IPA approach allows the researcher to shift his/her understanding process away from a biomedical model “*where an observable bodily process is held to map onto a predictable illness experience in a fairly simple way*” (Brocki and Wearden, 2006, p. 88) towards “*social constructions*”(Laitala and Klepp, 2019, p.125). It is appropriate then that the foremost objective of IPA is to study and understand participant’s experiential account of their personal and social experiences, of the issues being explored through the lens of phenomenology “*the study of human experience and the way in which things are perceived as they appear to consciousness*” (Langdridge, 2007. p.10). This deeply resonates with my approach as I was committed to understanding the subjective dimension of living and coping with Raynaud’s syndrome, which subsequently effect my participant’s personal and social world. By engaging with and interpreting participants own reflections on the significance of what is happening to them, I developed an understanding on the complexity of how textiles can support a person’s physical and psychological wellbeing. This effort to reflect upon and make sense of what is happening to my participants’, is informed by hermeneutics, the theory of interpretation and IPA’s second theoretical touchstone. To construct a deep and meaningful understanding of my participants lived experiences, IPA acknowledges that:

*“Access depends on, and is complicated by, the researcher’s own conceptions and indeed these are required in order to make sense of that other personal world through a process of interpretative activity”*

(Smith et al., 1999, pp. 218-219)

Therefore, the researcher takes on an “*active and reactive*” practice within a circle of interpretation, until the process is exhausted, and the research outcomes are finalised (Ania,



2016, p.85). This process is important to my research project, as I seek to construct understandings of the relationship between my participants' experience of clothing and accessories to self-manage symptoms of Raynaud's. By making connections between what the women say, think and feel when discussing what they wear in various contexts, provides an insight into their wellbeing. Furthermore, the analytical process takes on a double hermeneutic or dual interpretation practice. Participants reflect on their experience to construct meaning of their 'lived experiences', while the researcher aims to decode the participants making sense of their meaning of their personal world. Therefore, IPA "*recognises the interactive process between the researcher and the participant, and the inescapably intermediary role the researcher plays in interpreting the described experiences*" (Chin et al, 2009, p.4). I argue that this approach permits me to draw upon my own experiences as a Raynaud's sufferer, enhancing the richness of the interpretation process, of what the women desire in clothing.

Finally, IPA is an idiographic method of inquiry. Smith et al (2009) describes how IPA focuses on the particular, in contrast to the nomothetic approach, which is concerned with making generalised claims towards a group or population level. Ideography refers to the rigorous, careful and detailed examination of individual perspectives of each case study in their unique context. According to Smith et al (2009), IPA is committed to the particular on two levels. The first is a commitment to detail and depth of analysis. The second is the commitment to comprehending how "*particular experiential phenomena (...) have been understood from the perspective of particular people, in a particular context*" (Smith et al, 2009, p.29). However, Warnock (1987, cited by Smith, 2004, p.42), claims that to delve "*deeper into the particular also takes us closer to the universal*". Therefore, similarly in this study, IPA's idiographic dedication to the particular allows me to move from single case analysis to more "*theoretical generalizability*" (Smith & Osborn, 2007, p.530). This is important to my study, as the phenomenon is personal to how the condition physically effect each participant, while still having similarities across the board. IPA allows me to identify the particular convergences and divergences of my sample group, to create generalised themes generated from insightful analysis, whilst remaining grounded in examples of individual narratives. Therefore, the reader gains insights into the fundamental generic themes from the analysis and the narrative life world of the particular participants who have told their stories. This is essential to understanding the phenomenon at hand, as issues

concerning health and illness are personal and variable to each individual, but with considerable similarities across the board.

#### **4.6.3 Focus group workshop method**

To further comprehend the phenomenon under investigation, a *Design Workshop with a Focus on Raynaud's* took place at Broadway Cinema in Nottingham on Sunday 29<sup>th</sup> April 2018 with ten participants. The event ran for 3 hours, with an hour on each side allocated for set up, meet and greet, and take down. It commenced with a presentation which included a summary of my project and workshop schedule, followed by several activities with ten participants (for more details on the Design Workshop with a Focus on Raynaud's activities and schedule, please see Appendix 6). While the one-to-one interviews generated rich qualitative data between participant and researcher, this event created a collective environment for interaction between participants to provide "*a good understanding of the world of the participants since it reveals the group's shared experiences of everyday life, language and culture*" (Liamputtong, 2011, p.32).

The event was divided into two halves. The first half emulated the discursive nature of a focus group where two activities, *Future Visioning* and *Mapping Change*, were designed to give "*participants greater control of the issues raised in the dialogue, because they are essentially discussing the issues among themselves rather than directly with an interviewer*" (Hennink, p.5). The purpose of the first activity *Future Visioning* was to envision a better future by thinking about where participants would like efforts of change to take place (Escobar et al, 2014). It also allowed participants to slowly become comfortable working within a participatory environment, as it started with an individual exercise by listing three positive future changes, sharing these within a partnership, and then working as a group to create themed categories from the list. This exercise allowed participants to pool their knowledge and perspectives by "*sharing and comparing*" through exploring and discovering similarities and differences (Morgan, p.12). This was to understand what primary issues, main challenges and concerns participants shared regarding living with Raynaud's phenomenon. Having identified several key headings from the *Future Visioning* exercise, the second activity *Mapping Change* was designed to explore two of these challenges in more depth. Two groups of five were asked to map out ideas in response to the

question *what can be done to work towards having a more effective, improved, satisfactory and desirable.....?* The aim was to “*identify and discuss the barriers or strategies to achieving these changes*” as a community, very much in keeping with a participatory approach to research (Hennink, 2014, p.15).

The second half of the event consisted of a co-design activity called *Bring to Being*, designed to give participants the tools to express, share and design their future needs-based solutions in fashionable clothing. As participants were valued as experts of their own ‘lived experiences’ with Raynaud’s and not designers in the traditional sense, tools such as a mannequin, various fabrics and magazine images were provided for the women to design their wearer experience for a design scenario such as *designing a New Year’s Eve outfit on a rooftop terrace in London*. This approach was underpinned by Sanders and Stappers’ (2008) suggestion to ‘make’ with consumers as an interactive design process associated with a co-design method. As Steen et al argue, a benefit of co-design is that within “*creative workshops, people can jointly explore and articulate their latent needs and jointly explore and “make” solutions*” (2011, p.54). By asking the women to design what they would wear for an occasion, ‘brings into being’ the clothes they envision themselves wearing in terms of material performance to keep them warm, desirable aesthetics, along with the social and emotional values of the items of clothing. This is in keeping with the disability movement’s montage of “*Nothing about us without us*” (Charlton, 1998, p.14) and the human-centred design approach this thesis adopted.

#### **4.7 STAGE 3**

The third stage involved the designing and making activities to produce the Re-dress capsule collection underpinned by my own tacit and experiential knowledge to design and make knitted fashionable clothing to support the women’s well-being. Feedback interviews were later carried out on these fashionable clothing to gain participation validation. The methods adopted to design and make the items of knitwear are outlined in detail within chapters 6 to 8. In the following sections I explain the principles which underpinned these activities.

#### 4.7.1 Tacit and experiential knowledge for textile thinking

Tacit knowledge is described as the act of knowing more than we are able to articulate (Polanyi, 1966). Polanyi provides an example of the human face's physiognomy to explain how difficult it is to *know* and *express* how one recognises a person from their characteristics as opposed to solely based on their physical appearances. This comprehension of *knowing* cannot be described with words or images and so this act of *knowing* is ineffable and depends on an understanding of the thing in its entirety and not individual parts.

Polanyi does offer a description of tacit knowledge which is in keeping with this thesis, which is that of *personal knowledge* or an “*active comprehension of things known, an action that requires skill*” (1958, p.vii). Gascoigne and Thornton explained that “*personal knowledge is practical knowledge connected to skill and ability*” (2013, p.5-6). Niedderer goes further and associates tacit knowledge with connoisseurship or mastery of “*an ability for very fine (qualitative) discrimination that is (usually) beyond scientific measurement and that is acquired through extensive training*” (2007, p.6). Tacit knowledge is therefore relatable to the build-up of practical-orientated knowledge and close to experiential knowledge gained through ‘lived’ or personal experiences.

This thesis valued both tacit and experiential knowledge as I drew on my expert knowledge as a fashion knitwear designer and personal experiences of a woman living with Raynaud's during the making activities “*to originate new material and material systems, as well as to express and enhance the potential sensory pleasure of existing materials*” (Igoe, 2010). For a comprehensive understanding of textiles, Kane and Philpott (2013) noted the importance of tacit knowledge in textile design:

*“Through the constant handling of ‘stuff’ of textiles and the repetition of the gestures of making, the practitioner’s senses work together to build a comprehensive embodied understanding of both materials and process. Practice leads to mastery and eventually to the development of a whole body comprehension or tacit knowledge that is carried unconsciously within the practitioner but informs the activity of making”*

(p.5)

Tacit and experiential knowledge of fibres is developed through an accumulation of hands-on experience of materials and processes for successful application. Salolainen supports this idea that hands-on practice “*combines reflective and experiential knowledge with deep*

*material and tacit knowledge*” (2019, p.2). As established by Niedderer, this implicit understanding of fabrics and processes for successful application is “*often expressed as expertise and connoisseurship, and that therefore the deliberate inclusion of tacit knowledge within research is important and necessary*” (2007, p.11). Even though, this type of knowledge acquired through experience-based means is often “*difficult to communicate through conventional language-based means*” (Niedderer, 2007, p.1).

#### **4.7.2 Feedback interviews**

Following from designing and making, feedback interviews were carried out for ‘participation validation’ of my interpretations channelled through the material forms created. According to Tracy (2010), participant feedback or *member reflections* adds to the credibility or trustworthiness of research findings in qualitative data. By asking participants or members to check emergent themes, conclusions or reports, allows researchers to assess their interpretations of the data and acquire feedback on the validity of the accounts produced. Further to this, Slettebo emphasises that “*to engage in participation validation activities can be experienced by service users as respectful, inclusive and empowering processes which enhance their value*” (2020, p.1236) and provides opportunities for participants to construct new meanings when reflecting on the results.

User involvement in social research is argued as a fundamental aspect in relation to public health, social care and social work to improve services. This methodological practice also challenges societies’ tendency to treat ‘extraordinary’ people as ‘other’, which contributes to the concept of social exclusion (Beresford, 2013). Involving users in the research process originated in the disabled people’s movement discussed in chapter 2, section 2.2, where Hunt (1981) and other disabled people living in a residential institution requested to be integrated within the community, which was denied. Employing independent researchers to explore and provide evidence of possibilities to live alongside ‘normal’ people, the results produced stated that the disabled residents were ‘parasites’ who needed to rely on others. This prompted disabled people to undertake their own research to ensure fairness, unbiased opinions and acceptance of conventional views on the part of the researcher (Hunt 1981). According to Asbjorn (2017), user evaluation within information and communication technology may create two types of data: *interactive data* and *design feedback*. The first is

the data recorded from using an interactive system, and the second data focuses on “*user’s reflections concerning an interactive system, such as comments on experiential issues, considerations of the system’s suitability for its context of use, usability problem predictions, and design suggestions*” (Asbjorn, 2017, p.1). The latter method is what this thesis adopts for validation of my material interpretations and to ensure inclusivity of participants. Furthermore, it is in keeping with the two paradigms the research sat within. That is, constructing new meaning to further understand the phenomenon under investigation and transforming conventional assumptions of ‘extraordinary’ women within the context of clothing and fashion.

#### **4.8 SUMMARY**

This chapter explained the fundamental principles associated with carrying out the research study. The study sat between a constructivist and critical paradigm to understand and transform the lived experience of participants. To understand the phenomenon under investigation, a human-centred design approach was taken working with participants to construct meaningful insights. Underpinned by reflexivity, Stage 1 of the research design sought to explore, recruit and carry out interviews with people living with Raynaud’s, Diabetes and Rheumatoid Arthritis. This resolved assumptions formed from secondary research regarding the latter two conditions in the role of clothing to self-manage the condition in comparison to Raynaud’s sufferers. This led to the project solely focusing on women living with Raynaud’s phenomenon.

Stage 2 involved data gathering using semi-structured interviews and a focus group workshop method. The interviews were analysed using an interpretative phenomenological analysis to understand the subjective dimension of Raynaud’s. Because of the nature of the second method, it was not possible to apply IPA when analysing the data from the focus group design workshop. The data gathered was analysed using a thematic approach to identify key concepts. Both methods also produced practical information relating to clothing important for a designer, which was accumulated within a table explained in chapter 6, section 6.5. Knowledge from this stage of the research design was brought into Stage 3 where further interpretations of secondary research alongside subjective data from my own tacit

knowledge of Raynaud's and knitwear experiential design was used in an iterative reflective cycle to create design concepts and direct the making activities.

The following chapter discusses the insights produced during Stage 2 of the research design of which informed the designing and making activities.

## **CHAPTER 5. FIELD WORK: undressing Raynaud's**



## 5.1 INTRODUCTION

In the previous chapter, I explained my philosophical stance which shaped the human-centred design approach that I adopted for this research. The four stages of the methodology were outlined, along with methods used to encapsulate theory and practice regarding fashion, clothing and disability. The purpose of this chapter is to present the written interpretations of the empirical data gathered from the semi-structured interviews carried out during Stage Two of the research design.

The immediate section to follow provides a summary of insights developed from my analysis of the interviews using the IPA approach. This section, titled *Undressing Raynaud's*, explores three main themes, which are further broken down into several sub-themes. Each main theme draws on my interpretations of participant's narratives to understand their experiential relationship with Raynaud's phenomenon, clothing, and fashion, identified as *The Development of Self-management Strategies in Clothing Practice*, *Material Affairs* and *Societal Relations*. The subsequent section links back to my contextual review discussing how the empirical themes contribute to research on disability, clothing, fashion and well-being. These written interpretations communicate the theoretical aspect synonymous with a constructivist perspective of attaining experiential qualitative data, to create new meanings and add to existing knowledge and understanding within the field of fashion design and disability. The final section of this chapter provides reflections on the relationship between the themes and the effectiveness of the IPA method. The presentation of my findings begins with an introduction of both the superordinate and subordinate themes and includes a brief overview of my approach to analysing the interviews.

## 5.2 'UNDRESSING' RAYNAUD'S

The study aimed to bring to light the embodied experience of women living with Raynaud's phenomenon through the lens of knitted fashion, clothing and textiles. This section elaborates on themes produced from the IPA approach adopted to interpret the raw data from the interviews and wardrobe studies. It is important to note that these are not stand-alone themes as each interweaves itself into the next. This showcases the complex layering effect of the condition. Figure 5.1 represents the interlinking relationship of both the

superordinate and subordinate themes. For instance, the women make wardrobe adjustments to enhance physical and emotional comfort. Part of this adjustment motivates the women to carry out DIY practices to adapt their clothes to suit their ‘extraordinary’ bodies. By making do with what they have, they continue their search for a second skin to self-manage their condition. These aspects shape the women’s affairs and type of experiences through materials such as a desire for more aesthetically pleasing clothing appropriate for their condition; how materials provide choice in what to wear; and the role that textiles play in providing pleasurable experiences, authenticity and identity such as feeling feminine. All of the above aspects influence the women’s social relationships in terms of fitting in and feeling excluded from trends. Before elaborating on the themes, the next section provides a brief overview of my approach to analysis.

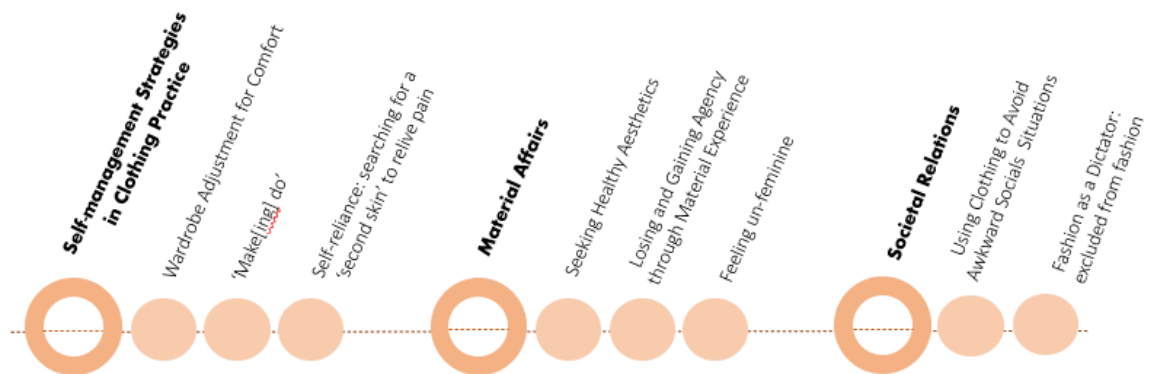


Figure 5-1: Superordinate and subordinate themes (Lisa Shawgi, 2019).

### 5.2.1 Approach to analysis

IPA predominately deals with text where the primary activity is reflexive writing. I drew on IPA studies for guidance, including Smith’s (2011) steps of conducting IPA analysis. Consequently, the steps I followed was first to transcribe the text myself on a prescribed grid consisting of three columns. The text was in the middle with margins either side for recording initial codes on the left, and emergent themes on the right side (for an example, please see Appendix no.7). Transcribing the interviews, myself, allowed for more familiarity regarding each transcript. This was followed by developing emergent themes in a separate table, followed by combining similar themes to condense information and make the task more

manageable. Once these steps were completed for one interview, I repeated this process for the next, looking for patterns before finalising the superordinate and subordinate themes. In the next section, I explore these in more depth, using participant's narratives to ground the findings. Please note that the numbers beside the pseudo names in brackets after a quote, refers to the line number in the interview transcripts.

### **5.2.2 The development of self-management strategies in clothing practice** *“but I find that I’m just always looking for strategies to try and improve things” (Carol, 599)*

This master theme aims to illustrate the participant's lived experiences of managing symptoms of Raynaud's through their clothing practice. The focus is on how the women adjust and adapt their lives through their wardrobes to meet the condition's physical demands to stay warm. The three sub-themes include *Wardrobe adjustments for comfort*, *Making(ing) do* and *Self-reliance: searching for a 'second skin' to relieve pain*. The first theme explores how the women move to a more practical means of dressing without compromising on style. The second identifies DIY techniques that the women develop to make clothing work for them in terms of material performance and fit. And the third theme unpacks how a lack of support from health practitioners creates an attitude of self-reliance to research and search for appropriate attire.

#### **5.2.2.1 Wardrobe adjustments for comfort**

The ten narratives provide insights into the progression of Raynaud's and its influence on how participants select and wear clothing. Throughout the interviews, the women stress determination to take personal care of themselves and protect their bodies against a Raynaud's 'attack' (see chapter 1, section 1.2 for discussion on a Raynaud's attack). Concern was expressed for possible tissue damage caused by reaching, what Louise referred to as *“that level of cold”* (13) where blood flow is restricted, causing numbness, pain and discomfort. Further into her interview, Louise explains that she *“will wrap up really warm, um, no, I won't put up with being cold because now I know that I worry about the tissue damage, no it's focusing the mind on doing the right thing and being sensible”* (861).

Louise's use of the word "*that*" suggests a perceived level of intolerable 'cold' from a comfort perspective. It invokes a sense of physical destruction to the body such as long-term "*tissue damage*", which indicates a temporal aspect to their existential concern. The women seek short-term alleviation to feeling uncomfortably cold and a long-term determination to avoid physical harm and discomfort by "*doing the right thing and being sensible*". To self-manage symptoms and avoid both short- and long-term discomfort, the women adjust a daily habit: their clothing practice. When asked how the women's relationship with clothing changed, they express the importance of remaining warm and comfortable in their clothing practice, Mandy explains:

*"I think now I go for more comfortable and warm things because... whereas, when I was younger it was more like I cared about how, how..., I care about how I look now so I don't really think that's the right way of putting it. I was more style conscious, and I would have chosen that over being warm, and comfortable but now as I get older I kind of want to look after myself and feel comfortable every day, if I have to go out like, I don't want to feel restrictive or I'm gonna be sitting shivering or you know, that sort of thing, so yeah, I do feel like it's changed,... probably not for the better in style decisions [laughs] but I'm warm [laughs] so... "*

(649-655)

The extract above indicates how the women's wardrobe changes, but most importantly, how they define what they wear and how they feel when wearing these types of clothing. Mandy describes this change as a move from "*stylish*" to "*practical*" (505) clothing. Mandy explains that "*I know it's not practical [...] that I wouldn't be keeping myself warm...or I wouldn't be as comfortable*" (505-506). The term 'practical' appears to be used to refer to clothing, which is unstylish or perhaps unfashionable, and unsuitable for keeping the wearer warm. It presents the question of what type of clothing is considered 'practical', as one might argue that a wearer can be stylish and practical at the same time. Or in this instance, perhaps it is a lack of choice and freedom in what a person living with Raynaud's can wear as the women prioritise thermal performance in a fabric, over visual aesthetics. The transition described in the extracts above provides us with a sense of how dynamic and complex the women's lived experience is with clothing and Raynaud's. As the women seek physical comfort through 'practical' clothing, there is a sense of psychological comfort by actively taking steps to ensure control to avoid experiencing physical harm. Interestingly, in the same breath, Mandy suggests a sense of compromise on her "*style decisions*". There appears to be an underlying tension in terms of self-perception; the old self (young and a bit more stylish

and carefree), and the current self (sensibly health conscious and management focused). It reveals challenges of working with the body to provide ‘functional care’, while sustaining a sense of ‘style’ as part of Mandy’s identity. Furthermore, Valerie provides us with an insight into how challenging and exhausting the transition of adjusting her ‘clothing practice’ was: *“I can’t imagine going through it all again, I, I can’t [...] all, all, all the learning how to, how to be comfortable, under any circumstance, you know?”* (268-274). Valerie’s repetition of ‘I’ and ‘all’ reveals how much of a struggle it was to make sense of her impairment in terms of making necessary decisions as she adjusts to impositions placed on her, which is an effort and struggle that has both practical and emotional dimensions.

Similarly, Margaret expresses how she feels about the transition: *“Oh [sighs] I dress accordingly, much more careful now dressing than before”* (182). Here, the key word ‘accordingly’ conjures up an image of Margaret relinquishing to a set of rules imposed upon her impairment. Her sigh further suggests a loss of freedom and liberation as she adheres to what her impairment dictates as appropriate clothing. By dressing *“accordingly”*, Margaret is *“careful”* not to upset the condition’s symptoms and instigate an ‘attack’. It is almost as if there is something here about the condition being an entity that requires tributes to be paid to it, to be pacified. For one participant, Jane (a young woman working in fashion), dressing ‘accordingly’ requires prioritising *“style over substance”* (508), for her to feel socially accepted. In doing so, she wonders about the implications on her long-term physical health: *“I wonder if, like it, if you know, if it’s dangerous, if it’s you know, gonna cause issues with your bones, I don’t know, or different things... basically I don’t want my fingers to fall off”* (339-341). Jane uses powerful and shocking images of skeletal bones and loss of limbs to express her fear of possible, bodily destruction. These are strong psychological drivers for the motivation to modify clothing practice. They show that the women summon up an imagined future, which is potentially problematic because of the condition. This is the temporality point arising again as above. For Jane, she *“did actually attempt to dress warm”* (446), as she becomes more conscious of her body. During the interview, Jane pulled out a pleated, patterned dress (Figure 5.2) constructed of wool, in an attempt to dress practically but still appear and feel stylish.



*Figure 5-2: Jane's wool dress (Lisa Shawgi, 2018).*

#### **5.2.2.2 'Make(ing) do'**

The psychological drivers discussed in the previous theme prompt the women to share a self-management strategy of making the most of their clothing by adapting what they have to accommodate their 'extraordinary' requirements, or through making clothes to fit their needs and make their wardrobe more practical. Many of the women interviewed in this study play around with their clothing by layering various clothes to provide the appropriate warmth, stretching cuffs on socks to ease tightness, wearing nightwear as outerwear for warmth and comfort, and several of the women make items of clothing to mitigate the effects of Raynaud's. As Valerie explained when she presented knitted wrist bands (Figure 5.3) during our interview:

*“I’ve knitted them myself, which are merely, a part of a glove pattern [...] these live in my handbag [...]so therefore, when I, when I sew clothing and when I knitted [...] I could just adjust lengths you know, and make them fit me properly, so that’s, that’s largely how I manage it”*

(37-39)

Valerie adapted glove patterns to make knitted wristbands, which “live” in her handbag. The use of the word “live” suggests the wrist warmers are regular fixtures, indicating frequent use and a strong sense of attachment. Valerie’s explanation for needing to make items of clothing herself, was due to her having “very long arms” (31), so “a full-length sleeve, for the average woman, is, is absolutely no use whatsoever” (32). As she is unable to make substantial items of clothing anymore, what Valerie “tend[s] to do, is [...] buy men’s jumpers” (34).



*Figure 5-3: Valerie’s hand-knitted wrist warmers (Lisa Shawgi, 2018).*

Valerie’s encounter with clothing issues and how she counteracts through making and wearing men’s jumpers are shared with other participants. Sandra replicates patterns of wristbands purchased from a brand online “I’m like, well, and I bought one, and then I guess, I’d be honest with you, I used them as a pattern [laughs] cos I can make them myself, then it was easier” (127-131). Deconstructing and replicating the bought pattern allowed Sandra to alter the shape to fit accordingly, explaining that it was “easier”. It is interesting that

Sandra uses the word “*easier*” as an explanation of why she makes wristbands, as one would consider that purchasing items is a simpler task than making them. Perhaps it comes down to the degree of control when making, in comparison to buying? This implies that perhaps the making is really about control in terms of personal customisation of an item of clothing. It is an indication of the challenges faced by someone living with an impairment to find suitable clothing. On a similar note, Margaret knitted woollen ‘cup’ shape cosies as seen in Figure 5.4, which provides extra coverage for her toes:

*“but I think the idea, I was looking for an idea, you see [...] But another thing, you’re going to like, because I made it myself, because my problem isn’t foot, it’s just here, so I made them to put on my toes only, a bit too big you know here, but that works, and this is wool, but I made it myself!”*

(400-403)



*Figure 5-4: Margaret’s hand-knitted toe warmers (Lisa Shawgi, 2019).*

The women have a personal investment in making as a self-management strategy to control their impairment. Margaret emphasises this by repeating the words “*I made it myself*”, which implies embodiment of the disease and a remedy for it in terms of actions, by making things



work in their favour. By ‘Making do’, both Mandy and Jane enhance performance and sensory qualities of items already in their possession as highlighted in Mandy’s testimony:

*“usually though... please don’t judge me I feel really lame right, what I do, usually I wear leggings OK, ‘cos I don’t like wearing jeans, they, they feel too tight and they feel really restrictive, so usually I wear leggings, but I double up, to keep warm [laughs]”*

(558-561)

For Mandy, the act of ‘making do’ with what she has, is slightly more complex in understanding how it affects her. She describes herself as *“lame”*, which conjures up images of physical limitation and as feeling ‘a bit pathetic’ and suffering negative feelings. As Mandy is the youngest participant, the word could suggest an image of being ‘uncool’ in how she dresses to keep warm, and she laughs at the thought of how absurd she must appear to others: wearing two pairs of the same item of clothing to stay warm. Or it could simply be from embarrassment in revealing a personal self-management strategy to solve a clothing issue. Either way, I sensed that this was a discreet tactic that Mandy developed to enhance her physical wellbeing. In contrast to this, Louise talks about how people described her as an ‘urban warrior’ in her attempt to manage staying warm when she wears several layers: *“I have people say I look like an urban warrior [laughs] when I’ve got, got my hat on and my gloves and my snood”* (491). In this instance, Louise feels empowered by her clothing tactics. Similarly, during my interview with Jane, she showed me how by wearing two scarves in her workplace (Figure 5.5), she inspired a fashion design: *“they’ve actually bringing out a two-scarf edition [...] I go into meetings [...] so I’ll have two scarves like this, and I love it [...] they’re like, O! [...] that’s two scarves you’re wearing, I’m like yeah [...] now it’s a fashion statement!”* (554-562).



*Figure 5-5: Jane's two scarf approach (Lisa Shawgi, 2018).*

It is interesting, in the context of managing Raynaud's, that layering, and covering up brings the condition into the public attention. By 'making do' through layering their clothing, the women become and maintain the identity of a person who has Raynaud's. The terms 'urban warrior' and 'fashion statement' are formed from social interactions that are the consequence of Raynaud's. They suggest that the women have found their strength and style through the simultaneous embodiment of the condition and their clothing practice. This is important, as Raynaud's is an incurable disease with no fixed-point of conclusion. As such, Raynaud's becomes an aspect of their identity. In her interview, Margaret described the embodiment of this process: *"I can't win with this, and, and I'm desperate to, and passionate to, to win"* (290). The quote provides us with a sense of how 'mak(ing) do' is an ongoing, evolving self-management strategy, and one which is very emotional. The 'making do' practices illustrate an approach which could provide a sense of control by playing around

with available garments and creating customised design features which complement their body or condition.

### 5.2.2.3 Self-reliance: searching for a 'second skin' to relieve pain

The incentive for this theme emanated from a lack of support and recommendations from general practitioners during the diagnosis process and treatment period. This experience prompted the women to rely on their personal efforts to search, research and test various clothing solutions to relieve physical pain. Jane provides us with an insight into how the lack of knowledge on how to cope with symptoms effect the women, when she explained that her surgery *“didn't really give any recommendation around it or... any advice around it or anything like that so yeah (61-62) [...] you know maybe just explain a little bit why, why it happens and... if there's anything that you should do, um to avoid it or help kind of when, when you have it...”* (68-69). Jane refers to her Raynaud's disease as 'it', a term associated with an unknown entity, stressing the point that she does not fully understand her body's response to her impairment. 'It' is also *things* which are sometimes used to refer to entities in horror movies such as *It, The Thing* or *It's Alive*. They all depict an unknown and malicious figure which requires destruction. Repeating the word 'it' also implies that she does not know what to do with 'it'. At the same time, the word 'it' does point towards a specific aspect of the condition. When Jane explained that she wanted *“to avoid it”* or know what to do *“when you have it”*, this implies a Raynaud's 'attack' experience. By referring to her Raynaud's as an 'it', Jane is mentally and physically trying to put some distance between herself, and an 'attack', which is unpleasant and painful. Margaret emphasised a woman's depth of understanding about their condition *“I cannot understand, aa.... Why I suddenly feel good, or why I suddenly, I, I don't know, it's just, from no reason, I suddenly I'm in pain”* (284-285). Margaret is still trying to make sense of her body's reaction to particular situations. She is also identifying factors which affect her well-being, whether these are internal or external. In addition, it suggests that the *thing* that comes unannounced, at random and always ready to do you harm. This is similar to the notion of a *it* in a horror movie.

If recommendations were provided, they lacked useful information for the women to understand how best to manage and cope with their symptoms. The treatment recommended to Brenda was *“buy somewhere in a warmer climate”* (13-14). Carol mentioned that her GP

declared she would “*have to retire*” (181). Daisy’s GP said to “*stay out of the cold*” (21), and Mandy was told to “*keep her hands warm and circulation, you know, moving, and that’s kind of all they said*” (94-95). There is a dimension of absurdity to suggestions made by GPs in how to manage the condition. Moving to a warmer climate or taking early retirement were unrealistic options for the women. More interestingly, compared to the depth of horror that the women feel or fear of *it*, the recommendations appear quite superficial. Further to these testimonies, Louise explained what happened when she requested medical intervention to avoid getting cold at work. That is, Louise requested a letter to exempt her from outdoor activities during colder months:

*“NHS doesn’t get involved with Raynaud’s until you start developing ulcers, and then they’ll give you treatment for the ulcers, and I said, and I, it really um, shocked me to hear the word ulcer, because from the reading I’d done, I knew that you’d have to protect against tissue damage, um, and I hadn’t equated that with ulcers cos I’m not a medic, [...] and once you’ve got ulcers you may lose your toes, and I came away thinking Oh my God, that nothing I’ve read had prepared me for that [...] (620-637) but they, but they, um, they don’t have any preventative measures, or you know anything that they could offer um, um, as a, yeah, as a way of avoiding that ultimate outcome which is really, really disappointing”*

*(904- 909)*

Louise’s account of her surgery visit stresses the lack of supportive and understanding advice provided by the NHS. She was met with warnings against developing ulcers, which could lead to a loss of toes because of severe tissue damage, rather than support to avoid this shocking outcome. There is medication available to increase circulation, however, they are often accompanied by unpleasant side effects. The accounts are indictive to general assumptions of how a person with Raynaud’s manages their condition, by staying out of the cold, wearing gloves and staying warm.

Once diagnosed with Raynaud’s, the women are able to put a name to the phenomenon that they experience, as Louise explains: “*It put a name to something I already knew I had, and, and I already knew I had a problem with the cold*” (682-683) and “*just putting a label on it hasn’t really changed my behaviour*” (696). Louise’s diagnosis confirmed a name and nothing else. We gain a sense of her exasperation over the lack of information from her diagnosis as she repeats “*I already knew*”, suggesting nothing useful was acquired to alter how she behaves when dealing with being cold. For this reason, the women adopt self-reliance to search, research, and test clothing to protect themselves against an ‘attack’ by the

thing, as Margaret points out: “I’ve researched a lot [...] (300) Just research, constantly googling, looking for answers, no one told me anything” (310). The use of the words “constantly” and “looking” suggest a temporal aspect to the condition, which is constant and continuous for the women. They also imply an unresolved issue of discovering “answers” or solutions to staying warm. Daisy reiterates this struggle of locating suitable garments: “so I haven’t really found anything that’s helped, like I feel like I’ve tried so much that I don’t even know if I can recall it all to be honest” (195-196). It is an indication of the effort and time associated with locating suitable clothing and the constant failure to locate appropriate attire. Furthermore, Louise explains the dedication to this cause/search: “I have to say, this isn’t two years’ worth, this is, this is ten years of trial and error, chucking out, trial and error, chucking out” (402-403).

These testimonies indicate temporal dimensions when living with Raynaud’s phenomenon, which influence the women’s relationship with their bodies and wardrobe. There is an ongoing battle to avoid an attack by taking care of themselves through their clothing practice, a result of imagining horrific future physical damage. This prompts strong emotions of fear and apprehension, leading to the women’s determination of shifting the way they dress and adopting a more practical way of dressing to stay warm. This approach prioritises thermal performance of fabrics over aesthetics. In addition, these psychological and emotional drivers motivate the women to adopt DIY methods to make personalised items of clothes and alter their clothing to suit their needs. This produces regular fixtures in their wardrobe, forming long-term wearer product attachment. At times however, these adaptations may not be practical such as Margaret’s toe covers, as I question how easy they are to place inside and take out of a boot and how the hem feels when walking on it. And as Mandy doubles up on her leggings, they make her feel ‘lame’ and embarrassed. It leads to a constant search for a ‘second skin’ to help self-manage their symptoms and gain control over it, a malicious monster or alien which is ready to pounce any time. This suggests a temporal experience, closely linked through materiality, which is explored in the subsequent superordinate theme, *Material Affairs*.

### 5.2.3 Material affairs

This theme is concerned with the women's relationship with materials and how material properties affect them. There are three sub-themes which include *Seeking healthy aesthetics*, *Feeling unfeminine* and *Gaining agency through material experience*. The first reveals the women's search for more exciting aesthetics which continue to provide the much-needed warmth required to manage Raynaud's. The second explores how the women quite often feel unfeminine due the number of layers needed and not being able to wear fabrics associated with the female gender. The third discusses how materials offer the women more freedom to interact with the public domain. All these material factors contribute to the women's holistic wellbeing. That is physically comfortable, emotionally content and socially active.

#### 5.2.3.1 Seeking healthy aesthetics

This theme is based on the women's desire for aesthetically pleasing clothing. As explained previously, the women adjust their wardrobe contents to suit their condition. However, this means that the style of clothing sits within the category of 'practical' or 'functional' clothes, associated with the fabric performance found in outdoor clothing or sportswear, which lacks aesthetic appeal. The theme's title stemmed from Margaret's testimony when she emphasised the desire for attractive clothing:

*"the look is very important to me, I mean, I got a lot of shiny things for the evening, you know, but usually they are long sleeves, they are thin, again, we are back to this thin layers, you know, and if I'm in where is warm, I can take two layers off and look good, but, you know, but, is, still is, it's aesthetics, but thinking around my health, and, and the heat I need, um, I don't usually look for these sort of clothes, I don't look for it, I come across it more, and I see it"*

(470-474)

Margaret's account revolves around looking and feeling good, both physically and psychologically. She emphasises that the "look" of a garment "is very important to me". The key word to note is 'me', which suggests something personal to herself. Later on in the extract, she indicates what this is, and that is to "look good". Her use of the word "look" also gives the impression of how she perceives herself when others 'look' at her. Further to this, Margaret uses the word "shiny" to describe the type of textile aesthetics for her evening wear. Is this an attempt 'to be noticed', as opposed to shrinking away into her surroundings?

Or is it, to ‘fit’ in with the dress code of ‘party’ wear and so not draw attention to herself as somebody different? Although aesthetics plays an important part in the women’s dress, Margaret points to her continuous thoughts for her health “*it’s aesthetics, but thinking around my health, and, and the heat I need*”. From this, we gain a sense of a balancing act performed by Margaret to acquire clothing items which are aesthetically pleasing, “*but*”, which also provide “*heat*” for her body to function. She repeats the word, “*but*” three times which highlights the importance of her balancing the visual with the performance of a fabric in clothing which she referred to as “*these sort of clothes*”. Her use of the words “*sort of*”, implies a type of clothing which has no terminology or characterisation to describe what they are. This explains the reason behind her saying “*I don’t look for it, I come across it more, and I see it*”. This suggests types of clothing items that are elusive, widely unavailable, inaccessible and inconsistent as to when and where they appear.

In the following extract, Brenda explains what happens when the balance between aesthetics and performance is tipped in favour of the former:

*“I, I’m almost... addicted to buying summer clothes that I can’t wear just because they, they look so lovely and bright and, the textures, the textiles are so lovely and, and, and it feels like something almost you can’t enjoy, or I can’t enjoy”*

(422-424)

Brenda admits to having the guilty pleasure of purchasing fabrics which she is unable to experience. The adjectives ‘lovely’ and ‘bright’ are used to highlight the aesthetic pleasure of the material, as opposed to technical elements. It suggests Brenda is referring to fashionable or trend-led clothing, which she is unable to “*enjoy*” wearing. Her correction from “*you can’t enjoy*” to “*I can’t enjoy*” further implies the move from the generalisation of anyone to someone specific, a person with Raynaud’s, suggesting that the fashion industry does not cater for the practical elements needed to keep her warm. Fashion is nonetheless attractive to her, and she is delighted by the colours and textures. Brenda gives the impression that she does not feel included in the ‘normal’ and ‘simple’ act of being able to enjoy fashionable aesthetic pleasures, and what seasonal textiles have to offer because they do not suit her condition. On this note, Carol highlights the lack of aesthetic appeal in ‘functional’ fabrics, using fleece as an example: “*but I don’t feel that um... I don’t feel very smart in them, I wouldn’t normally wear a fleece, unless it’s inside a coat or something... or if I’m outside and need it*” (783-792). The words “*I don’t feel*” are repeated, as Carol struggles to articulate

how she feels, followed by “*smart*”, which suggests that she experiences emotional dissatisfaction when wearing fleece. The adjective “*Smart*” in this instance, refers to the visual element of a fleece jumper, as she describes her efforts to hide the garment under a coat.

In addition, she points to the type of clothing family fleece belongs to, outdoor wear. Perhaps it is the reason why Carol is more comfortable wearing fleece outdoors, as she ‘fits’ in visually with her surroundings, as fleece is a technical fabric, designed to keep you warm, while taking part in outdoor activities. There is an association with fabrics and the context in which they are worn. The women wear technical fabrics as every day casual wear to stay warm. This leads to misconceptions of who the women are. We see this in Carol’s testimony below:

*“he said to me um.... We were talking about clothes and what’s good at keeping warm, and aaa.... He said, well you look like somebody who likes wearing sports clothes, that’s the sort of person you are, I said yes, but afterwards I thought, no I’m not [laughs]”*

(798-801)

This is a prime example of how clothing is a non-verbal form of communication of one’s identity (Barnard, 2014). In the extract above, Carol is judged by how she appears to others. This echoes Margaret’s use of the word ‘look’ used here to describe the ‘sort’ of person both she and Carol are. In this case, Carol’s appearance implies a sporty type of individual. Carol agrees with the viewer’s inference, but later disagrees with this notion of “*somebody who likes wearing sports clothes*”. When she later realises her disagreement, she laughs, suggesting that the initial agreement was made from embarrassment. Admitting to a lack of control over her choice in clothing in terms of agency, as her identity is misunderstood through her visual representation. It links in with the women being forced to wear ‘practical’ garments but not wanting to because they project a sense of self that is not appropriate or authentic.

Regarding being forced to wear ‘practical’ fabrics, Valerie reveals her mission to replace fleece with an alternative fabric, to avoid feeling herself becoming a ‘boring’ person:

*“fleece is the obvious, the obvious, thing, [...] I don’t mind, I really don’t mind what I wear, but, but, but while fleece always seems like a Godsend, in that it’s very, very warm, you, you, you... I, I can’t say you, I, get, get a bit bored with it, you know, in, in, [...] there’s, there’s no interest in it”*



Valerie describes fleece as the “*obvious thing*” and “*a Godsend*” for keeping warm. It is obvious, as in the best technical fabric to stay warm. Valerie links it to a divine intervention, a miracle of some sort. It highlights the level of value placed on how a fabric performs for a person living with Raynaud’s. Interestingly, fleece fabric is composed of 100% polyester which is known for its wicking capabilities, as opposed to its thermal qualities, which wool is commonly known for. However, fleece is designed for warmth through its raised ‘pile’ surface which traps air and acts as an insulator (this approach is further explained in chapter 6 when I explain the type of yarns and knitting techniques selected appropriate to help the wearer stay warm). In Valerie’s testimony, there is also a sense of struggle with accepting functional clothing to support their physical wellbeing. Valerie struggles to describe her feelings towards fleece, before settling on “*bored*” and “*no interest*”, implying a lack of engagement with the material. This is similar to Carol’s experience with portraying an inauthentic persona by wearing ‘practical’ garments. For Valerie, there is a sense that the material fleece suggests the type of person she is – boring and uninteresting.

The testimonies so far suggest that the women want more technical textiles that are visually interesting and appealing. But also, they want to wear items that represent them as authentic individuals. It highlights how the women feel excluded from material experiences. This is emphasised by Valerie’s disappointment with the absence of artistic endeavour within the materials: “*there’s no subtlety, there’s no precision, um, and, I always think well, what a pity, what a pity*” (377-378). It is an example of how materials instigate unpleasant emotions such as self-pity for the wearer by having little choice in what they can wear. Furthermore, there is a sense that Valerie, like Brenda, feels guilty for desiring a more pleasurable experience from their clothing, as Valerie attempts to persuade the interviewer that she is not complaining “*I don’t mind, I really don’t mind what I wear*” (306). Valerie repeats the phrase “*I don’t mind*” in an attempt to convince herself and the interviewer that her impairment has no effect on her desire to wear aesthetically pleasing clothing or a sense of surrendering to an inability to engage in aesthetically pleasing materials that offer a pleasurable experience. And she does not want to sound ungrateful for the gift of fleece or appear irresponsible for neglecting her health. This exclusion from wearing visually interesting technical fabrics extends to not only a compromise on their individual characteristics, but on experiencing pleasurable materials associated with femininity, which for each of the women, forms part of their identity.

### 5.2.3.2 Feeling unfeminine

Throughout the interviews, a sense of feeling unfeminine emerged, due to wearing “*utilitarian*” (Brenda, 473) type clothing and layering garments to keep warm. The Oxford Advanced Learner’s Dictionary (2023) defines ‘utilitarian’ (adjective) as something which is “*designed to be useful and practical rather than attractive*”. This is indicative to the style of clothing associated with the research participant’s physical need to stay warm. As highlighted in previous themes, the women rely on ‘functional’ garments to self-manage the symptoms of Raynaud’s. This theme explores in more detail, the emotional implication from wearing these ‘utilitarian’, ‘practical’ or ‘functional’ type garments: a sense of not feeling feminine, as indicated by Brenda:

*“I like, I quite like wearing dresses, um... [sighs] ... perhaps for about six weeks in the summer, if it’s very warm... not, not very much, lots of Barbour jackets and wool, wool jumpers, I, I suppose it’s not very often I feel feminine inside and escape.”*

(715-726)

The verb ‘escape’ denotes an act of running away from an unpleasant situation, experience or a *thing*. In Brenda’s testimony, Barbour jackets and wool jumpers precedes the verb ‘escape’, suggesting an escape from wearing ‘functional’ garments. Furthermore, she explains how rarely she feels “*feminine inside and escape*”. Her use of the word ‘inside’ highlights how deeply Brenda’s sense of femininity is suppressed by these types of clothing. Coupled with the verb ‘escape’, it indicates an urge to bring forth her femininity from inside, outwards. This implies an importance in visualising her femininity to her ‘self’, and perhaps to others as well, by way of tangible dress elements. This conveys a message to others, receivers of that visual message, to recognise her position as a female.

Feeling unfeminine is further emphasised when two of the women refer to themselves as ‘The Michelin Man’<sup>3</sup>. An example is seen in Jessie’s testimony below:

*“but I usually found if my legs are warm, then it helps my fingers, so I’ve started wearing [laughs] a pair of running jogging bottoms underneath these, and [laughs] I’m like the Michelin man, but at least I’m kind of like warm [laughs] it’s a bit sad really but [laughs].”*

(108-111)

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<sup>3</sup> The Michelin Man is a tubby mascot made up of tyres for the Michelin car tyre company.

Jessie employs a strong illustrative character to describe how she perceives her 'self' when layering garments to stay warm. The image of the 'Michelin Man' depicts a round and bulky figure and strong representation of how several women feel when adopting the layering technique to build insulation. Composed of car tyres, the 'Michelin Man' represents a 'practical man', devoid of female notions. Jessie laughs four times during her testimony. This is either to cope with embarrassment at referring herself to a bulky comical character, or how absurd she must appear to others walking along the street. Nevertheless, it leaves Jessie feeling "a bit sad". Although, this sadness is possibly connected to the women's failure to access a single layer of suitable clothing to stay warm. Consequently, Jessie and the other women wear multiple layers of garments. However, this approach appears flawed, as Jessie explains in her comment; "I'm kind of like warm", which suggests a level of effectiveness that is low. It also implies a figure of speech and Jessie means to say she *is* warm enough when she wears two layers on her legs. Perhaps this explains many of the women's motivation behind commandeering their husbands' or boyfriends' garments for being more practical, as explained by Mandy as she presents a leather jacket commandeered from her partner as seen in Figure 5.6:

*"I feel like, that's the, that's what I had to resort to wearing men's clothing, and I know that's, it sounds such a shame when I say it, but, men's clothing seems to be so much more practical, and so much more warm, I feel like their clothing is designed to do the, to do the job it's meant for [...] [sigh] um... I, I, I don't think I would [buy men's clothing], purely because... I'd feel [laughs] I'd feel, I'd feel like I just... I'd completely given up at that point if, if I did"*

(677-685)



Figure 5-6: Mandy's boyfriend's jacket (Lisa Shawgi, 2018).

Mandy's testimony explains how she had no option, but to wear men's clothing: "*I had to resort to wearing men's clothing*". She uses the noun 'shame', suggesting that this causes her to feel sad or disappointment, or feeling a sense of 'shame' from wearing menswear. Mandy struggles to articulate something which cuts to the core of her femininity; being 'practical' and healthy, as opposed to having that 'feelgood' factor. She describes men's clothing as fit for purpose, designed with practicality in mind "*to do the job it's meant for*".

What we understand from the women's testimonies, is not the lack of 'practical' womenswear, but the absence of key qualities associated with feeling feminine in 'practical' clothing. Brenda provides an example of such qualities: "*I've got a lovely navy cocktail dress with silk stitching [...] I can't wear it anywhere, I'm too cold, so what's the point [...] why do I even bother I just, just.... just stay in a corner with a blanket really*" (770-774). Brenda identifies feeling feminine with dresses, intricate details, and sensual fabrics. These are the missing qualities associated with the adornment of dress, essential for making the women maintain that 'feel good' factor. Such types of embellished clothing details are particularly associated with women's fashion. Brenda's testimony highlights the importance of such elements. We gain a sense of how the absence of these elements effect the women in Brenda's

testimony, as she questions her effort to adorn beautifully crafted clothing. This suggests an ongoing battle with coming to terms when the women need to compromise on their femininity. The phrase “*what’s the point?*” could refer to the act of purchasing glamorous garments, and what is the point of living if you are unable to experience the pleasure textiles have to offer. Brenda does not understand the need behind it as they are intangible experiences that one seeks. There is a sense of exertion to experience pleasurable materials, and we see this as Brenda would find it easier to give up her search.

The desire to wear more feminine fabrics was also discussed during the co-design activities in the focus group, where a group of five participants designed their ideal outfit for a New Year’s Eve roof top terrace party. Figure 5.7 shows a range of fabrics selected by the women that hold visual and textural appeal. Whilst these do not provide warmth, the women imagined thermal layers and electrical heating elements beneath the more decorative materials such as the gold patent leather, green lace, yellow organza and the white cut out fabric. The co-design illustrates the women’s desire for more sensual and feminine materials as highlighted by Brenda.



*Figure 5-7: New Year’s Eve outfit designed by the women during a co-design activity in the workshop with a focus on Raynaud’s (Lisa Shawgi, 2018).*

### 5.2.3.3 Gaining agency through material experience

The women experience limits on their agency as they negotiate clothing choices and what activities they can partake in due to their condition and access to suitable clothing. There is a sense of missing out and feeling excluded, and the question of how to dress often plays a role in supporting the women's ability to take control over their bodies and choose for themselves what experiences to engage in and the level of enjoyment. Many of the women describe how they feel "sad" for "missing out" on social occasions, and how they reluctantly accepted the reality of not being able to continue with recreational activities. Valerie explains how for most of the year, she "*feel(s) a little bit trapped*" (55). The use of the verb "*trapped*" gives a sense of being in an unpleasant situation, lacking the freedom to escape. The women are subjugated by their bodies as it excludes them from social events and cultural activities. Valerie provides a sense of how this makes the women feel:

*"I felt as though, ah, I've, I've... as though it was excluding ME, you know, rather than I was excluding IT, you know, that, that, I hadn't decided that I wanted to stop doing it, so um, I felt largely, you know, very much at its mercy, and there was really nothing I could, I could do about it, um, and so, cross! Cross!"*

(196-199)

The above testimony indicates how the condition excludes the women rather than the women making their own decision and choice to not participate in events. The condition removes a certain amount of agency from the women. This is shown in Valerie's comment regarding being at her body's "*mercy*" or feeling a lack of compassionate treatment on the part of her impairment. This has an emotional impact where Valerie feels "*cross*" either at her lack of control over the situation or annoyance at her own body for making her feel captive through her symptoms. However, one could argue that organisers of social events could provide accommodations to cater for Valerie's condition, creating an inclusive experience. Similarly, Sandra highlights her "*biggest disappointment*" (64) through living with Raynaud's, which was giving up her indoor swimming classes. She explains that she "*was really heartbroken*" (63). She expresses a sense of deep loss and inconsolable emotional heartache. The use of the word 'broken' implies a physical break within the body, suggesting how Sandra perceives herself. It implies both an emotional and physical affect of her impairment. The women experience anger, disappointment and sadness. Brenda speaks about a family getaway for an outdoor sporting affair, and how she intended to give her ticket away "*because I'll just be*

*too cold [...] and the boys will go off and, and have fun and it's also the summer"* (521-524). There is a sense of missing out and unfairness that others can *"have fun"*. Attending the sporting event with the family, is an experience that Brenda hoped to participate in as she had already purchased a ticket for the event. However, the reality of sitting outdoors on a summer's day is a daunting thought that controls her decision to remove herself from a potentially unpleasant situation.

The emotional stress that the women experience extends to their ability to dress according to their environment and changing situations as Sandra explains: *"but it's, it's very complicated, it's, it's very frustrating, because [...] how do you dress? [...] I, you don't, I don't know how to dress"* (345-354). 'Knowing how to dress' is part of being a competent grown-up person. Sandra experiences frustration at how Raynaud's complicates her decision to dress for a more pleasant experience. The act of dressing alone should be an intuitive and pleasurable experience, but as Sandra reveals, uncertainty plays with women's confidence in knowing what to wear. Sandra asks how this is done in her interview and moves from *"you"* to *"I"*, giving the impression of not knowing herself. It gives the impression that Raynaud's de-personalises Sandra's and other participants in terms of how they dress. Making the right decision seems stressful in what the women wear, which has the potential to shape their experiences. An example is provided by Carol as she explained how a pair of self-heated gloves and socks (Figure 5.7) enables freedom:

*"they are just superb, it makes such a difference to my life, because I got to the stage where I couldn't really go out for more than half an hour cos my feet just got so cold, so now I, I've got freedom [laughs]"*

(34-35)



Figure 5-8: Carol's electrically heated socks (Lisa Shawgi, 2018).

This is a clear example of how technical textiles empower and enable lifestyle changes. Before Carol discovered these gloves and socks, it was a challenge and ordeal to leave the comfort of her own home. Carol described “*three nasty falls*” (540), due to her inability to “*feel the ground*” (538). Having self-heated garments, Carol now enjoys going to public spaces such as restaurants and the cinema. Additionally, it enables her to volunteer at a local charity, supporting children’s needs. Not only do the accessories maintain an element of physical care, but it also means a certain degree of freedom, enablement and they have also restored her confidence to move from one environment to the next. On a similar note, Mandy presented a pair of gloves which kept her warm but gave her freedom to move comfortably through an unpleasant cold environment and control over her actions: “*with these [...] I can listen to my music and can actually use the touch screen, so I thought it was a really cool thing*” (390-391). The word “*cool*” has associations with composure and a sense of self-control. The gloves allow Mandy freedom of movement through her environment and gives her control over her experience and situation. It stresses how clothing are enablers and contribute a disabled person’s agency. The relationship between suitable attire and the woman are so important, as Sandra expressed: “*I, I wouldn’t want to live without*” (570) her



down coat. This is a strong indication of how women associate items in their wardrobe with their ability to “live” and experience, rather than just existing. It gives the impression of how attached a person living with a disability is, to items of clothing.

From the women’s testimonies, clothing can support affordances as participants negotiate scenarios of everyday activities of personal interest to them. Things like a simple enjoyment of listening to music, partaking in family activities or just leaving the house are all affected. But there is often the emotional distress of what to wear as the women are limited to accessing clothing that appears authentic for them as individuals, which allows them to fit in with what is accepted in social situations and experience pleasure from textiles to feel more feminine. All of these elements shape the women’s experiences and ability to interact socially, discussed in the next superordinate theme *Societal Relations*.

#### **5.2.4 Societal relations**

This subordinate theme is associated with exploring affiliations between the women and cultural ‘norms’ to appear ‘normal’ and visually ‘fit’ in with the majority of the demographic. Sub-themes include *Using clothing to avoid awkward social situations*, and *Fashion as a dictator: feeling fashionably excluded*. The first sub-theme highlights how the women use clothing to manage their physical appearance to socially ‘fit’ in. The second sub-theme discusses how fashion makes the women aware of how aesthetically different they appear to others.

##### **5.2.4.1 Using clothing to avoid awkward social situations**

This theme provides insights into how the women handle their appearance to socially ‘fit’ in. Participant’s use clothing to conceal ‘abnormal’ parts of their bodies and use ‘dress’ to appear ‘normal’. As discussed in chapter 1, section 1.2, a Raynaud’s attack turns the skin blue, white, purple, or red, which causes a visual spectacle. However, Louise explains that this is “*not part of the aesthetic, the acceptable aesthetic*” (330). The word “*acceptable*” implies social measures that Louise compares herself and her body against, suggesting that having Raynaud’s is not part of the ‘normal’ aesthetic. So, what is the ‘acceptable’ aesthetic? The media presents perfect bodies, which leads to what is familiar and taken to be normal.

As Raynaud's causes skin discolouration, the women are viewed as having skin 'abnormalities', which draw public attention. As a result, items of clothing are used to hide these visual 'defects'. Louise provides an example into this insight:

*My nose goes completely blue and so I wear a snood the whole time [...] I say to people "has my nose gone blue?" [...] it's OK that you've noticed that my nose has gone blue and you can say something, you don't have to pretend cos it looks as though, um, what's it look like? it doesn't look like anything else, I suppose I'd rub newspaper print or something all over it, or like that, people say "you've got something on your nose" no it's just gone blue [...] so I have to pull that, I wear it, I wear it, I wear them all the time and I just pull them up and my breath inside the snood sort of warms my nose up."*

(290-306)

Louise is conscious about the manifestation of Raynaud's and how this creates an awkward situation in public in which she attempts to diffuse by pointing out her body's abnormality. This direct tactic of acknowledging a visual defect is an attempt to comfort others and assure them that they do not have to "pretend" they have not noticed something extraordinary. The functional performance of the snood helps keep her nose warm. Louise repeats the words "I wear it" three times consecutively emphasising her reliance on wearing the garment to warm her nose, thus avoiding public awareness of a skin defect. Wearing the snood is not so much to help with the physical discomfort of her nose turning blue but feeling conscious about the manifestation of her condition bringing it into the public domain. Similarly, the women wear gloves to hide their skin discolouration. For example, Daisy comments that after the realisation that she would not be able to "stop the colour changing" (605), she wore gloves to try and "hide it" (606). In addition, Jessie received comments on "how awful" (322) her hands appeared, and was asked to cover them with her gloves.

At the same time, the women are conscious of how clothes and accessories are visually accepted. Brenda provides an example of this when she describes a jumper seen in Figure 5.9:

*"It's a summer jumper, and because it's that blue and white stripe, in the summer, even if it's really hot, it seems quite acceptable, that lots of people have blue and white shirts with um, or I just feel comfortable in, in the summer, if I need a jumper"*

(688-691)



Figure 5-9: Brenda's white and navy summer jumper (Lisa Shawgi, 2018).

Brenda's selection of a blue and white jumper suggests a 'nautical' theme, which is often associated with summer collections. She too, uses the word 'acceptable' in this instance. There is a sense that Brenda is conscious of drawing attention to herself if she were to wear a jumper in hot weather, so she looks to 'fit' in with colours worn by others. However, from her words "*it seems*", there is a sense of uncertainty, and attempts to convince herself as she looks for confirmation in what others wear. Her use of the word "*comfortable*" links to her physical comfort (as discussed in theme 1), but her psychological comfort as well. She can relax and avoid feeling self-conscious. In keeping with this perspective, many of the women express an awareness of how wearing appropriate clothing to manage Raynaud's affects them in social situations, or in the company of others. This also means that the women avoid wearing clothing which could help them relieve their symptoms due to their inappropriateness which leads to a barrier being put in place between their bodies and the world. Carol provides an example of this when she considered wearing a balaclava to help keep herself warm:

*"but, but, but then again, face, short of wearing a balaclava [laughs], ah... because... people may, people... look at you... I feel conscious about it, um... because I think your face is really important when you're communicating with other people, to have it covered up I'd find quite difficult really..."*

Carol uses the term “*conscious*” which suggests feeling self-conscious as well. Facial expression is important to develop an authentic social connection. Wearing a balaclava is a barrier to human interaction and Carol is conscious to avoid wearing clothing that builds conversation barriers. But she feels self-conscious at the same time, suggesting self-awareness of how she appears to others, meaning a sense of embarrassment. This is evident by Carol saying “*people...look at you*”. Wearing a balaclava might help relieve her symptoms, but it would exclude her from the group or ‘collective’, visually by appearing unfriendly and physically by limiting interaction. Daisy emphasises this by revealing her decision not to wear earmuffs as she feels they will exclude her from conversations: “*being able to hear through the earmuffs is more important to me, so I just expose my ears to the cold and do my best to [laughs] warm them up with whatever I have*” (258). The absence of unfitting clothing is just as important as the presence of appropriate attire. Items of clothing can detract from a pleasurable experience. Louise wears a headset underneath her hat with cups to keep her ears warm, but it is not always what she wants: “*I like being out of doors and experiencing being out of doors*” (493-494) and, although this helps keep her warm, she would prefer to wear less to enhance her experience and connection with her environment.

#### 5.2.4.2 Trend as a dictator: excluded from fashion

As discussed previously, the women prefer clothing, which is both aesthetically pleasing, and which mitigate the effects of cold and poor circulation effectively. Quite often, this aesthetic is determined by fashion and dictated by trends, which the women find challenging to buy in to. Margaret explains that “*I always liked to wear, very, sort of trendy shoes, that is finished*” (425). There are two aspects to the type of footwear that Margaret describes. The first is that they are ‘trendy’, which implies fashionable footwear and the second is ‘shoes’, which is footwear no higher than the ankle with a light sole. It gives the impression of acquiring and adorning more chic and delicate footwear that aligns with consuming the latest fashion aesthetics. This is an activity which Margaret demonstrates by her use of the word “*finished*”, clarifying her position of no longer taking part in something which others do. Similarly, Louise expresses difficulty in wearing “*ordinary shoes*” (269). The term ‘ordinary’ suggests something which is ‘normal’, and fits in visually with current aesthetics. Louise continues to explain that wearing her warm Ugg boots with a dress or skirt appears

*“strange, so wearing a dress means lighter footwear”* (1087). Either Louise feels ‘strange’ marrying a heavy fabric with a more fluid material, or she is conscious of others noticing how unusual the combination is. This suggests a set of rules of how certain ‘trendy’ attire is worn, and breaking these rules excludes you from appearing ‘ordinary’. In addition, Louise refers to the types of shoes required to wear with dresses, that is *“lighter footwear”* which gives the impression of less weighty footwear. This implies a physical weight the women associate with their regular footwear such as boots to keep warm. Therefore, there are two connotations here: the visually lighter and more chic footwear and feeling light footed as opposed to the physical weight experienced by the women to stay warm.

Similarly, Brenda speaks about her shopping experience, highlighting that most are *“fashion statements”* (486) without the much-needed warmth to support her condition. The word ‘statement’ holds connotations with a desire to be seen visually and presenting a strong presence in the public domain. On a similar note, Mandy spoke about attending university and being aware of how the fashion students dress *“all these different ways”* (517), and how she wishes she could *“wear that”* (523). Once again, it implies visible and noticeable outfits associated with being ‘trendy’. *“That”* refers to the activity of making a statement, which, Mandy feels she cannot do. Mandy’s testimony also implies a choice to wear various types of clothing to make a statement as the type of clothing is dictated by the women’s condition of wearing more practical attire. Whilst fashionable clothing is what the women might want to wear, their testimonies demonstrate that they exercise their ability to find clothing that does what they need, even if it is not fashionable. Clearly, being in fashion is not compulsory, however bad being forced to be ‘not in fashion’ may make the women feel. However, current trends do restrict the availability of potentially more suitable items that are not on trend.

However, there is an element that fashion also dictates what clothing the women need to wear as Carol explained:

*“I’ve difficulty, I actually know that fashion has been for some while, for women to have um, shorter, shorter trousers, so that, so people always have their ankles showing, and flat shoes, I, it’s taken me years to find a pair of trousers, I’ve been wearing some jeans that I have for years cos they were um... aaa... wide legged.”*

(419-423)

Due to a popular style of trousers prescribed by fashion, Carol wears a pair of jeans she has had for years as it is difficult to access trendy legwear suitable to cover her heavier footwear. Carol has worn her unfashionable wide jeans for years without concerns of feeling untrendy.

The use of the phrase “*I actually know that fashion*” demonstrates that Carol is confident in knowing what is on trend, possibly from fashion adverts or what women are wearing in her surroundings. And it recognises that this is the reason why she finds it difficult to find wide legged trousers, which cover her boots, for the reason Carol provides that people do not wear them, implying that the majority of the population adopts a trendy style, and this is considered what is ‘normal’ to wear at the time.

Jessie indicates a disappointment that the women feel when after diagnosis, fashionable garments are not designed for their bodies.

*“Um, before I had Raynaud’s I’d never, I’d look at the clothes, I’d buy the clothes that I liked, um... that was probably fashionable or, um... yeah, I’d, I’d just, I’d, it, it never occurred to me that I’d look for something that would be, I’d want warmer, or I wouldn’t look to see, now I always look to see if something contains wool, um... and if it doesn’t, I don’t tend to bother because I know that, I’d be disappointed”*

(451-455)

Jessie describes how her decision to purchase clothing was based on aesthetics indicated by the phrase “*I’d look at clothes*” which led to her purchasing of clothing she visually “*liked*”. Now, the fibre content determines suitability as opposed to the aesthetics, otherwise the garment would disappoint Jessie in its failure to keep her warm. There is a sense of disbelief from Jessie as she contends with adopting a purchasing habit of looking for warmth as she repeats the word ‘*it*’ consecutively twice followed by “*never*” associated with past and present consumption experiences. There is an ‘aesthetic deficit’ that women living with Raynaud’s have to accommodate somehow. The phrase “*it never occurred to me*” characterises the shift that Jessie *has* been forced to make by Raynaud’s syndrome. A shift in how the women select items of clothing by often prioritising fabric content over visual appeal, which contributes to the women feeling excluded by fashion.

### **5.3 DISCUSSION**

In this chapter, I have discussed my interpretations of the lived experiences of a sample of ten women living Raynaud’s Syndrome with respect to their experience of the condition and relationship with their clothing. The data gathered and analysed using IPA outlined three superordinate themes which were The Development of Self-management Strategies in

Clothing Practice; Material Affairs; and Social Relations. These include subthemes of Wardrobe adjustments for comfort; ‘Make[ing] do’; Self-reliance: searching for a ‘second skin’ to relieve pain; Seeking healthy aesthetics; Feeling unfeminine; Gaining agency through material experience; Using clothing to avoid awkward socials; and Fashion as a Dictator: feeling fashionably excluded. In the following sections, I discuss the key points that arise from part 1 relating to literature discussed in chapters 2 and 3 on disability, clothing, fashion and wellbeing.

Throughout the interpretations presented, participants indicated how both internal and external factors shape their lived experiences with Raynaud’s. Both fashion and Raynaud’s remove the women’s agency in different ways, curtailing their freedom to choose what to wear, and how to engage with society. This closely links with being diplomatic in their lifestyle and wardrobe choices. Moreover, there is significant consideration of how fashion and clothing impact their agency and subjectivity or ‘feel-good’ factor. These insights align with the argument discussed in chapter 2 that disability is multidimensional, including physiological, psychological, and social aspects, acknowledging individual pain of the body and self, alongside external societal factors. The argument for the need to consider the aesthetic dimension when engaging with materials on a personal and social level is also contained in this thesis. The latter aligns with ideas explored in chapter 3: the role that clothing plays in managing the condition and how fashion affects a sense of personal style and identity, and how aesthetics impact women living with Raynaud’s when engaging with social norms. Ultimately throughout the IPA analysis we develop an understanding of how living with Raynaud’s is complex and there are many layers and aspects that impact women’s holistic well-being, who live with the condition: biological mechanisms, atmospheric temperature (inside and outside of buildings), emotional stress, healthcare support, general knowledge and the golden thread that interweaves these experiences together to create either pleasurable or painful scenarios - access to appropriate and desirable clothing.

I return to the topic on the importance of acknowledging the body within disability studies and its role in shaping personal and social experiences, discussed in chapter 2, section 2.3. Due to the biological implications of Raynaud’s, women living with the condition adjust their wardrobe attire to self-manage their physical comfort, as the body is brought to the foreground from experiences of pain and discomfort. This wardrobe transition is a long-term transformation, indicating women living with Raynaud’s are constantly trying to maintain a healthy body to avoid discomfort. This aligns with Morris’s (2010) argument that pain rules

even before it reveals itself, making the body a continuous project, shaped by biology and time as suggested by Shilling (1993). And as Price (2000) indicates in his concept of ‘body listening’: when an individual develops new understandings and constructions caused by disruption from the onset of an impairment. In terms of disability and clothing, women living with Raynaud’s, respond to their impairment by wearing practical and functional clothing to self-manage symptoms. To add to this, the women experience emotional discomfort even before the onset of experiencing physical pain as they imagine and plan for future scenarios or contending with feelings of exclusion from activities and events due to potential physical discomfort. This notion links with Williams and Bendelow’s (1998) proposition that pain is physical, emotional, and social. Quite often, women living with Raynaud’s are able to manage their physical pain through their wardrobe which in turn avoids emotional distress as they seek comfort in practical clothing.

According to Goodacare and Candy: “*the contents of wardrobes as [are] manifestations of health and illness, or their diagnostic or therapeutic potential within the management of long-term conditions*” (2007, p.3). This certainly aligns with women living with Raynaud’s. To this, I add that this often means a compromise on personal style, self-identity, and femininity, associated with a loss of self as the women contend with how they are perceived by others. This leads us onto the second part of Shilling’s (1993) theory, on how the body is constructed from its engagement within society through body modifications, adornment or clothing, to improve self-esteem. Shilling’s theory of the body being subject to societal influences, relates to this notion of self-presentation. For women living with Raynaud’s, impairment determines an individual’s wardrobe, which in turn shapes social perceptions of the wearer. Some personal characteristics of women living with Raynaud’s are often defined by the condition through their clothing, consequently offering visual misconceptions perceived by others, as the women contend with wearing more functional clothes. On this note, we begin to move into the realm of constructing and reading a body in terms of cultural meanings, closely associated with the concept of fashion which we now consider in the section below.

Entwistle (2000) proposes that fashion structures much of society’s clothing aesthetics and makes available certain types of clothing. Blumer (1969) suggests that fashion is a mechanism by which certain styles become ‘in fashion’ through ‘collective selection’. For women living with Raynaud’s, they are excluded from that collective by their condition. Culturally, materials such as silks, flowing fabrics and embellishments are associated with



femininity (predominantly in the West). Not only do women living with Raynaud's feel excluded by fashion, but they also feel they cannot enjoy what feminine clothing has to offer in terms of textiles. Additionally, as discussed by Entwistle on the 'fashioned body', fashion and clothing communicate shared understandings, which aligns with Blumer's notion of 'collectiveness'. If one is unable to follow the 'dress rules' or 'visual code' of a collective, this strongly leads to a sense of exclusion and creativity in terms of wearing fashionable clothing. As Entwistle (2000) emphasises, dressing for social interaction is an 'embodied practice' and facilitates insights into identity, emotion, social acceptance, and participation through material culture. Fitting in aesthetically enhances a sense of inclusiveness, social belonging, self-esteem, and self-actualisation. For women living with Raynaud's finding and wearing suitable clothing enhances physical well-being and psychological comfort as discussed previously. But sourcing and wearing fashionable clothing supports agency, emotional and social well-being, aspects which are present throughout the interviews, and which closely link to Bowen's theory on how clothing (when explicitly chosen) "*enrich our lives by giving them meaning*" (2012, p.12). With reference to women living with Raynaud's, the former is present in the women's search and selection of clothes that perform well to relieve symptoms, giving them freedom of movement without causing physical harm and increasing social participation. In contrast, the women also avoid wearing clothing that would relieve symptoms, so they are not *seen* or noticed for their aesthetic differences, including clothing which presents itself as a barrier for interaction such as wearing a balaclava or earmuffs. Therefore, there is meaning when wearing and *not* wearing specific clothing as highlighted within the theme *Using Clothing to Avoid Awkward Socials*.

To continue with the discussion on aesthetics, the women often use clothing to conceal parts of their bodies such as their hands and nose as they turn various colours. As Louise commented, the appearance of Raynaud's when it manifests itself, is "*not part of the aesthetic, the acceptable aesthetic*" (330). As discussed in chapter 2, disability is still treated within a medical framework where impairments are ideally fixed or pragmatically concealed to appear 'normal', resulting in objects for disability potentially designed as functional or disguised to 'fit' in. An example is prosthetics produced in flesh-coloured plastic, to mimic 'ordinary' limbs (Pullin, 2022). This leads to shaping disabled bodies in the image of 'other', "*particularly a person who is marginal or subversive in some way*" (Van Pelt, 2000). According to Rawlinson (2016), this approach is evident in how prosthetics were designed to resemble human flesh to blend into how the 'other' 'normal' person appeared, which

creates an experience of public shaming for amputees. Therefore, amputees were encouraged to conceal their disability from public view, to maintain a ‘wholeness’ image in front of others. This is similar to what participants experience, as they conceal how their skin ‘abnormality’ appears. A prime example was when Daisy was asked to hide her skin discolouration in her hands using gloves, as they turned from a ‘normal’ flesh colour to white, purple and blue. On a similar note, the notion of acceptable bodily aesthetics, aligns with Rosemary Garland-Thomson’s (2017) discussion around how society’s proposed idea of a ‘normal’ or ‘ordinary’ body, results in the exclusion and oppression of an ‘extraordinary’ person.

I have discussed how aesthetics play a role in forming one’s identity, public perceptions, and social participation. Aesthetics also shapes hedonic pleasures from wearing fashionable and stylish clothing. Colour, pattern and touch are important for sensual experiences or material delights. This certainly supports the need for generating and stimulating psychological well-being through positive experiences for individuals as we now move into the realm of fashion and identity and the effect on the wearer’s emotional dimension or ‘feel good’ factor. While it was clear that aesthetics plays a role in personal identity through social perception, in terms of distinction, on a personal level, impairment limits choice of fabrics and embellishments to allow for individual creativity and expressiveness. There is very little negotiation on this aspect and in turn it affects cultural experiences. However, the women do find agency through material experience, including creative DIY fixes as demonstrated within the themes *‘Make[ing] do’* and *Gaining Agency through Material Experience*. This aligns with Dunne’s (2013) argument that designers must consider the expressive and aesthetic needs of people living with a disability alongside the functional requirements in a garment’s performance, fundamental to contributing to their overall wellbeing. I add to this notion that a more considered approach can re-*address* material experience by understanding and incorporating explicit (the body), implicit (emotional) and social or cultural meanings for disabled people. This closely aligns with The New Economics Foundation’s (2009a) three categories essential for a person’s well-being: personal, social and work. These are dimensions in which fashionable clothing can support a disabled person’s ability to engage with society to enhance pleasurable experiences.

## 5.4 REFLECTIONS

In this chapter, my aim was to discuss the empirical data created from the IPA process. These were in-depth interpretations of three superordinate themes and eight subordinate themes to describe participant's experience with Raynaud's, clothing, and fashion. Below, I present three key insights developed from this chapter.

Firstly, the themes discussed in this chapter are interlinked through a complex network of inter-dependent themes. Each theme links with another and they do not stand in isolation to each other. An example is how the women adjust their wardrobe for comfort, which in turn means compromise on personal style and femininity, quite often leading to feeling excluded from fashion in terms of cultural aesthetics. The three superordinate themes concentrate on how the women seek physical comfort through their wardrobe, how this shapes the women's relationship with materials and their activities, alongside how the women's wardrobe and engagement with the clothing and textiles influences social experiences, whether pleasurable or unpleasant. The research shows how materials have a close relationship with both the body, personal emotions, and with other people. Secondly, the IPA method allowed for an insight into the women's experiences supported by wardrobe studies. This created in-depth understandings of the relationship between women living with a disability and their wardrobes, of how both internal and external factors construct meaningful clothing practices and on the women's continuous long-term negotiation with garments and accessories. This is important as it ties in with this thesis argument that design for disability requires a human-centred approach to consider the wearer's holistic experience in terms of well-being. Thirdly, both explicit and implicit aspects must be considered when designing to support agency of women living with a disability, which are the physical (explicit) requirements for comfort and aesthetical (implicit) implications of wearing clothing suitable for an impairment. This leads us on to the next chapter of how I moved from the theoretical data to the designing for my participants to inform the design and making stage.

**CHAPTER 6. '*MATERIAL AFFAIRS*': moving between forms of empirical work**

## 6.1 INTRODUCTION

This chapter outlines the practice-based process of the PhD project. This was the third stage of the research design, which involved interpreting findings from data gathered during stage one to inform design concepts for the knitted designs. This phase entailed preparing for the textile workshop activities, followed by the making of five knitted designs: a pair of socks, a cardigan, a jumper, a pair of gloves, a pair of leggings and two vest undergarments. The practice-based stage of the research linked to exploring issues in designing and knitting clothing to self-manage participants' symptoms of Raynaud's and enhance their well-being and agency.

The practice-based stage of the project was transformative in nature, as it moved the investigation on from its theoretical basis into the realm of 'real-world' application in keeping with the epistemological position of this thesis. This was an iterative process of designing and making. Figure 6.1 shows the four elements which informed the decision-making for selecting yarns, exploring knit structures, developing design concepts and making activities within a cycle of reflective practice. The first element consisted of using the physical, social and emotional understandings from the Interpretative Phenomenological Analysis (IPA) interviews and co-design work. The second was drawing on my lived experience with Raynaud's and as a fashion knitwear designer. The third involved analysing secondary research and the fourth drew on my tacit knowledge to aid my selection of yarns and knitted structures. These principles characterised the design and making process which I discuss in this chapter.

I begin by explaining the two approaches that I used to select yarns and appropriate knit techniques in preparation for the making of the knitted designs. I provide an example of how these choices were underpinned by research studies on clothing comfort, and knitted structures that were appropriate to supporting thermal characteristics in clothing. The next section describes how I used the primary research for the making process which took place in the knitted textile workshop. I conclude this chapter by explaining how the methods fit in the proposed methodology outlined in chapter 4.

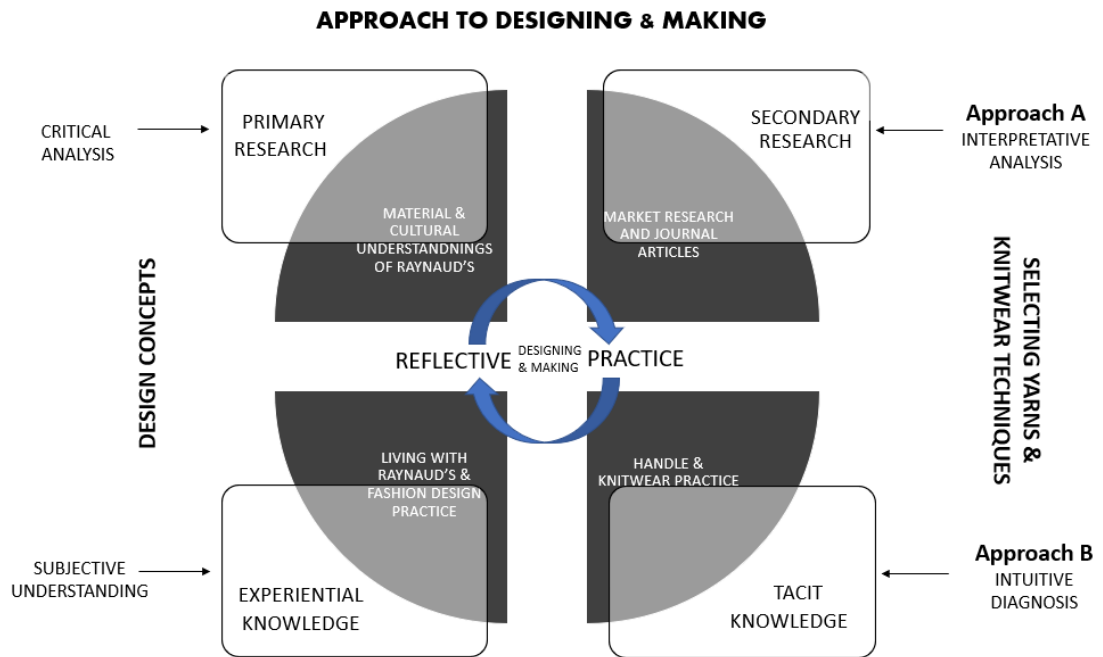


Figure 6-1: Model showing the four principles that underpinned the designing and making (Lisa Shawgi, 2020).

## 6.2 KNITWEAR DEVELOPMENTS

The practice-based stage was in two parts: preparing for the knitted textile workshop and the making activities. Preparations took place between May and August 2018 and involved sourcing, selecting and organising deliveries of yarns suitable for the phenomenon under investigation, and negotiations to access Nottingham Trent University's knitwear machinery and technicians necessary for the making process. The preparation phase took place between May and August 2018, for two reasons. Firstly, it depended on the collection and analysis of the research data to inform my decision making. The IPA interviews were carried out between October 2017 and July 2018 and the Design Workshop with a Focus on Raynaud's on 29<sup>th</sup> April 2018. Until I had carried out most of the data collection, transcription and analysis, I was unable to judge what types of yarns I needed. Secondly, the time allocated to me in the knitwear labs was between October and March during an academic year<sup>4</sup>. Therefore, between May and August 2018, while I was transcribing and analysing the

<sup>4</sup> This was to accommodate undergraduate and Master students submission deadlines. Time spent in the knitwear labs was required for these students to complete their workload in time for end of year assessment and their involvement in graduation shows and exhibitions.

interview and focus group data, I prepared for the making process to begin in October 2018. Subsequently, I carried out the making activities between October 2018 and January 2019 and October 2019 to January 2020. During the first period, I developed the sock, cardigan and jumper designs, followed by the gloves, leggings and undergarments in the later period. In the following sections, I explain how I went about selecting the yarns I worked with.

### **6.3 SELECTING YARNS**

In this section, I explain the two approaches I took when selecting yarns for developing the knitted garments and accessories, and the implications of these approaches. In these two approaches, I drew on my understanding of Raynaud's, gained from my own experience and the findings described in chapter 5 and my tacit knowledge of materials, gained from over ten years of knitwear design outlined in chapter 1, section 1.3.2. These two approaches were: A) deciding on what yarns to purchase from manufacturers online, and B) choosing yarns from Nottingham Trent University's textile stockroom. Through approach (A) I sourced technical yarns unfamiliar to me, which did hold a few risks as I had never worked with them before and didn't have the knowledge of understanding how they would knit. Approach (B) was more effective as it was an embodied engagement where I gained first-hand data about the yarn's qualities. Additionally, it was efficient for developing the knitted textiles, as it allowed immediate access to various yarns when problem-solving to create the right fabric. Having direct contact with fibres meant that I could gauge how the yarn might knit by analysing its strength and how the texture would feel against the skin. This judgement was based on tapping into years of practical experience of knitting. This was a process I could not apply to Approach (A) as I was relying on secondary information or "textual clues" (Ornati, 2019, p.254) to make a judgement call on their suitability. Furthermore, having a direct experience with yarns is an important process for textile designers, as it triggers an immediate response from the body's physical and subjective senses. Approach (B) provided a more "*inclusive understanding of sensory perception that was primarily informed by haptic touch*" (Hunt, Piper and Worker, 2020, p.59), whereby sensing yarns through the fingers provided perceptions of its effects as mentioned above.

In the following section, I expand on both these approaches. Within approach (A) I interpreted marketing or promotional material to select unfamiliar technical yarns informed

by insights developed from my research on Raynaud's and practical knitting experience. Whereas, in approach (B) I carried out intuitive diagnosis when picking yarns up from NTU's storeroom.

### **6.3.1 Approach (A): interpreting marketing material**

The first approach was ordering yarns online. This meant negotiating between technical and qualitative information about yarns, e.g basic information on yarn colour, fibre, weight and the claims of the manufacturers in the form of promotional marketing material. Textile designers are trained to differentiate between common fibres such as cotton, wool, polyester and acrylic. We understand that cotton would be ideal for a summer garment and wool would suit colder seasons. Its common knowledge that active wear made from polyester is effective at keeping you dry during a workout, or that a merino wool base layer is ideal for keeping you warm while hiking in winter. However, selecting 'raw' materials is far more than common sense and designers often possess years of technical knowledge regarding textiles (Gale and Kaur, 2002). Deciding on what materials to use is founded on experimental practice of working with yarns and machinery to manufacture fabrics. When selecting new yarns to work with, we rely on a producer's description of their product to gauge suitability, but that is not to say that we set aside years of practical knowledge. In this instance, while sourcing online or secondary materials, I drew on my experience of managing Raynaud's through clothing, knowledge of general fibres and insights gained from this research project to interpret promotional language and product description.

An example was my experience of testing the Zondo Astec 'self-heating' gloves discussed in chapter 1, section 1.3.3. Described as 'self-heating' gloves, the impression was that the material heated itself. This was not in fact the case. The gloves used silver particles embedded in the fibres to reflect the wearer's body heat towards their hands, keeping them warm. Similarly, during the one-to-one interviews, participants commented on their experience wearing *Raynaud's Disease Silver Gloves* purchased from the Scleroderma and Raynaud's UK organisations. Participant's analysis of the gloves was that they needed to be worn as a liner and there were mixed reviews as to just how effective they were. Many participants needed to wear two pairs as liners to feel the effects. The gloves were also very thin, ill-fitting and not durable as the material snagged. From my experience with trialling



the Zondo Astec ‘self-heating’ gloves, I came to the realisation that the silver gloves were not as effective as promoted due to the fact that they worked on reflecting body heat to prevent it from escaping. However, Raynaud’s sufferers are unable to produce their own heat during an attack for the material to reflect, causing the technical fibres not to perform to their full potential.

Relating to my experience with yarns, I worked with natural and synthetic fibres during my industry years, such as wools, silks, cottons and linens alongside synthetics e.g polyamides and acrylics. Despite drawing on personal and professional experiences on Raynaud’s phenomenon and knitted textiles, this method contained an element of risk when selecting yarns. As I had little experience with technically engineered yarns, the language used by producers to promote innovative products provoked a sense of seduction. Therefore, when it came to selecting yarns online for my research practice in the textile workshop, it necessitated an exercise of interpretation to see the science behind the vague claims. I did this by reviewing textile research studies which investigated clothing comfort discussed in section 6.4.

### **6.3.2 Approach (B): intuitive diagnosis**

The intuitive diagnosis approach involved walking into Nottingham Trent’s University (NTU) extensive textile storeroom, and physically picking up cones of yarns to *feel* the fibres. Selecting yarns this way meant that I developed an immediate reaction to the yarn’s characteristics, strength, handle and appearance. In these instances, I would wrap the yarn several times around three fingers. By doing this, I could gauge how the fibres felt against my skin and judge its visual attractiveness as a fabric. I would then tug on a single thread to analyse whether it had the right amount of strength and flexibility for the knitting machines and techniques. This approach of interacting and connecting with the yarns, relates to the ‘handle’ of cloth, which is associated with the “*haptic sensing of the hand to ascertain sensations [...] to determine textile quality and type through feel*” (Whitaker, 2021, p.18).

As a knitter, this was the approach that I favoured. In contrast to the first approach A, this was a subjective, tactile process, synonymous with my practice as a textile designer. Being able to assess yarns first-hand triggers tangible and intangible sensations felt through direct handling of fibres; if it feels rough, smooth, soft, prickly, stretchy, rigid, weak or

strong. By twisting various yarns, you can test how they react together and whether their colours complement each other. This approach has its merits, as it is the same approach that wearers take when purchasing clothing. People are attracted to a garment visually, followed by touching the fabric and then finding out what it is made of. Touching and feeling plays a big part in experiencing materials. My understanding of how people judge and react to materials stems from directly selling knitted clothing under my label *Lisa Shawgi*. I observed that customers spot a garment or accessory on a rail, walk up to the item, run their fingers along the garment, pick up the end of a sleeve and place it next to their face. It means that they appreciate the garment's sensory quality. This was usually followed by finding out the material content on the label, accompanied with trying on the garment or accessory. This type of touch is described as intra-active touch where an object is actively moved over a stationary part of the body (Zuo, Hope and Jones, 2014, p.30). And as participants emphasised the importance of soft fabrics against the skin for comfort, this process was effective in determining the initial texture.

Traci Lamar emphasises the importance of this *INTUITIVE DIAGNOSIS* when working directly with materials in the design process within education. Discussing three case studies from a technology-based course, Lamar discovered that increasing the presence of touch in the design process, increased creativity and led to development of more design outcomes. The material knowledge gained through haptic touch when engaging with materials is critical in improving problem solving skills and decision making in the design process. Lamar emphasises the importance of touch:

*“When working with textile handicraft techniques, such as handweaving, knitting, or needlepoint, one develops an embodied understanding of material properties and behaviour. Balanced tension, for instance, is difficult to grasp until one feels the material pulled taut or slacking. Identifying the textural variance between different yarns is possible through visual assessment, but handling the fibres themselves leads to a deeper, instantaneous understanding”*

(2019, p.3)

By directly handling a material, you can gain a sense of its characteristics and automatically develop a positive or negative reaction to a product. This relationship between materials and their characteristics played a fundamental role when choosing yarns from NTU's storeroom. Using touch as an *evaluation tool* was found to be essential for *“making choices on which materials to use or in evaluating the quality and potential of a material”* (Groth, 2017, p.59). Having access to a wide range of yarns on site at NTU, allowed for an iterative process of

testing and generating design ideas and knit techniques, as it facilitated speedy problem-solving when trying to develop a knitted fabric.

An example was during the development of the sock design, which was a combination of yarns sourced online and from NTU's storeroom (Figure 6.2). The design called for an elasticated yarn to allow for a more comfortable fit and stretch for ease of dressing. With access to a variety of elasticated yarns, I was able to carry out testing to achieve the desired stretch within a week, as opposed to several weeks of sourcing different qualities in large quantities to experiment with. This is an example of the realities of yarn selection when designers need to experiment to achieve the desired effect. However, experimentation requires flexibility to work with multiple materials to achieve the desired outcome. By combining approach (A) and (B), I experimented with technical and aesthetic yarns to develop my knitted fabrics.



*Figure 6-2: Sampling with different yarn qualities to resolve the plush and plating technique. See Appendix 10. for detailed yarn combinations (Lisa Shawgi, 2018).*

The following sections provide an example of how my tacit and experiential knowledge of Raynaud's and knitwear underpinned the application of both approaches when researching and searching for suitable yarns and deciding on appropriate knitted materials for a Raynaud's sufferer. I outline a narrative where I was introduced to a garment which should suit a Raynaud's sufferer and by interpreting marketing material and through haptic touch. I also show the effectiveness of these approaches to inform my decision making on the choice of yarns and knit structures.

### **6.3.3 APPLICATION OF APPROACHES (A) AND (B) USING EXPERIENTIAL AND TACIT KNOWLEDGE**

On 3<sup>rd</sup> August 2020, I stood outside our hotel accommodation in the French Alps. I turned my gaze towards my partner. He was gesturing for me to join him and a member of our party, Mark. That summer, we had decided to accompany two other families on their trips to France. Summer temperatures in the French Alps are an average of 10 degrees Celsius. Mark was one of the other fathers and he recently described how his hands would feel cold, numb and change colours, from normal to blue and white. "*Sounds like you've got Raynaud's*", I remember saying to him. Walking over to both men, my partner turned to me with an excited look on his face. I don't remember his exact words, but they were something along the lines of... "*you need to check out Mark's top, it's supposed to help you stay warm*". Mark was smiling, explaining that his wife just bought it especially for him. It was also his first time wearing the garment. I felt excitement bubbling up from the bottom of my stomach. Intrigued, I moved in for a closer look. "*It's from Under Armour*" Mark explained as he gestured to his top "*and the way they've made it, it's meant to keep heat in*". I focused my gaze on the garment and recognised the knitted structure. Touching the material, I made a judgement call on the fabric content. After a brief analysis of the Under Armour (UA) top (Figure 6.2), I felt my initial sense of excitement at possibly discovering a garment with warming properties slowly dwindle. As a result of my knitwear practice, I understood how the garment was constructed and was confident about identifying the material content. Coupled with my experience as a Raynaud's sufferer and the insights that I gained from my research project, led me to

perceive the reality of the garment's performance prior to user (Mark) testing. At the end of the day, I enquired into Mark's experience of wearing the Under Armour top. Worn on its own, the garment was ineffective at keeping him warm. However, he described it as a good base layer that packs up small.

Drawing on my experiential and tacit knowledge of knitwear and Raynaud's phenomenon, I had identified three factors which supported my diagnosis of the garment's inability to provide warmth for Mark that day in France. The first was the knitted structure, and the second was the fibre quality. These were two components necessary to address thermal properties within a fabric. The third was context of use and user. In the following section, I provide an explanation on the use of structure and yarns to enhance wearer comfort, using the Intelliknit© Under Armour (UA) garment as an example and provide an explanation as to how Mark found the garment to be ineffective for his needs.

The unpacking of this narrative is important as it relates to this thesis approach of human-centred design where the wearer's needs and context must be considered alongside the function of a garment. It also provides a glimpse of how I worked by interpreting marketing jargon in approach (A) drawing on aspects of my tacit and experiential knowledge underpinning approach (B), to analyse how the garment potentially kept the wearer warm. This leads to further research on technical knitting from research articles to help select appropriate yarns and knit techniques to support a Raynaud's sufferer.



Figure 6-3: Under Armour Intellinknit© knitted garment.

#### 6.3.4 *Intelliknit* Under Armour Garment

Under Armour referred to the garment’s construction process as Intellinknit©. That is, the garment is comprised of “*technologically advanced Japanese yarn that holds heat and dries fast, meaning it offers breathable warmth and unreal adaptivity [...] constructed on a microscopic level to make it as lightweight as possible*” (UA, 2019). As I inspected the garment, I concluded that the knit technique involved a two-bed knitting machine, using an alternating process. The technique involves knitting a jersey fabric simultaneously on both beds of the knitting machine, before only holding on one bed, whilst continuing to knit on the other bed, before returning to knit jersey on both beds, which tucks the extra knitted rows. This creates a ripple effect on the knit side of the fabric. The ripple effect can be alternated to knit on one bed or the other, which gives a ripple effect on either side of the fabric. Figure 6.4 illustrates the ripple effect and within the black circles on the image, the ripple effect is facing outwards, away from the body. In addition, Under Armour produced the garment with a synthetic yarn of 99% polyester and 1% Lurex, ideal for wicking moisture away from the body and keeping the wearer dry. Furthermore, the fabric is produced using a fine gauge knitting machine, making the garment lightweight. I explored this technique in sleeve prototypes during my MA, when I began investigating thermal comfort for Raynaud’s

sufferers (Figure 6.4(b)). In theory, the technique should have enhanced the fabric’s warming capacity, as multiple layers are produced, which increases density and insulation space within the channels. I believe that UA aimed to enhance the garment’s heat holding ability via this process. After further interpretation of the Intellinknit© definition, the strategy for keeping the wearer warm and comfortable was an alternative approach as I will now clarify.

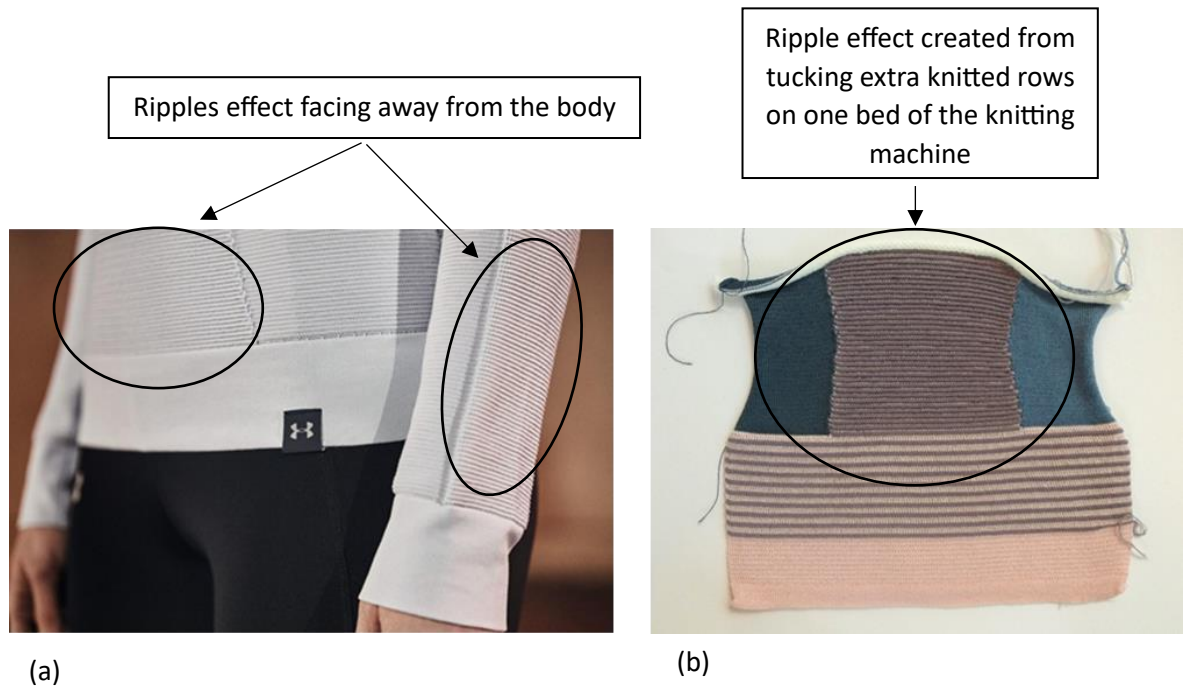


Figure 6-4: Image (a): Detail of Intellinknit© Under Armour top; Image (b): MA knitted sample; Close up of the knit technique.

Under Armour’s definition of the Intellinknit© technique is somewhat ambiguous. Without clarification on the manufacture of the “technologically advanced” 99% polyester and 1% Lurex yarn, I struggled to comprehend how it “holds heat”. A possible explanation could be that the yarn is highly effective for wicking moisture and sweat away from the body, evaporating it into the atmosphere, keeping the fabric dry against the skin. This way, the wearer avoids having a damp or wet material against their skin, making them feel cold. Therefore, the fabric’s fast drying capability, allows the wearer to maintain their body heat produced during exercise, as heat loss can take place via evaporation. Re-arranging the sequence of words used by Under Armour from “holds heat and dries fast” to “dries fast and holds heat” would make better sense, as staying dry would mean the person avoids feeling wet and cold. The phrases “breathable warmth” and “unreal adaptivity” reflects the nature of Under Armour’s definition of Intellinknit© as symbolic promotional material.

These terms hold connotations, which are open to interpretation. For example, “*breathable*” presents an image of not suffocating in a wet and heavy garment, whereas “*unreal*” conjures up disbelief that the user is able to carry out activities such as shopping post exercise whilst continuing to wear the garment in comfort. At this point, I would like the reader to note that the critique that I present of the garment is my interpretation, in keeping with Approach (A): *Interpreting Marketing Material*. However, I remind the reader that this approach was underpinned by my experiential knowledge of knitting and Raynaud’s. My analysis of the garment and conclusion of its performance on that day in France, was formed from the perspective of a Raynaud’s user. I acknowledge Under Armour designed the Intelliknit© knitted sweater for active users performing light or extreme exercise, such as running. In this context, the garment potentially supports user comfort by addressing the need for maintaining a comfortable running temperature, by staying dry. In contrast, Mark’s wife purchased the top under the impression that it was a warm garment, which was not UA’s initial purpose for the garment. And as Mark wore it during a leisurely walk and fishing activity, the garment was ill-fitting for the purpose. Despite Under Armour’s *woolly* description of Intelliknit©, the science behind the garment’s design concept is sound and supported by research studies on enhancing thermal comfort in clothing. According to Onofrei et al (2011): “*the thermal comfort of a garment depends on several factors: heat and vapor transport, sweat absorption and drying ability*” (2011, p.10). So, to enhance a wearer’s comfort parameters, their clothing fabric must be able to support ‘moisture management’. A prime example is the Under Armour Intelliknit© garment, where the knitted top preserves the wearer’s heat by keeping them dry. The factors outlined by Onofrei et al (2011) identify with what is referred to as, the ‘thermo-physiological’ comfort of garments, which sit alongside sensorial and physiological factors. In the following segment, I discuss the factors related to clothing comfort and explain my approach to influence thermal management in knitted structures.

#### **6.4 THERMO-PHYSIOLOGICAL COMFORT IN CLOTHING**

According to Demiryürek and Uysaltürk, thermo-physiological comfort relates to “*general expression of factors such as the thermal properties, water vapor transmission, sweat absorption and drying ability of fabrics*” (2013, p.1740). An example is when active wear brands adopt a ‘moisture management’ strategy to aid balancing thermal characteristics



as opposed to the garment containing thermal properties. Stygiene et al (2019) explain that, in the case of high levels of physical activities, it is important ‘thermoisolating’ fabrics remain dry. In normal or mild conditions, heat loss takes the form of perspiration, and during extreme physical exercise, heat loss promoted by evaporation is associated with sweating. Similarly, Kamalha et al describes that *“clothing comfort is commonly associated with stimuli and sensations that garments feel with change in human activity and the microclimate”* (2013, p.424). As such, textile research studies for functional knitted fabrics focus on the effectiveness of thermal properties and moisture management during physical activities. Their goal is to maintain a stable microclimate between the wearer and the garment no matter the physical activity or environmental conditions (Onofrei et al, 2011). For liquid or moisture management to be successful, ‘thermoisolating’ factors hinge on yarn and fibre properties, structure and applied treatment such as a microencapsulation finishing technique. In addition, fibres can be chemically engineered to include active properties where the fabric responds to atmospheric or skin temperature change. An example is the use of bio-ceramic additives with the ability to absorb, store and release infrared radiation. Gloves containing bio-ceramic properties would harness heat from external sources, ideal for Raynaud’s sufferers as the women use warm running water, radiators and cups of hot drinks to warm their hands. However, when the gloves are reviewed within the context of Raynaud’s, there are design issues, as Sandra explained in her interview:

*“the gloves I wear now are Raynaud’s gloves with the bio, was it, bio ceramic in them, um... I have those, um... they’re expensive [laughs] so um... and they only work if, they, they work the best if your hand, if the gloves are in the sun, you can actually feel them heating up, but if you’re not in the sun, then, they really don’t work, um...”*

(82-84)

While exposed to direct sunlight, the bio-ceramic gloves provided heat to Sandra’s hands. Unfortunately, their unique application is limited. Without the infrared rays, the gloves are passive and behave like ‘common’ knitted gloves, which are deemed affordable compared to the bio-ceramic gloves. Furthermore, on one occasion, Sandra recalled wrapping her hands around a cup of tea which overheated and melted the gloves. Constructing ‘thermoisolating’ factors is key to establishing comfortable clothing for a Raynaud’s sufferer, however, understanding the context of use is equally fundamental. This aligns with this project’s reasoning to adopt a human-centred design approach to understand the context of

the wearer, as opposed to focusing on how a product is used discussed in chapter 2, section 2.3.2.

Other factors to consider when exploring thermal regulating characteristics are engineered thermoregulating yarns, and knit structures that support insulation to enhance warmth. The next section outlines my selection of appropriate engineered yarns, followed by my choice in suitable knitted structures for this project's design development stage.

#### **6.4.1 Yarns and knitted structures to enhance thermal characteristics**

Onofrei et al argue for the inclusion of engineered fibres within textiles, as they “*enhance thermal and moisture management performance in addition to the existing passive characteristics of the structure to keep the body in the comfort state*” (2011, p,10). The research team tested thermo-regulating yarns, Coolmax® and Outlast®, in knitted structures to measure thermal and moisture management properties. They conducted a quantitative study measuring air permeability, thermal conductivity and resistance, and diffusion ability. They determined that wicking ability is influenced by fabric structure and fibre properties. The research concluded that yarns containing Coolmax® suit colder climates as they managed higher thermal resistance, wicking and diffusion ability. In contrast, they recommended yarns with Outlast® for warmer environments due to their lower thermal resistance, high thermal conductivity, absorptivity and water vapour permeability. Outlast® is a technology that provides proactive thermoregulation abilities in textiles. It uses phase-changing materials, which are microencapsulated into fibres encased within microcapsules called Thermocules™. These capture and store excess heat when the body's temperature rises. The excess heat is released back to the body when the person's temperature cools down (Outlast®, 2018). Therefore, any material containing Outlast® has the capacity to regulate the skin's microclimate. In contrast to using thermal proactive properties, Coolmax® is thermoregulating and performs by drawing sweat away from the body and transporting it to the fabrics' exterior for evaporation into the atmosphere. This is due to the fibre having a greater surface area and multiple cross-channel sections.

Further researchers have carried out various studies into the effect of material properties and structure on thermal transmission of knitted fabrics (Mararali et al, 2009; Ertekin et al, 2015, Ucar and Yilmaz, 2004). Although these studies were carried out using laboratory

equipment to measure a material's extreme performance, the work was in keeping with one of the objectives of this PhD project: to investigate how materials support a wearer's physical well-being. Those research studies investigated wearer comfort by keeping the body dry during exercise or rigorous activities. In contrast, this project's participants layer garments to help keep themselves warm but share a common issue with the textile laboratory studies. As a result of layering, the women living with Raynaud's become overly warm causing them to sweat and feel uncomfortable, but removing an outer layer meant their body temperature drops. Therefore, in line with the research studies mentioned previously, I looked to thermoregulate their bodies using a combination of engineered yarns and knitted structures to balance insulation characteristics and drying ability outlined in the following sections.

#### **6.4.2 My selection of engineered yarns**

Table 6.1 lists the engineered yarns I selected for the designing and making of knitted samples. From the supplier UPW, the first and second yarn are a mixture of Outlast®, cotton and linen fibres with the first yarn containing Nylon (a synthetic polymer) for added elasticity. Outlast® is a "*microencapsulated natural wax*" (outlast.com, 2021) where heat is captured, stored, and released when needed by the user. Considering participant's need for warmth, it made sense to order this yarn. The third yarn combined Coolmax®, viscose and nylon. Coolmax® works by wicking moisture away from the body to keep the wearer "*dry and comfortable*" (coolmax.com, 2021). Because layering of garments was an approach to dressing to regulate body temperature, they would often sweat as a result of this, so this yarn was selected for moisture management. The fourth yarn from UPW, combined zinc and cotton fibres. Micromolecules of Zinc within the acrylic are meant to provide naturally anti-bacterial properties. The women suffered from chilblains or ulcers on fingers and toes: these often become inflamed and raw by the skin breaking. Incorporating a yarn with zinc properties should help avoid to possible infection and inflammation. In addition, the women would often wear cotton for a comfortable sensation against their skin.

From the second company Baruffa, I obtained wool because of its natural ability to act as an insulator and wicking material. I ordered three types of wool from Baruffa: Woodland, K-Wool and 100% Merino Wool. The Woodland yarn was combined with a polyamide fibre, designed to be "*highly elasticated, fast drying, tear and abrasion-free*" (Baruffa, 2019). At

this point, I would like to remind the reader of my approach (A) when selecting yarns: interpreting marketing material. Therefore, my interpretation of this yarn was the following: it enhanced stretch in a garment for a more comfortable fit; wicking capability was enhanced with the inclusion of the polyamide fibre; and I understood the yarn to be more durable than 100% natural wool fibre. Both the Woodland and K-Wool were H2DRY treated yarns, which was described by Baruffa as a treatment that allowed the wool fibres to maintain their natural elasticity, increase their capacity to transfer body moisture to the outside of the garment, and allowed the making of create-resistant garments. As well as these yarns, I acquired Elastomeric, a 100% elasticated yarn with the aim to increase stretch in clothing while maintaining its shape, along with producing a more fitted item of clothing without restricting blood flow from a third company, Yeoman Yarns. Additionally, there was a yarn chosen from the NTU yarn store room called Lineapiu Fenix, which appeared to be a combination of wool and elastane. However, it was unclear where the yarn originated from and the exact composition percentage, as this information was not presented on the label on the cone. This yarn was used mostly within the knitted cardigan for the collar and a section on the wrist area, as it knitted well when using the double plush technique discussed in chapter 7, section 7.2.3. One other yarn selected from the NTU store room, was a Lycra and Nylon yarn from Wykes suppliers used to produce the knitted sock design. Other yarns from NTU store room were used during the iteration process using approach (B), which were not used in the final garments, and these are listed within Appendix 10, within the explanation of the knitted samples.

*Table 6.1 Table of selected yarns*

<b>Manufacturer</b>	<b>Yarn Number</b>	<b>Yarn Properties</b>	<b>Yarn Count</b>
<b>UPW Yarns</b>	1.	40% Outlast (Acrylic), 24% Cotton, 20% Nylon, 16% Linen	2/60Nm
	2.	50% Outlast (Acrylic), 30% Cotton, 20% Linen	2/48Nm
	3.	48% Coolmax (Polyester), 32% Viscose, 20% Nylon	2/48Nm

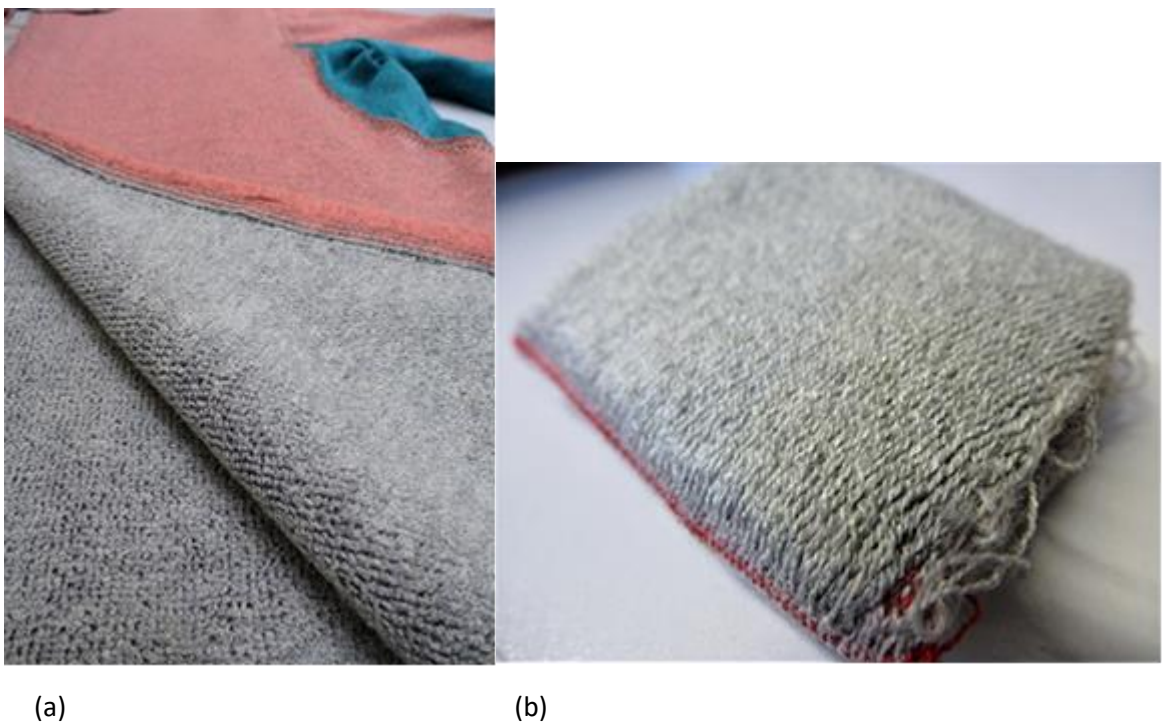
	4.	40% Zinc (Acrylic), 60% Cotton	2/60Nm
<b>BARUFFA YARNS</b>	5.	Woodland H2DRY 60% Virgin Wool, 40% Polyamide	2/48Nm
	6.	100% Merino Wool	1ply
	7.	K-Wool H2DRY 100% ExtraFine Merino Wool	2/30Nm
<b>YEOMAN YARNS</b>	8.	100% Elastomeric 19% Lycra, 81% Nylon	Not Applicable
<b>NTU YARN STOCK ROOM</b>	9.	Lineapiu Fenix	2200 Nm
<b>WYKES</b>	10.	22 Dtx Lycra, 78/34 Crimp nylon	N/A

### 6.4.3 My selected knitted structures

According to Uçar and Yilmaz, “*heat transfer characteristics are very important for thermal feeling*” which are “*governed by conductive, convective and radiation heat transfer mechanisms [...] if moisture absorption or desorption takes place, evaporative heat transfer will also occur*” (2004, p.34). Measuring thermal properties through knitted ribbed fabrics (1x1, 2x2, 3x3), they concluded that heat loss by convection and conduction decreased with a decrease in ribs, such as a 1x1 ribbed structure. The bulkier and tighter the fabric, the greater the increase in air entrapment or still air, which decreases air permeability and circulation, occurs. They explain that “*heat transfer characteristics of fabric are more influenced by the fabric’s structural features such as thickness, air volume fraction and bulk density of fabric, rather than fibre type*” (2004, p.35). However, when the design of a fabric is considered, fibre and air gaps (conductive) overcome the importance of heat loss due to air circulation (convective). If a gap is too small, heat will pass through easily by conduction, whereas if a gap is too big, air circulation will be enhanced through convection (He et al, 2012). It demonstrates that the texture and thickness of the fabric is equally important to how well the fibres perform to provide insulation. It is reminiscent of the women’s testimonies regarding their preferred fabrics which include long pile cushioning. An example is fleece fabric where the material is brushed to loosen the fibres to create a nap (raised surface). Even though the material is polyester, it is the texture that aids insulation. For this reason, the knitting technique ‘plush’ was used to produce a fabric to trap air volume to increase insulation. This was the main fabric which made up the first three designs: the sock, jumper, and cardigan design. Later, a vest undergarment was produced in the ‘plush’ fabric as well, after the leggings, gloves and another vest undergarment were created using a ‘floating tuck’ technique to enhance density in the fabric for more insulation. This technique suited circular knitting more than the ‘plush’ approach as discussed in chapter 8, section 8.2, which linked with a design intention to remove irritable seams for participant’s comfort.

‘Plush’ is a fabric with a nap or pile. Figure 6.4(a) shows the inside of the cardigan prototype, where the ‘plush’ technique is located. The technique creates loops of yarn on one side of the knitted fabric, ideal for enhancing insulation. Figure 6.4(b) illustrates a ‘floating tuck’ technique to allow the yarn to ‘float’ between each tuck. Each knitted row tucks the yarn on the fifth needle, selecting the first needle to tuck, working inwards on alternative needles, ensuring that all needles hold a tuck stitch, before knitting an all-needle row. This

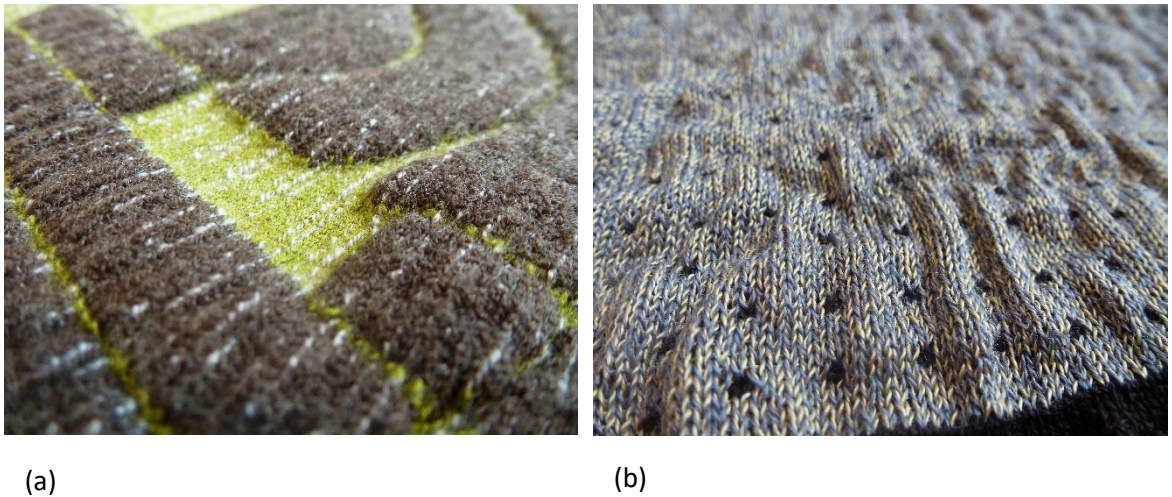
process equates to six rows of knitting to produce one knitted course on the back bed, before moving to the front bed. ‘Plating’ is a knitting technique where a stockinette stitch creates a fabric which is lined. The use of the ‘plating’ technique allows for two different yarn qualities to be used. This technique contributed to the aesthetics of the garment. For example, figure 6.5 (a) is an image of the cardigan design showing a contrast in colour with a soft grey on the inside for the ‘Plush’ technique, and a rose pink for the right facing side of the fabric. During the knitted fabric developments, the grey Coolmax© yarn was the most effective to produce the loops needed for the ‘plush’ fabric, as the Outlast© yarn broke too easily. The subsequent chapter 7 provides yarn qualities used for each design in detail.



*Figure 6-5: Image (a): ‘Plush’ technique on the inside of the cardigan design; Image (b): ‘Floating Tuck’ technique (Lisa Shawgi, 2019).*

The techniques ‘plush’ and ‘plating’ were selected from a library of knitted samples developed from the MA project (as discussed in chapter one, section 1.3.3), which acted as a pilot study for design development of suitable knitted fabrics for women living with Raynaud’s. The ‘ripple’ effect explained in section 6.3.4 was also developed during the MA project. Whilst the MA allowed for the improvement of my research skills, it also provided an opportunity to explore potential knitted fabrics with insulating capabilities, such as ‘spacer’ technique where a monofilament filler material was inserted between two knitted

layers to create volume. However, this proved to be too bulky (Figure 6.6 (a)). In addition, tucking was used to build fabric density and layering was utilised to knit two fabrics simultaneously on a double bed machine, which were attached in areas with a single jersey knit (Figure 6.6 (b)). Of all the samples created, the ‘plush’ technique proved most effective for producing a sense of warmth against the skin.



*Figure 6-6: Image (a): ‘Spacer’ technique; Image (b) ‘Tucking’ on selected needles to join two layers of material together (Lisa Shawgi, 2016).*

The selection of yarns and knitted structures were informed by my reflections generated from insights into the participant’s ‘lived experiences’, knowledge produced from the design workshop and more practical data gathered from the interviews such as fit of a garment. The following section explains how I combined all the information to guide the designing and making activities.

## **6.5 INTEGRATING INPUT AND REFLECTIONS FROM THE WORK WITH PARTICIPANTS**

Stage three of the project involved an iterative process of reflection during the designing and making. Reflection on Interpretative Phenomenological Analysis (IPA) interviews and focus group findings shaped initial design ideas and making activities. The challenge that I faced was how best to extract, analyse and articulate key elements from the complex data to



inform the designs. To explain why I found it challenging, I need to return to the early stages of the IPA analysis. The IPA framework captured the women’s experiential account of Raynaud’s. The IPA approach explored in detail meanings of the participant’s experiences discussed in chapter 5, underpinned by theoretical understandings in the field of disability and fashion. This was important, as the project called for a subjective understanding of Raynaud’s phenomenon to address misconceptions of the condition and build an awareness from a humanistic perspective as opposed to a pathological framework. However, this subjective insight was not enough to inform my practical explorations. It lacked information on a pragmatic level, such as the women’s experience with material content, structure and fit of a garment. Aspects of clothing which they liked, disliked, found uncomfortable, desired and required were fundamental when dealing with symptoms of Raynaud’s. Although the interviews contained this information, it needed to be treated in a different manner to the Interpretative Phenomenological Analysis. For this, I isolated the information, so that it became eligible from a designer’s perspective to guide the designing and making activities, which can then merge with the theoretical understandings to inspire the design concepts, direct my design intentions, which informed the design development. This created the *Re-dress* design framework that I could follow to outline the designing and making process for each design (illustrated in Figure 6.7). This is one which I explain in the sections below.

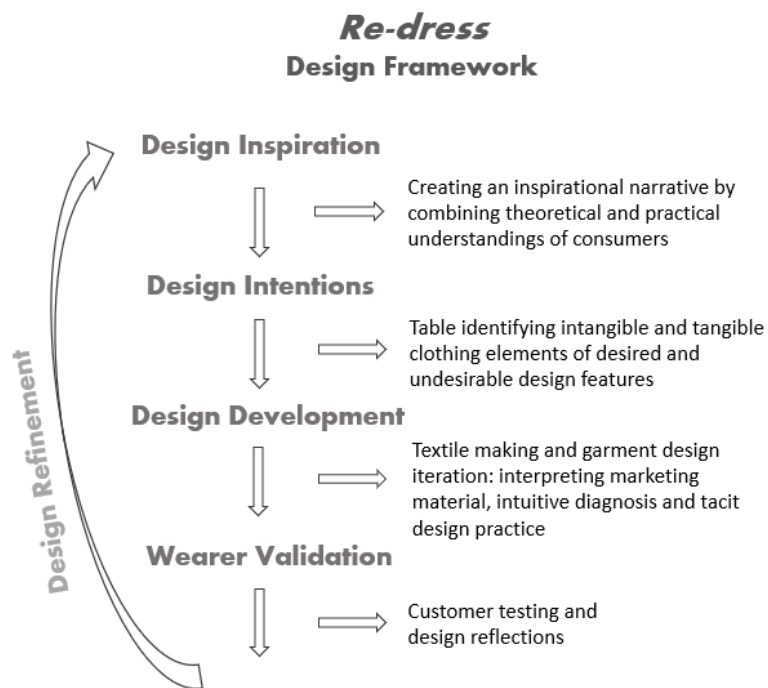


Figure 6-7: *Re-dress* Design Framework (Lisa Shawgi, 2023).

## Design Inspiration

Firstly, while carrying out the Interpretative Phenomenological Analysis (IPA), I made notes and extracted information regarding aspects of clothing and listed the data in a table for each participant. I then placed this information into categories under the following headings: *Fit of a Garment*, *Visual Appearance*, *Texture*, *Fabric Structure*, *Material Content* and *Dressing Practice*. In addition to these headings, a *Miscellaneous* category included information pertaining to products such as creams was created. The next step was to highlight information directly related to garments or accessories, such as socks, trousers and tops. To combine this practical information or tangible information with the intangible or theoretical insights from the IPA, I composed a narrative using testimonies from participants to outline key insights which inspired the design concept of each garment. This was then transferred into a sketchbook for a more detailed and focused exploration. Furthermore, during the interviews, I photographed clothes and accessories purchased by participants and it was in the sketchbook where these images were most useful.

## Design Intentions

The next step was to construct a table and merge the subjective and pragmatic information into tangible and intangible elements (Table 6.2). This helped isolate and summarise key design features that were tangibly constructive and destructive in terms of an explicit feel of how a garment fits, the material content and components such as fastenings, and how the item of clothing performs in terms of keeping the wearer warm. The intangible elements covered implicit desired and undesirable notions of how a garment looked aesthetically, how sensorial characteristics, such as the feel of the material against the body, effect the wearer, and what type of experience was created from wearing the clothing item.

*Table 6.2 Table identifying tangible and intangible design features*

Table 6.2: Summary of data to inform design.		
Tangible, Design Elements	Constructive	Destructive

Fit of garment		
Material & Components		
Performance		
Intangible, Design Elements	Desirable	Undesirable
Aesthetic		
Sensorial		
Experience		

### **Design Developments**

Following on from the design inspiration and intention stages, I was ready to move into the knitted textile workshop to develop the knitted fabrics and pattern samples. It was during the development activities that the intuitive approach was most effective as discussed in section 6.3.2 of this chapter. It involved testing of yarns with knitted structures, reconstructing the shape of the garment for a comfortable fit and reflecting on sensorial and aesthetic elements in relation to Raynaud's. This was an iterative process to refine the design of the intended garments during the making process, outlined in the next chapter.

### **Wearer Validation and Design Refinement**

Once the designs are created, it is important to receive wearer feedback on the items of clothing to gain valuable insights into the level of success regarding the designer interpretations of their potential customer requirements. After this stage, any refinement to improve the design is carried out before proceeding to the production stage. This increases

the chance of launching garments and accessories with a higher rate of success in terms of meeting wearer expectations.

## **6.6 SUMMARY**

This chapter explained the methods used to support the reflective practice for the designing and making stage of the research project. To select appropriate yarns and knit structures to help mitigate the effects of cold, I adopted two approaches. The first was an interpretative analysis of marketing material, alongside journal articles, to comprehend the science behind maintaining a comfortable temperature for the wearer through technical yarns and knit structures. The second approach involved intuitive diagnosis when handling yarns through haptic touch to gain first-hand data on the yarn's qualities. The combination of the two approaches was effective for developing the knitted designs, and a scenario was provided to demonstrate the application of these methods, underpinned by my tacit knowledge of knitwear and reflections on insights gained from my research on Raynaud's. It supported this thesis' human-centred design approach, where the extraordinary needs and context of the wearer must be taken into consideration for a successful design.

In keeping with a human-centred design approach, I outlined my method for dealing with different types of qualitative data (tangible and intangible experiences) gathered from participants to inform the design and making activities. This considers the multifaceted approach to address people living with disabilities within the context of fashion and clothing discussed in chapter 2. These tangible and intangible material experiences were captured within a design framework to guide the designing and making process for each of the designs which make up a capsule collection titled *Re-dress*, outlined in the subsequent chapter. This was the practice-based element of the project where the creation of the *Re-dress* capsule collection allowed the research to explore the following questions: How can fashion knitwear design respond to people living with Raynaud's phenomenon? And how can these responses cross over into further disability contexts and cater for other people living with extraordinary requirements?

**CHAPTER 7. THE *RE-DRESS* COLLECTION part 1**

## **7.1 INTRODUCTION**

This chapter outlines part 1 of the designing and making of the knitted fashionable clothing *Re-dress* capsule collection. The entire collection consisted of 6 designs: a sock design; a jumper; cardigan; pair of leggings, seamless gloves and two undergarment vest tops. In this chapter, I focus on the sock, jumper and cardigan design (in that order) predominantly made up from the ‘plush’ and ‘plating’ techniques described in chapter 6, section 6.4.3. I explain the process of creating the three designs using the design framework also described in chapter 6, section 6.5, consisting of three headings: Inspiration, Intention and Development. This framework outlined what information inspired the design, how these insights shaped the intended design and subsequently the process of developing and making the design. In addition, chapter 6 provided the methods used to select the yarns and knit techniques appropriate for a person living with Raynaud’s phenomenon, for the *Re-dress* designs. These were underpinned by two factors: firstly, my tacit knowledge of fashion knitwear design explained in chapter 1, section 1.3.3. where I discussed my background and factors shaping this research project, and chapter 4, section 4.7.1 as part of Stage 3 of the research methodology, and secondly, themes created from my understandings of participant’s ‘lived’ experience of Raynaud’s developed from chapter 5, which this chapter continues to draw on when reflecting on the design work and knitted samples. The chapter ends with discussing interim feedback provided by participants on the sock, jumper and cardigan design before moving onto the remaining designs in the next chapter.

## **7.2 RE-DRESS CAPSULE COLLECTION part 1**

This section outlines the three designs centred around the ‘plush’ technique outlined in chapter 6, section 6.4.3. This section outlines the design development for the sock, jumper and leggings. As mentioned in the introduction, a design framework was followed using three headings: Inspiration; Intentions and Development, as outlined in chapter 6, section 6.5. Each design was given a name that gives the object personality. I begin with Casandra, the sock design, followed by Joanna the jumper design, and finish with Michelle, the cardigan.

## 7.2.1 CASANDRA: sock design

### Inspiration

Throughout the IPA interviews, the women spoke about experiencing physical pain and irritability in their feet when they get cold, causing difficulty walking and in Carol's case, "nasty falls" (541) as discussed in the sub-theme *Losing Agency Through Material Experience* (chapter 5, section 5.2.3.3). Carol relies on heated socks to keep her feet warm to avoid such traumatic events. The other women layer socks for extra warmth or wear thermal outdoor style socks (as seen in Figure 7.1 showing a range of participant's socks in the sketch book). These three tactics adopted by the women for dressing their feet create challenges in relation to their wardrobe. Electric heated socks require a battery mount which dictates the style of trousers worn, such as wide-legged trousers to fit over the battery. The layering of socks often feels too tight and calls for the purchase of larger shoe sizes, as highlighted by Louise: "I find one of the big things is [...] not to wear so many socks, they do make your shoes too tight, which is why I do buy shoes which are two sizes too big or about a size and a half" (390-392). Similarly, Margaret is "not very happy about [wearing bigger shoe sizes], but I don't have a choice" (479). Wool socks are preferred, but these limit the type of shoes the women can wear, due to their thickness as Jessie highlights "if you buy thermal socks, they are really thick, usually [...] but that's no good for me to wear with my shoes for work" (551-552). Additionally, tight ribbing in socks causes circulation issues with the women's feet as experienced by Daisy:

*"I, I've noticed that if I take off my sock and I can see the ribs in my skin that that's too tight for me, it gives me problems [...] I've bought socks thinking these are gonna be so warm and less than five minutes later, I'm like, nope, like these are too tight, I have to take them off"* (429-434)

For a looser fit around the ankles and leg, Sandra wears diabetic socks as they "don't have the elastic around them [you can't] go to Walmart or something like that and to try and find socks that don't have a band around them" (547-548). Otherwise, Margaret stretches the opening of her socks around wine bottles to loosen their grip. Additionally, Margaret knits cup like shapes to place over her toes with her regular socks for extra warmth as discussed in sub-theme *Make(ing) Do* (chapter 5, section 5.2.2.2). Furthermore, seams around the toe area causes discomfort. This issue was discussed as a group in the focus group as well. The

women spoke about socks with extra padding on the toes and heel areas for comfort and warmth.

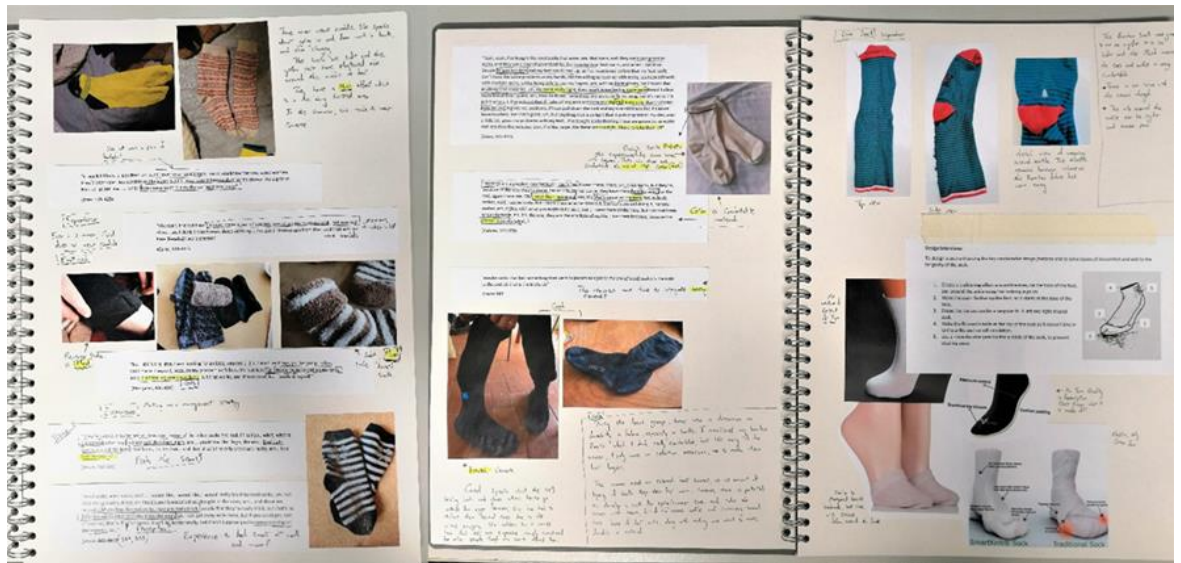


Figure 7-1: Sketch book pages of socks belonging to participants, with transcripts from interviews, and the beginning of research for design inspiration (Lisa Shawgi 2018).

The women experience cold feet even during spring and summer seasons. Jessie exclaims that *“Oh, that’s the other thing, in summer, everybody wears flip flops and sandals, and I’m still wearing socks”* (611). Jane admits to never wearing sandals *“but I never wear sandals, you know, you know, the way some women they’ll wear open toe sandals or like going out, I’ll never ever, I’ll never do that”* (425-426). Margaret is adamant that she *“wouldn’t expose her toes in any weather”* (192). Quite often, during the winter, no matter what socks are worn or how many layers are involved, the women are unable to warm their feet, as admitted by Daisy, *“honestly [sighs] so during the wintertime I would wear multiple layers of socks and then some really thick snow boots, but I would find that I would still, my feet would still end up hurting”* (168-169).

Based on the participant’s comments and their wardrobe items, I decided to focus on developing a summer sock. Heated socks are the ideal solution for winter, and as I was not exploring smart textiles, a summer sock offering comfort and style offered a pragmatic solution. Therefore, after understanding the women’s experience, the information was recorded under two headings: tangible and intangible design elements shown in Table 7.1 in the following section and next step of the design framework.



## Intentions

As noted previously, a table was created to summarise key tangible and intangible design features from the inspiration stage, to focus on what design I intended to bring into the knitted textile workshop. Such a table was produced for each design and below is the table for the sock design (Table 7.1) to showcase the information gathered (please find in Appendix 9 the tables of intangible and tangible design features for subsequent designs). With this information, I produced a drawing illustrating these design intentions using it as a blueprint in order to work with the technician on creating the computer-aided design pattern outlined in the development stage of the sock design in the following section.

*Table 7.1 Table showing tangible and intangible design elements for the sock design*

Table 7.1: Summary of tangible and intangible elements to inform Sock Design		
Tangible, Design Elements	Constructive	Destructive
Fit of the garment	Diabetic socks have no binding around the hem, making it a loose fit around the ankles.	Compression socks are too restrictive. Ribbing around hem of sock causes discomfort due to its tight fit. Seam along toes causes irritation.
Fibres & Components	Cotton, wool and mixed fibres (natural and synthetic) are preferred fibres. Electrically heated elements provide independent heat source for warmth.	Thermal socks are too thick to wear with 'normal' smart shoes. Layering of socks causes restriction to flex and move toes. Issue with durability of electric components. Battery is bulky to wear.
Performance	Handmade extra cup panel to cover toes for extra warmth.	Although two layers of socks are worn, the wearer's feet remain cold in winter months.

Intangible, Design Elements	Desirable	Undesirable
Aesthetic	Socks are outdoor and sports like (functional) in appearance, the aim is to design a smarter sock.	Warm, thermal socks are thicker, and restrict wearer on choice of footwear, such as smart footwear for work.
Sensorial	Soft and fluffy provides comfort and a sense of freshness.	Ribbed effect causes an imprint on the skin.
Experience	Electrically heated socks enable freedom to leave the house.	Thickness of layering of socks requires bigger shoes, causing embarrassment.



*Figure 7-2: Illustration of intended sock design (Lisa Shawgi, 2018).*

1. Create an insulating and cushioning effect to encase the toe, sole and heel regions using the technique ‘plush’.
2. Remove the seam across the toes by knitting a circular seamless sock.
3. Shape the toe section for a tailored fit. A left and right-shaped sock, for a more symmetrical fit and associated comfort.
4. Make the hem without a rib and replace it with a tubular finish, similar to a diabetic sock for a looser fit.

5. Incorporate two yarns using the ‘plating’ knit technique, to make the sock more durable and longer lasting.
6. Incorporate colour to make the sock more visually appealing.

## **Development**

The first step involved a day at Stoll’s Knit Design Centre in Leicester to develop the sock design (Figure 7.3 documents the sampling process). So, the selected yarns were not wasted for the final prototypes, the technician sampled with an equivalent quality stock yarn. Figure 7.3(a) shows the first samples produced using a 1x1 rib for the main body of the sock, while attempting to incorporate the ‘plush’ technique in the heel and sole areas (represented by lighter colour sections of the sock). 1x1 ribs creates a more fitted structure, but stretchable fabric as you can see from the shape of the first three sock patterns in Figure 7.3. When knitting the fabric, the yarn knits on every second needle which allows for that flexibility as shown on Figure 7.3(c). The 1x1 rib appeared in the first three samples, as the technician uses an existing sock pattern in Stoll’s library which acted as a template for the beginning of the sock development. The ribbing was later replaced with a jersey stitch as ribbing caused issues for the women, as outlined in chapter 5, section 5.3.2 within the theme *Make[ing] do*. I decided to incorporate a ‘single jersey’ where the yarn is knitted on all needles, which creates a wider fabric as showcase in Figure 7.3(b). The ‘single jersey’ also offers a smoother, more comfortable texture, which avoids leaving any marks on the women’s skin. This is to avoid causing physical discomfort and visual dissatisfaction or as discussed in chapter 5, 5.5.1; negative perceptions of body image from comparing to what is aesthetically pleasing.

The sock design also included the introduction of an opening on one side of the sock to test a design concept for a more adjustable and comfortable hemline illustrated in Figure 7.4. The design concept explored hemlines other than the common ribbing hem found in socks, often too tight for participants, causing discomfort. The idea was to fold section (c) seen in Figure 7.4 inwards and insert a ribbon through the eyelet within the fold for participants to tie, altering the tautness to suit their level of comfort. The next step introduced the ‘plating’ technique (Figure 7.5), as to provide more stretch in the sock, I looked at incorporating elastic with the main yarn using the ‘plating’ technique as explained in chapter 6, section 6.4.3. The final sample produced at Stoll illustrated two issues with the ‘plating technique’ and the ‘plush’. Firstly, a stripped effect produced from the ‘plating’ meant that the two yarns

were switching positions. Secondly, the ‘plush’ area needed refinement to stop the ‘plush’ yarn coming from the inside of the sock, through to the outside layer, creating a puckering effect. To resolve these issues, I returned to NTU with the knit programme developed at Stoll and continued with prototyping the sock design.



Figure 7-3: From left to right, development of sock prototype using Stoll, CMS ADF 32W, Multi gauge machine (Lisa Shawgi, 2018).

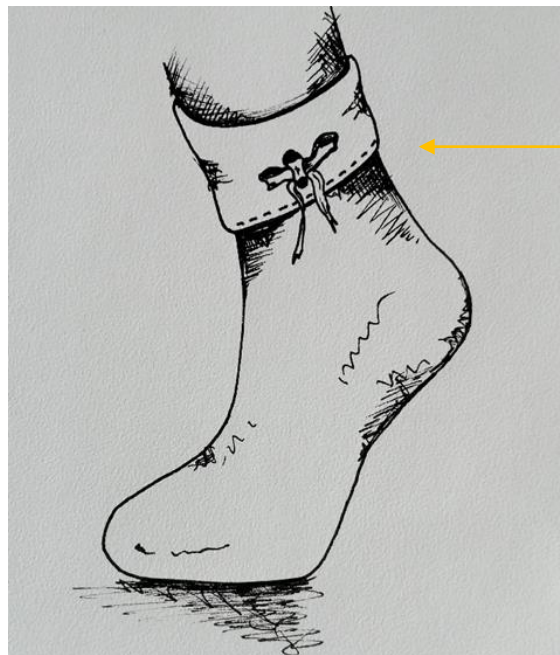


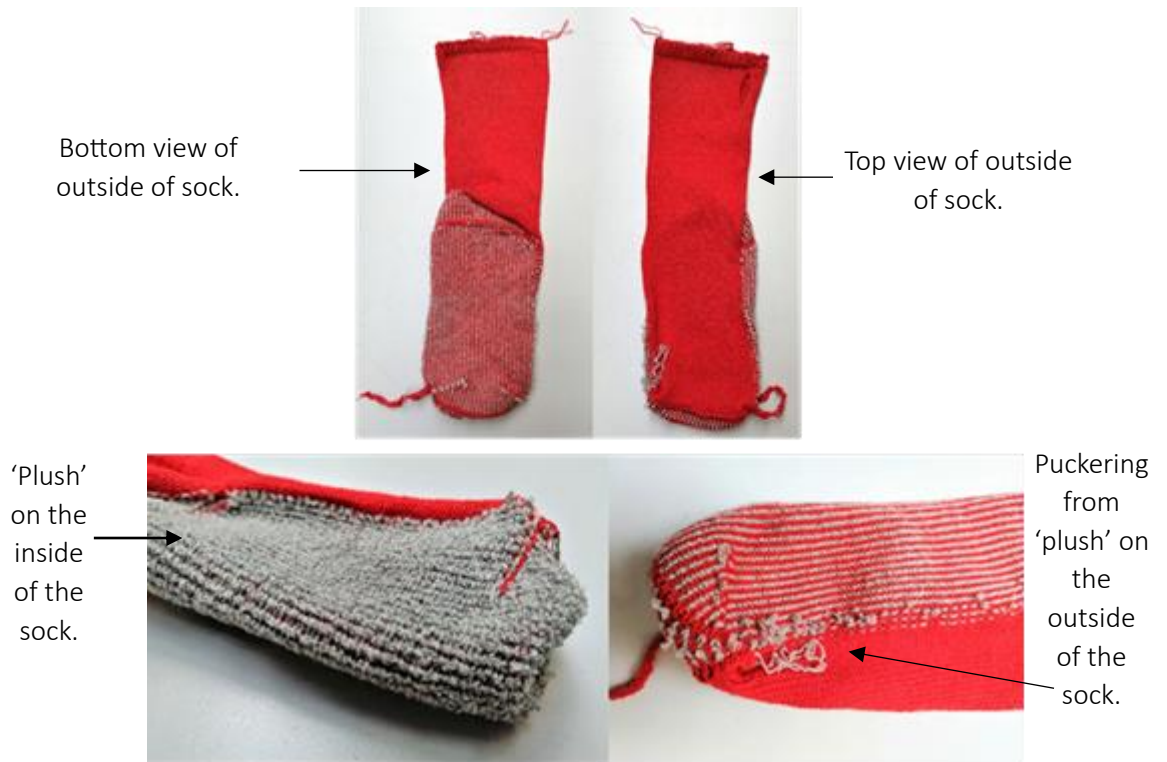
Figure 7-4: Exploring a folding and tying mechanism (Lisa Shawgi, 2018).



*Figure 7-5: Final sock sample produced at Stoll Knit Design Centre (Lisa Shawgi, 2018).*

Returning to NTU's knitwear lab, the technician and I focused on the issue of puckering from the 'plush' technique by solving the yarn tension. To simplify matters, we chose the same colour for both 'plating' yarns. This allowed us to solely focus on solving the problem with puckering without distractions of other unresolved issues. Figure 7.6 highlights the continuous issue with puckering, which we believed occurred for the following reason. The Stoll ADF is a multi-gauge knitting machine. The gauge refers to the number of needles per inch, and on the Stoll ADF, the needles accommodate a gauge range of seven to fourteen needles per inch. The 'plush' technique is successful when the tying in yarn is taut, and the fabric is knitted on all needles. For a circular seamless sock, it is knitted using half-gauge knitting where the yarn is knitted on every other needle (see Figure 7.8(a)), so the tension begins to slacken as the yarn misses every second needle, which makes space for the loops created from the 'plush' fabric to come through. To resolve the puckering dilemma, the sock was knitted using all needles (Figure 7.8(b)). Therefore, a centre seam was inserted down the centre of the sock along the top of the foot (Figure 7.10). In addition to this, to achieve the finesse in the sock for an elegant, sophisticated design texture and look to the design, we moved to work on the Shima Seiki 122 knit machine (a true 14-gauge machine). Figure 7.8 shows the software design pattern created for this design. I continued with yarn

experimentation to resolve the 'plush' and 'plating' issues, using the Intuitive Diagnosis method explained in chapter 6, section 6.3.2. During this stage, I also explored various approaches to how the sock's hem could comfortably fit around the ankle, explained in the next section.



*Figure 7-6: Puckering from the 'plush' is coming through from the inside of the sock and showing on the outside (Lisa Shawgi, 2019).*

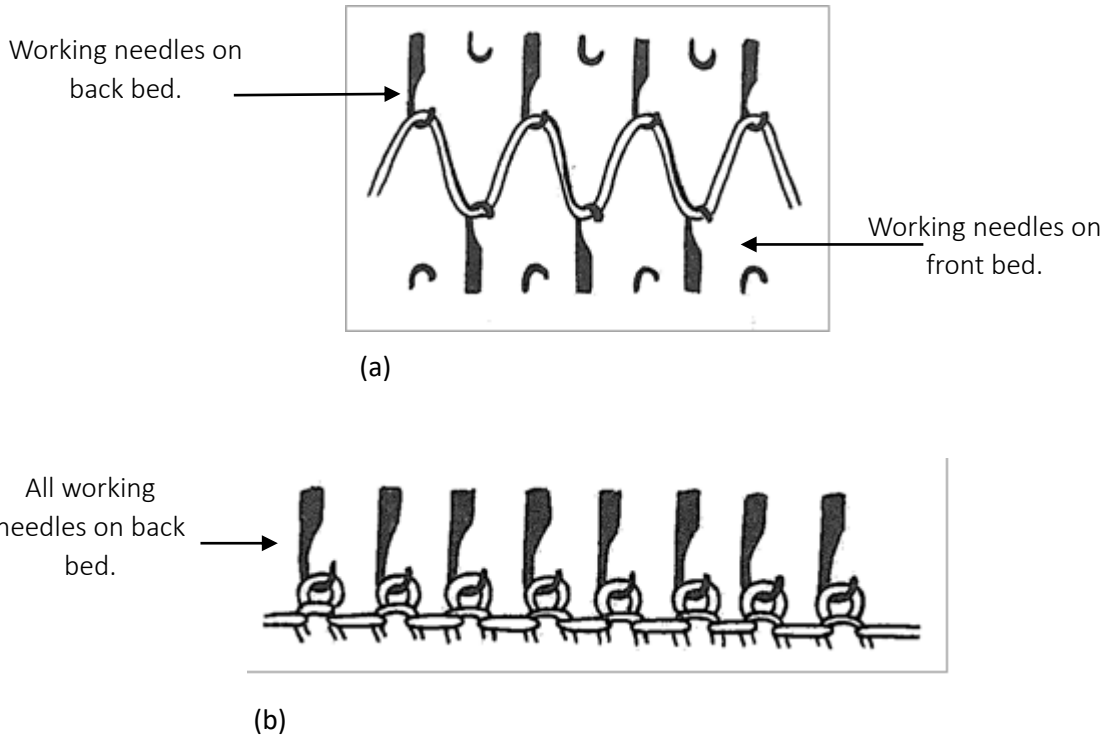


Figure 7-7: Image (a): half gauge knitting on two beds; Image (b): all bed knitting one bed (Lisa Shawgi, 2021).

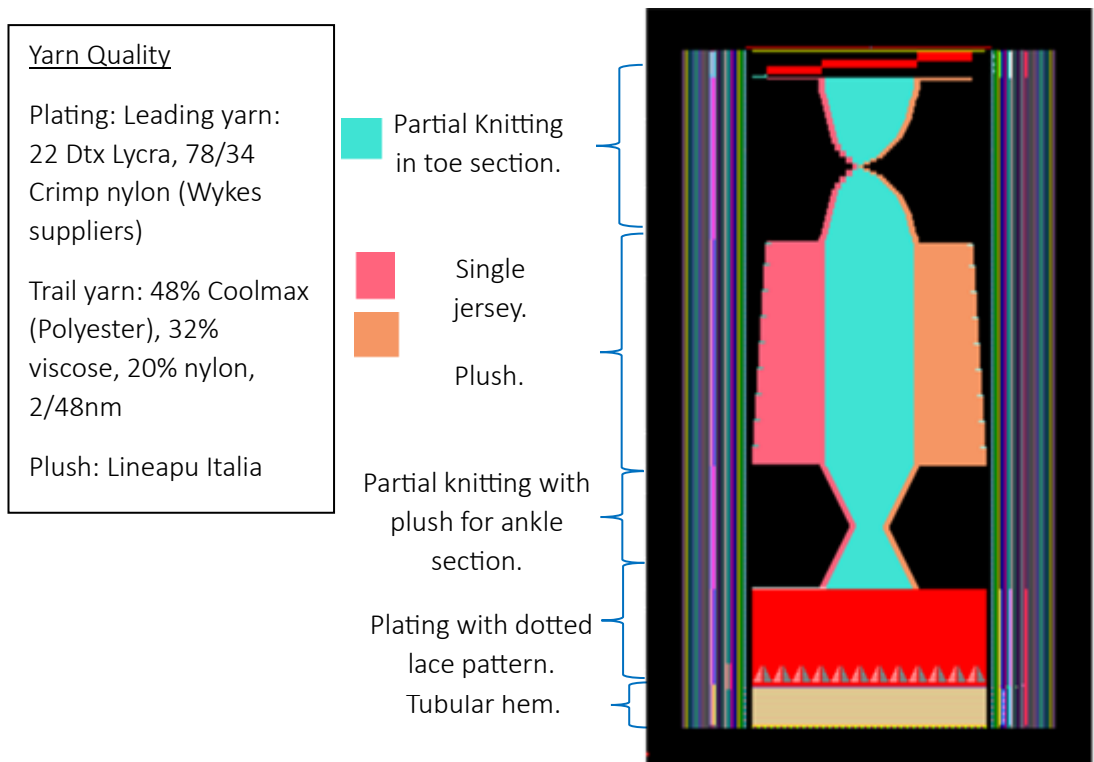


Figure 7-8: Shima Seiki software pattern for sock design (Lisa Shawgi, 2019).

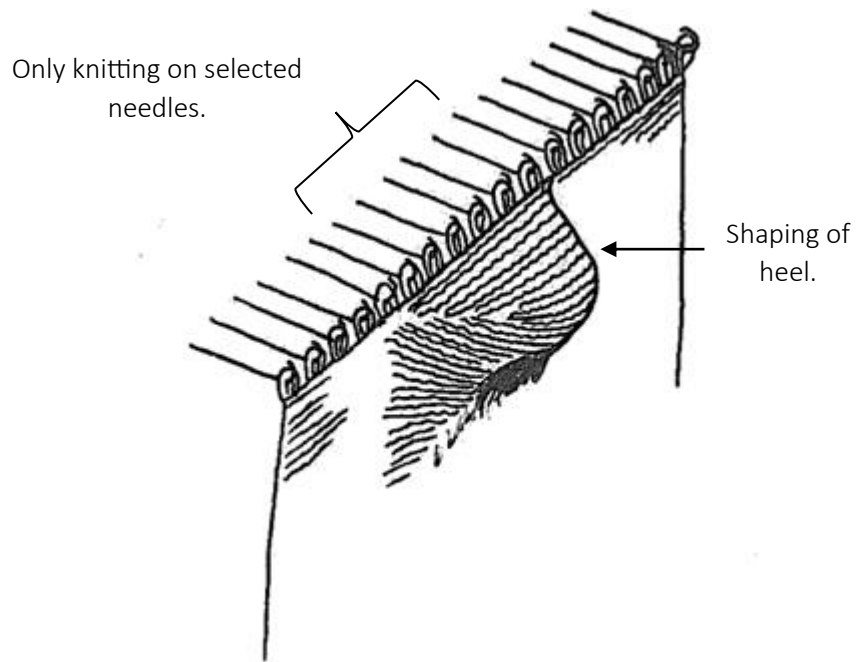
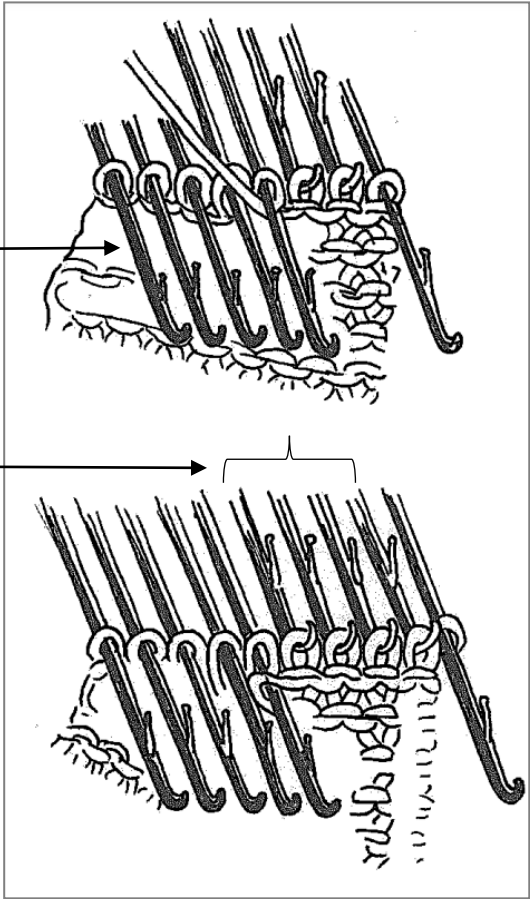


Illustration showing the adding of fabric by increasing working needles.

Needles in hold position.

Needles in working position.



Decrease needles.

Increase needles.



Figure 7-9: Illustration of 'partial knitting' technique (Lisa Shawgi, 2021).





*Figure 7-10: Knitted sock design (Lisa Shawgi, 2018).*

### **Folding, tying and toe seam design strategies**

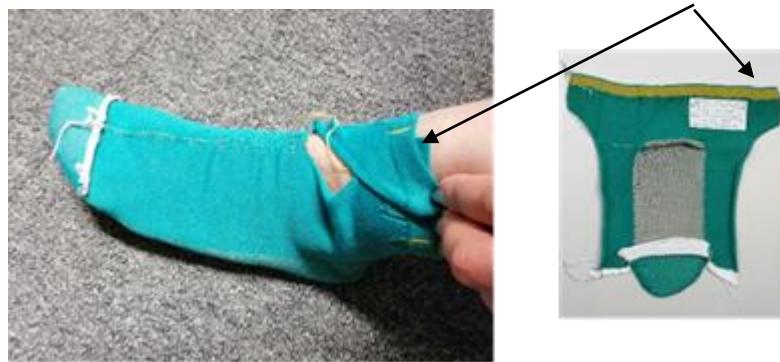
A feature that I first explored to create a more comfortable sock hem was the folding and tying mechanism as mentioned previously and seen in Figure 7.4. The hem folded inwards and stitched to the main body of the sock. A ribbon was inserted within the fold as a tightening mechanism. After testing, the design felt uncomfortable. Two other hem alternatives explored are shown in Figure 7.11 and 7.12. The concept was an adjustable opening and closing mechanism using pockets with magnets to loosen or tighten the hem around the ankle at the wearer's convenience. The first was a half triangular panel (Figure 7.11) and the second a tubular strip (Figure 7.12). However, as seen in Figure 7.11, when placed on the foot, the knitwear was too flexible to hug the shape of the foot. Additionally, I was concerned that the magnets could rub and feel uncomfortable against the wearer's leg when wearing boots. The design I later settled on, included a tubular hem, with elastic on the outer layer (Figure 7.13). Eyelets dotted the hem edge in a zig-zag pattern to add aesthetic value with a tubular hem (Figure 7.13(a)).



(a)

(b)

Pockets to insert magnets.



(c)

Figure 7-11: Image (a): Sketch book pages exploring opening and closing for sock; Image (b): Half-triangle sock hem closure mechanism on both sides; Image (c): One sided half triangle closing mechanism (Lisa Shawgi, 2018).



Figure 7-12: Strip with openings to insert magnets (Lisa Shawgi, 2018).



Plating; Leading yarn: 22 Dtx Lycra, 78/34 Crimp nylon (Wykes suppliers)  
 Trail yarn: 48% Coolmax (Polyester), 32% viscose, 20% nylon, 2/48nm  
 Plush yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

*Figure 7-13: Sock with dotted zig-zag eyelets along tubular hem  
 (Lisa Shawgi).*

At the same time as designing a comfortable hem, I focused on moving the seam running across the toes further up the sock to prevent potential rubbing and allow for more plush fabric to encase the toe area. This was to accommodate the women's issues with seams across cold, sensitive toes and when they have chilblains. Through 'partial knitting', fabric was added to the toe panel on one side of the toe seam located above the baby toe area (see Figure 7.14(a)), which presented a new challenge to resolve. 'Partial knitting' is where a section of the fabric is knitted on a selection of needles and placing a hold on the remaining needles as previously seen in Figure 7.9. To join both panels without excess fabric and bulkiness when both seams are joined, fabric on the left side of the panel needed removing, as seen in Figure 7.14(b). To accomplish the removal of excess fabric, the sock was knitted using 'partial knitting', where several rows of knitting on one side panel were held in place, while the other panel continued to knit. This was a gradual reduction over several samples as seen in Figure 7.15, made in the final yarns shown in the above Figure 7.13. The seams of the socks were hand stitched to create a very fine join. By not including the yellow Lycra yarn in the grey 'plush' sections meant there was a contrast in colours to enhance the aesthetic of the sock. The sock felt sensually and physically comfortable when on. The feel in difference between the 'plush' and 'plated' section between my fingers, gave me an idea for the concept of the

jumper design. The Lycra felt cool against the skin, whilst the ‘plush’ felt softer and cushioning. I thought perhaps this sensation could help develop a design for the women when they stay warm by wearing thicker fabrics, but at the same time, look to remove a layer to cool down. This made me think about developing an all-in-one fabric, so the women need only wear one layer which keeps them warm and not overheat, to avoid feeling like the Michelin Man discussed in the theme *Feeling Unfeminine* in chapter 5, section 5.2.3.2 under the superordinate theme *Material Affairs*.

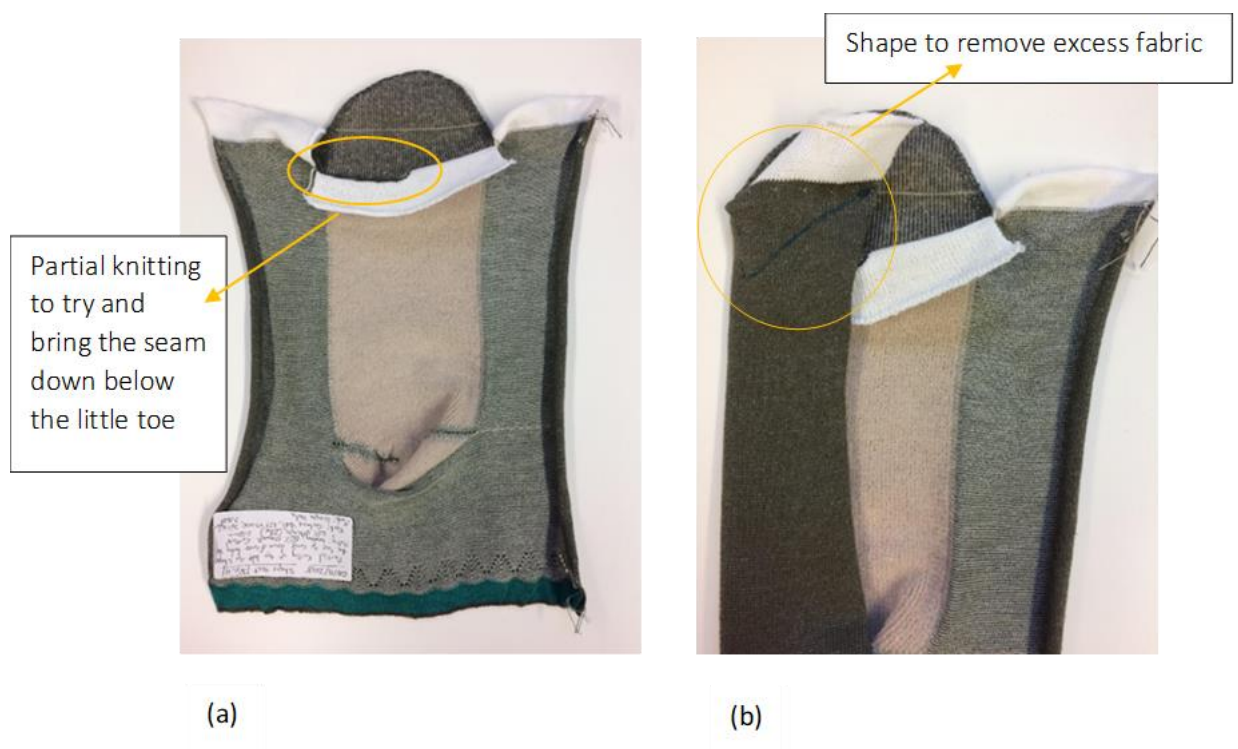
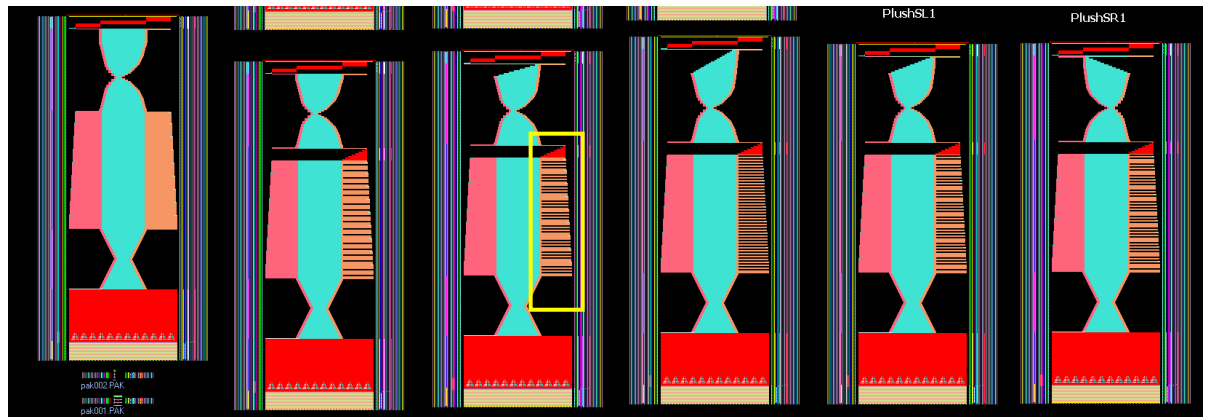


Figure 7-14: Shaping the toe seam (Lisa Shawgi, 2018).



(a)



Detail view of yellow box content:

- The nude colour represents the knitting of rows. Where black is seen, a hold is placed on knitting rows.



(b)

Figure 7-15: Image (a) Shows the Shima CAD programme showing 'partial knitting' to reduce excess fabric. Image (b) Shows the knitted samples produced from each pattern (Lisa Shawgi, 2019).



*Figure 7-16: Casandra, Sock Design. Image (a): sock design modelled by a Raynaud's sufferer; Image (b): side view displayed on the left, and an inside-out version to the right; Image (c): top front view of sock design (Lisa Shawgi, 2023).*

### 7.2.2 JOANNA: boat neck jumper design

#### Inspiration

As highlighted in chapter 5, section 5.2.2.1 within the theme *Wardrobe adjustments for comfort* the women modify their wardrobe to include more ‘practical’ garments. This often means borrowing their boyfriend’s or husband’s jumpers for the extra hem and sleeve length. Mandy points out that all her “*women’s jumpers [...] are all quite short*” (552-553) and when she puts her boyfriend’s jumper on, “*it’s like a, kind of jumper and glove at the same time*” and she “*just wish[s] there was a little bit more practicality behind ...female clothes*” (703). Regarding Mandy’s comment on wrist coverage, Brenda points out that she wears “*sports wrists bands*” (162) because if she “*keeps her wrists warm, it doesn’t improve my[her] Raynaud’s, but it helps a little bit*” (163). Adding to this, Jessie comments on what she looks out for in tops, “*First thing is, if I can get, um... tops, that can cover my wrists, and you can, you can get like sports tops [...] they’re brilliant, because if I can keep my wrists warm that helps loads*” (360-363). Furthermore, Valerie knits her own wrist warmers and used to sew her own shirts, solely to make the standard woman’s sleeve length longer.

A further practical design feature that Mandy is attracted to is the hooded element of a sweater. Similarly, Sandra expresses her attraction to hoods: “*I like to wear something with a hood, because if the air is blowing [...] right on me [...] I can put the hood up*” (160-162). Regarding the head, neck and shoulder region, the women prefer fabric covering their necks and in Cheryl’s case, her shoulders: “*I sometimes wear that [wrap] and I’d put it over my shoulders*” (894-895). Scarves are an essential item for keeping the neck warm, as Cheryl further explains, “*I always keep myself warm with having tops on, and if they’re not with a, aaa... they don’t cover my neck, scarves, I’ve lots and lots of scarves*” (450-451). On a similar note, Jane on occasion, wears two scarves as a playful tool and style conscious decision, as discussed under the theme *Mak(ing) do*, in Chapter 5, section 5.2.2.1. Scarves not only cover the back of the neck, but often are draped around the shoulders for extra coverage.

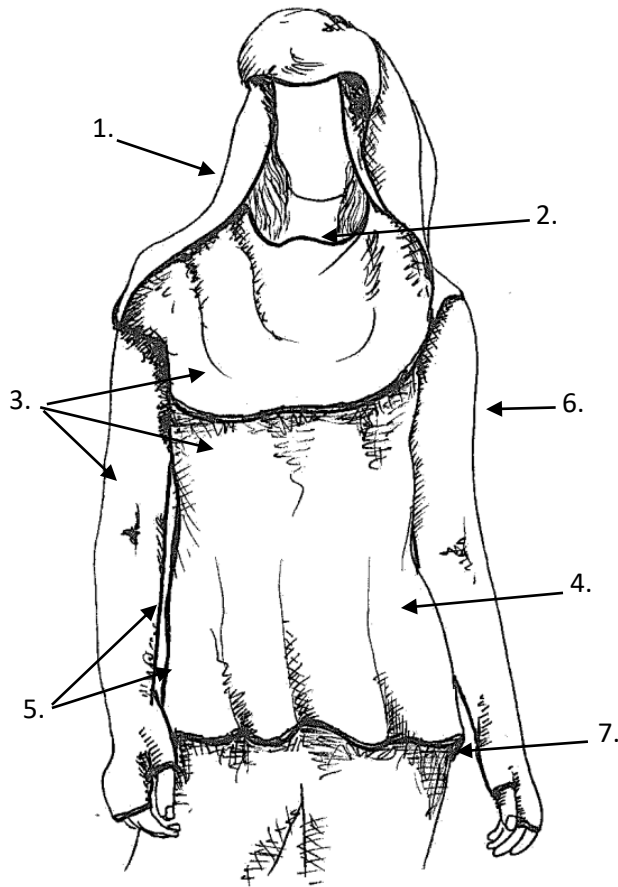
Within the theme *Feeling un-feminine*, chapter 5, section 5.2.3.2, we see how the women adopt a layering system to regulate their body temperature. Due to having so many layers

on, the women often get too hot, but removing a layer often means exposure and getting cold again quite quickly, as mentioned by Jessie: *“not only do I get cold, I also get hot and sweaty, because I got so many layers on”* (76). This layering approach can be a bit of a nuisance. Brenda refers to the fact that *“I’ve got all these clothes to carry [...] I’ve got a backpack the size of a caravan really [laughs]”* (490-493). Three of the women refer to themselves as the Michelin man because of the number of layers that the women wear as Jane described: *“It’s unbelievable trying to prepare yourself going out, it’s like, it’s like the Michelin Man heading out for the day [...] but I had to”* (193-195). Valerie *“never assume[s] that it’s going to be warm, um, more or less, always take, you know, a cardigan, a jacket”* (57-58) and as the women *“can have episodes that last for hours”* (Valerie, 131) they always need to be *“prepared”* (Valerie, 133). This preparation *“slows things down [...] it slows things down”* (Brenda, 409). Even Louise’s *“dog gets so impatient while I’m [she] while I’m [she] putting all the layers on”* (1062-1063). And then you have *“all these clothes to carry”*, explained Brenda (489). An additional feature that Valerie mentions is boat neck lines which gives a higher neckline, *“fairly high neck, it’s boat shaped, and it’s beautiful, beautiful, beautiful, um, all cotton yarn”* (239-240).

When it came to designing the jumper, I wanted to tackle the issue of layering and sweating. Layering clothing is effective but while it helps warm the hands, the rest of the body overheats. Carrying so many layers is also a nuisance for the women. I wanted to design a garment that would help the women cool down, without having to remove a layer. I also wanted to incorporate features such as longer sleeves, a higher neckline with extra fabric which could act as a hood if needed. In addition, the fabric needed to be interesting with a hint of femininity.



## Intentions



*Figure 7-17: Drawing of design intentions (Lisa Shawgi, 2019).*

1. Oversized collar to drape over the shoulders, which can be pulled up over the head for extra coverage.
2. Boat neck with a large collar panel attached to give the wearer a three-way option of wearing the collar: over the head, draped over the shoulders and gathered to drape down the front as showcased.
3. Use the 'Plush' technique for one side of the fabric, to offer warmth when close to the body. A synthetic yarn such as a viscose will complement the 'Plush' using the 'Plating' technique. The intention is to reduce the number of layers by having a garment that can offer warmth and to cool the women down when needed.
4. The body is a boxy shape for a loose fit to allow for comfortable layering.
5. Link seams flat to allow the garment to be reversable.

6. Create an elegant aesthetically pleasing garment using deep tone colours with a hint of femininity using a pink colour for stripes as shown in the colour palette in Figure 7.18.
7. Hem length comes to hip line and make the back panel longer to avoid any gaps when the wearer sits down or bends forward.
8. Extended sleeve cuffs with thumbholes to cover the hands.

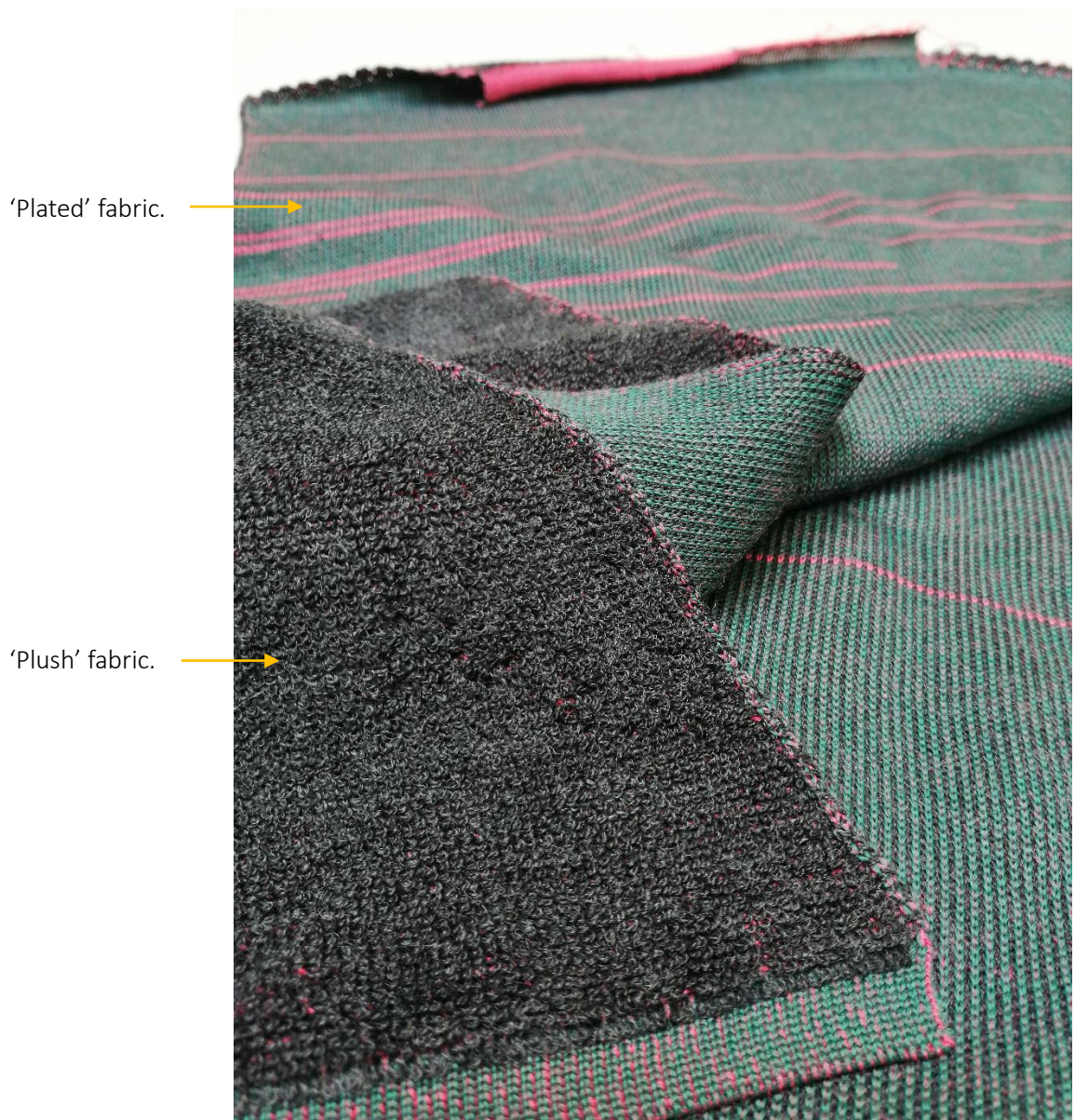
## **Development**

The concept behind the jumper was to create a garment that would keep the women warm but cool them down without having to take the item off. I also wanted to design a garment that would reduce the number of layers worn by the women, making them feel less like the Michelin Man. I decided to design and create a jumper that would allow the women to cover their hands, with a large collar to provide extra coverage around the shoulders and which the women can pull over their head. In addition, I wanted to develop a fabric that would give a sense of warmth and a cooling comfort simultaneously to reduce the number of layers worn.

An idea formed when I returned to my analysis and interpretation of my friend Mark's experience with the Under Armour top, and the Marketing Material used to describe the user's experience (discussed in section 6.3.4). Under Armour described the knitted top's performance as *"holds heat and dries fast, meaning it offers breathable warmth"*. I realised that the top maintained the wearer's 'warmth' by keeping them dry and in turn, not cold from feeling sweaty and damp. Mark discovered that the top did not provide the heat he needed on its own but worked fine when worn as an under layer. What if a layer of warmth and a cooling layer can be combined? There was a similar effect when I rubbed the sock fabric against my fingers and felt the difference between the 'plated' and 'plush' layer. The Lycra felt cooler to the touch compared to the cushioning looped fabric produced by the 'plush' technique. I am referring to the sensorial perception of the 'cooling feeling' or 'warming feeling' of a material against the skin, as *"objects made of different materials feel thermally different"* (Fenko, Schifferstein and Kekkert, 2010, p.1326).

Following on from the idea of having one fabric to create a sense of warmth, while delivering a cooling feel, I decided to combine the knit techniques 'Plush' and 'Plating'. The 'Plush' side of the fabric would deliver warmth through insulation, and the 'Plating'

technique would cool the body by not overheating the wearer by getting warmer. To clarify, when I use the term ‘cooling down’, I’m referring to the general *feel* of fabrics against the body. Drawing on my design and making experiences, I considered wool and cashmere to *feel* sensorially warm and hug the skin. Cotton and linens *feel* soft, fresh, and light against the skin, while polyester and viscose *feel* cool against the skin. Based on this knowledge and yarns I had access to, my choice of knit techniques and experience with clothing, I decided to use the following yarns for the jumper design:



Leading Plated Yarn: 100% Viscose 20nm (Green yarn)  
Trailing Plated Yarn: 60% organic cotton, 40% acrylic (Zinc) 2/60Nm (Pink yarn)  
Plush: Woodland 2/48Nm, 60% Virgin Wool, 40% Polyamide Nylon (Charcoal yarn)

*Figure 7-18: Yarns making up fabric for the jumper (Lisa Shawgi, 2023).*

Figure 7.18 shows the make-up of the fabric for the jumper design. The viscose yarn is the 'Leading Plated Yarn', which is the yarn that is mostly exposed on the top layer of the fabric. The 'Trailing Plating Yarn' is composed of 60% organic cotton and 40% acrylic. This yarn was selected for its colour and suitability for the knit technique of tying in the yarn. The 'Plush Yarn', was the Woodland fibre composed of 60% WV and 40% PA. When this material was placed against the skin my perception was that the 'plush' side felt warm to the touch, while the 'Plating' face side of the material, felt lighter and cooler. As well as the feel of the material, I considered the aesthetics. During the knitting of the socks, I recalled an issue with 'plating'. If the yarn was too silky or smooth in texture, it would swap places with the main plated yarn. This gave the stripy effect seen in the Figure 7.18, where the Teal (Viscose) yarn would slip behind the Pink (cotton and acrylic) yarn. This did not compromise the *feel* of the fabric but produced an appealing stripe pattern.

The shape of the garment consisted of a square front and back panel, a boat neckline with a large collar attached, and a slit for the thumb in the sleeves (see Figure 7.19 and 7.20). The collar was gathered in around the neckline to allow the fan of more material over the shoulders. The wearer has the choice of draping the collar over the shoulders, bringing the material over the head like a hood, or gather the material forward as a cowl neck as seen in Figure 7.21. The cowl shape meant the jumper can fit under a coat, whilst giving coverage along the centre front opening. The sleeves are extended to double up as a cuff, or fold down over the hands with a thumbhole. For an effective fold, the jumper has a couple of single jersey knitted rows along the wrist line to avoid bulkiness. All the seams were kept straight to allow ease of joining for a flat finish to accommodate the reversibility of the garment.

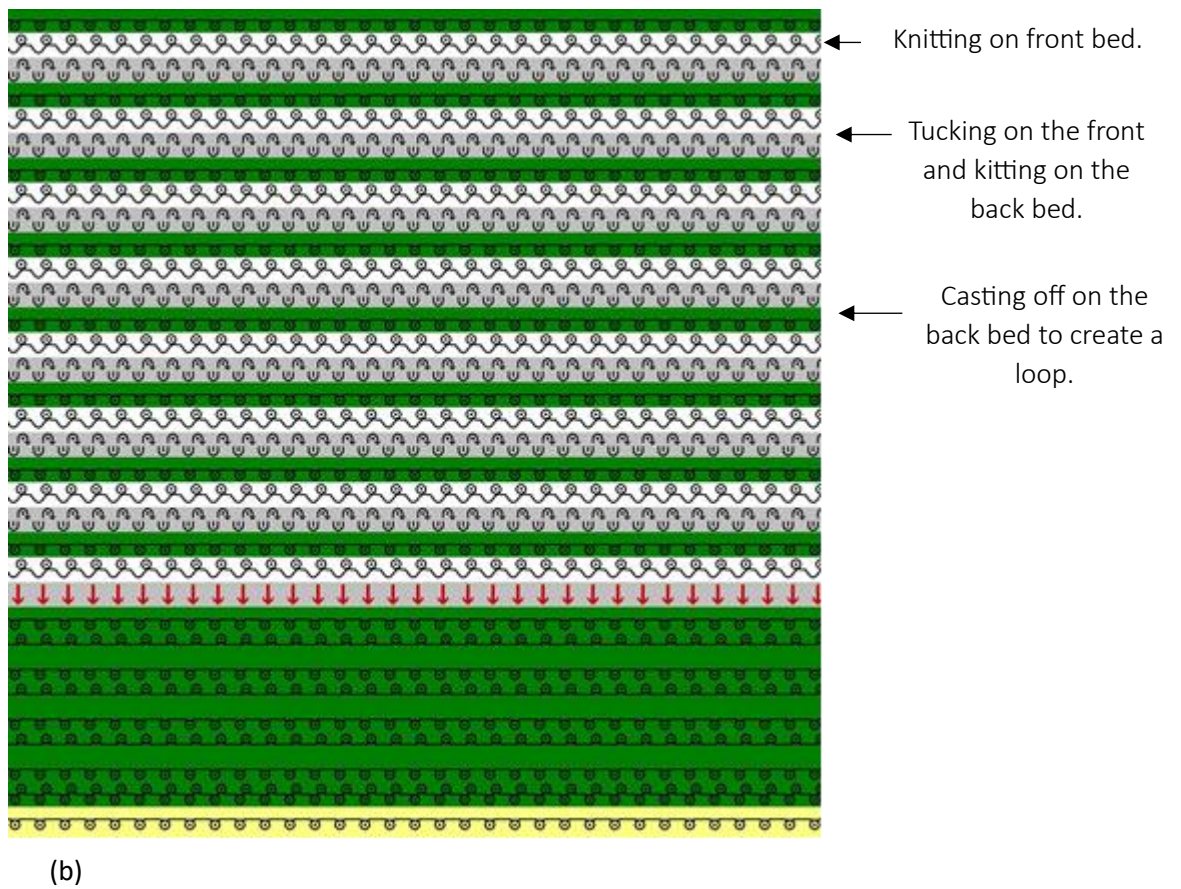
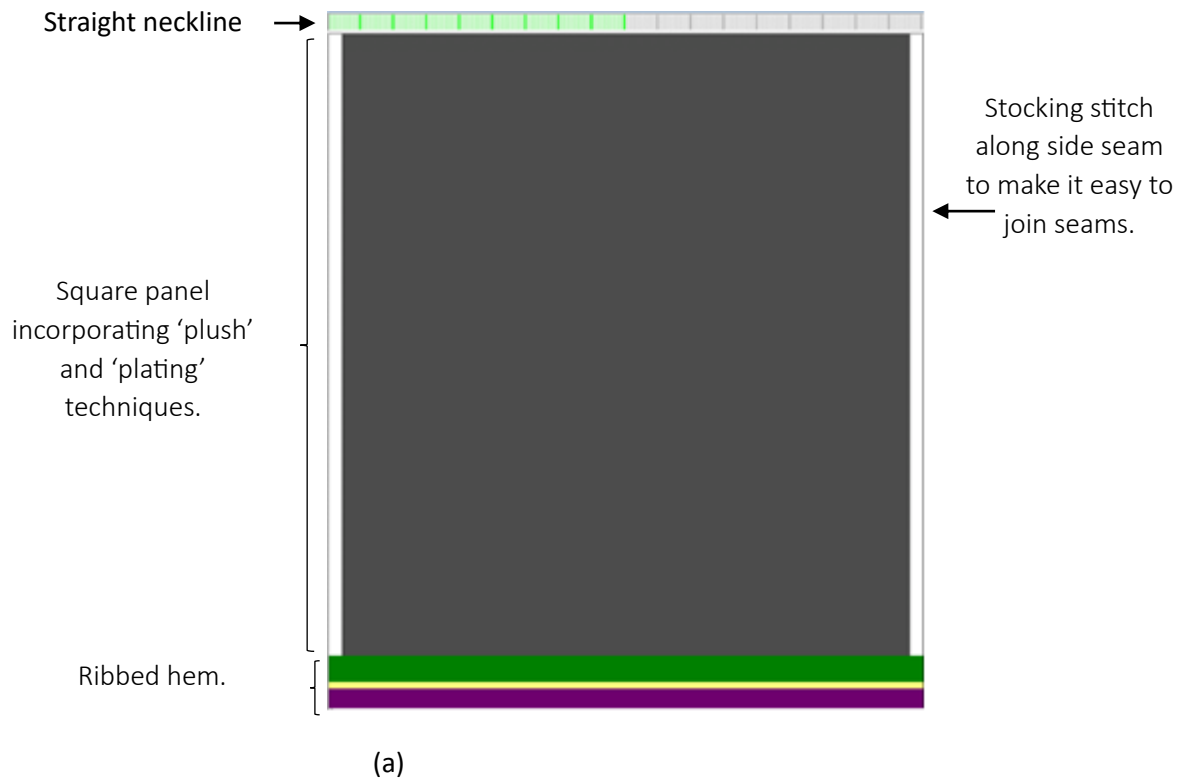


Figure 7-19: Image (a): Stoll pattern for front panel; Image (b): stitch detail of 'plush' and 'plating' technique (Lisa Shawgi, 2019).

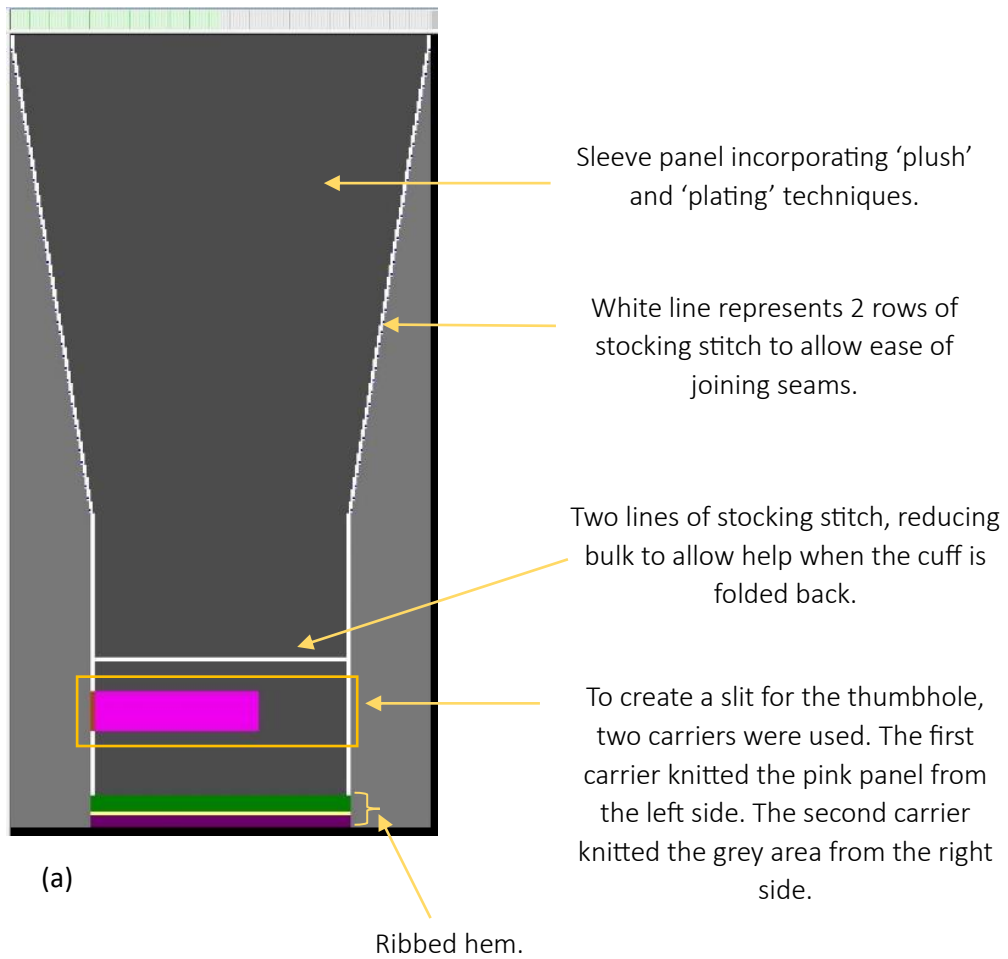
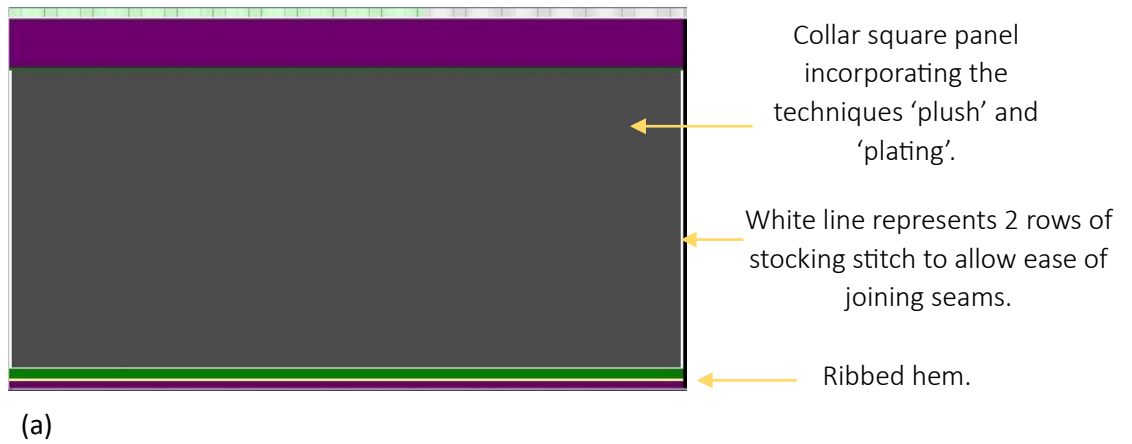


Figure 7-20: Image (a): Stoll pattern for sleeve; Image (b): photo shows the sleeve extended; Image (c) shows the cuff folded back.



(b)



(c)



Figure 7-21: Image (a): Stoll pattern for collar; Images (b) and (c): Wearing the collar various ways (Lisa Shawgi, 2019).

With the jumper completed, I moved on to design the cardigan Michelle, as I wanted to explore the use of the ‘plush’ and ‘plating’ techniques used in both the sock and jumper designs. From these developments, I selected the best yarns suited to these techniques, and considered lighter colours for the overall aesthetic, in a pink shade as this is a colour is often associated with femininity in Western fashion. This is an insight developed from the theme *Feeling Unfeminine* in chapter 5, section 5.2.3.1. Gender-based colour association is a concept which is socially constructed, where the colour pink is associated with girls and blue for boys (Clark and Rossi, 2015; Jonauskaitė et al, 2019), as a result of the development of the children’s clothing industry in the first decades of the twentieth century. Up until this point, pink was the more masculine colour (Kaiser, 2013). The introduction for pink as a fashion colour was introduced by the New York menswear manufacturer, Brooks Brothers in 1949 for their ladies’ button-down shirt. The colour pink became the craze from garments to household interiors, Men were even encouraged to wear the colour pink in the mid-1950s (Blaszcyk, 2012). However, the Baby Boomer age (1960s – 1970s), were the first generation to have a colour coded system of “pink-versus-blue” assigned from birth (Kaiser, 2013, p.220). The colour pink is still marketed as part of the gendered aesthetic code and connotes femininity (Bush, 2020). For this reason, I decided to incorporate some shades of the colour pink throughout the knitwear.



Figure 7-22: Joanna, boat neck jumper design (Lisa Shawgi, 2019).



### 7.2.3 MICHELLE: cardigan design

#### Inspiration

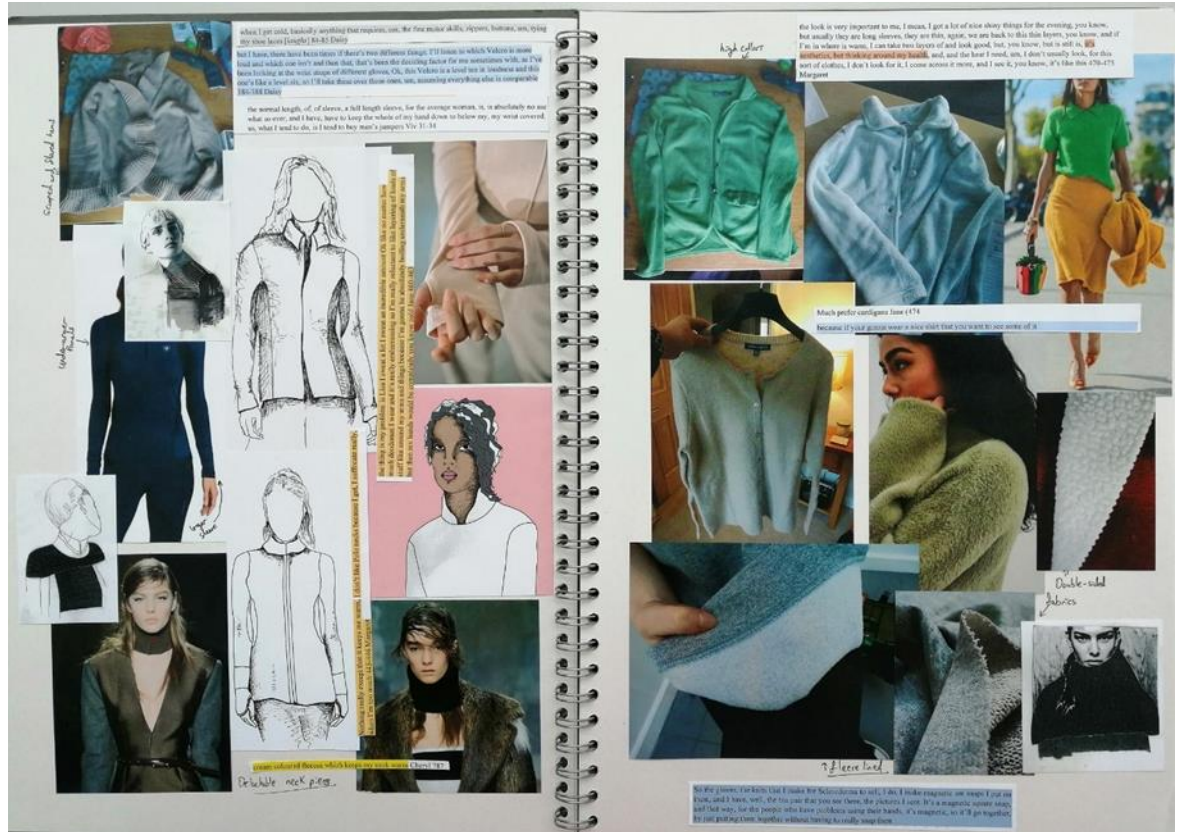


Figure 7-23: Sketchbook pages illustrating research on fabric textures and garment style using participants wardrobe items and market research (Lisa Shawgi, 2019).

The insights generated from the interviews discussed in chapter 5 gave an understanding of how the women desire more clothing which are both practical and aesthetically pleasing, to meet their physical, social and emotional requirements. That is, feeling comfortable in terms of warmth, fitting in stylistically, how this affects their identity and ‘feel-good’ factor such as feeling feminine. Both Carol and Valerie spoke about how fleeces helped with keeping them warm, and in the same breath, they raised their dissatisfaction with the material’s appearance. Carol described how she doesn’t “*feel very smart*” (783), and Valerie felt “*a bit bored*” (310) with their lack of “*subtlety*” and “*precision*” (377). Margaret mentions her search for “*shiny things*” (470) for the evening and Louise mentioned her attraction to sparkly thermal tops. As such, the women search for warm, but aesthetically

pleasing garments, discussed in the theme *Seeing healthy aesthetics* in chapter 5, section 5.2.3.1.

Following on from this, the women's struggles with their hands were highlighted when the cold sets in. As Daisy explained: *"When I get cold, basically anything that requires, um, the fine motor skills, zippers, buttons, tying my shoes laces [laughs] [...] I have a hard time when my hands get cold"* (84-85). In an attempt to ease this struggle, Daisy acquires clothing items with Velcro. While Daisy *"thinks[s] Velcro is wonderful"* (354), there is the loud sound to contend with, as she explained her experience with *"So I'd have to un-Velcro it, which then it'd like [makes a loud Velcro sound] it's like, I'm all the way over here [...] hey, look at me"* (375-376). Whilst Velcro reduces pressure on the hands, it is loud and draws attention to the wearer. This may not be an issue for most people, but when one is already conscious about a physical ailment, clothing which avoids attracting further attention is preferable to Daisy, as highlighted in the theme *Using clothing to avoid awkward socials* in chapter 5, section 5.2.4.1. This is so much so that she grades the level of loudness out of ten, *"I'll listen to which Velcro is loud [...] this Velcro is a level ten in loudness and this one's like a level six, so I'll take these over those ones"* (384-388).

Due to the difficulty in using their hands during and after an episode, the women rely on others at times to help them undo fastenings or other tasks. Louise on occasion asks her neighbour to open her front door, while Valerie has even requested her friend to blow her nose. Sandra knits gloves with magnetic straps for *"people who have problems using their hands, it's magnetic, so it'll go together, by just putting them together without having to really snap them"* (590-591).

As well as the above aspects which need considering when designing a cardigan for the women, I return to the layering strategy to help manage the women's body temperature and comfort level. This does lead to the women overheating as we discovered when discussing inspiration for the jumper. Because of this, Jane avoids layering which leads to discomfort in her hands:

*"The thing is my problem is Judith I sweat an incredible amount OK, like no matter how much deodorant I wear and it's really embarrassing so I'm really reluctant to like layering of loads of stuff around my arms and things because I'm gonna be absolutely boiling underneath my arms but then my hands would be completely you know cold"*

(460-463)

Developing a design feature which incorporates a cooling aspect could allow the women to layer comfortably and reduce bulk under the arms where sweat occurs. I took inspiration from sportswear and their under-arm panelling. This feature is common on fitted tops, but I decided to include this feature in the cardigan. It means that the women don't have to wear sports tops and can still wear a 'normal' layer over with the aim of reducing extra warmth beneath the arms. Wearing garments with a front opening, such as a cardigan, serves two purposes; firstly, it helps with air flow for cooling down without taking a layer off, and the secondly, it shows off what is worn underneath, as Jane explained; she "*much prefer[s] cardigans [...] because if you're gonna wear a nice shirt, you want to see some of it*" (474 - 478),

As mentioned above, the women prefer longer sleeves and extra coverage for their neck. Margaret wears polo necks, but out of necessity rather than choice: "*It keeps me warm, I don't like polo necks because I get, I suffocate really, when I'm too much*" (445-446). And Cheryl wears "*fleeces which keeps my[her] neck warm*" (787). Similarly, Valerie "*tend[s] to wear polo neck jumpers all through the winter [...] got a collection of those in, fairly straight forward colours*" (265-267). I remember in conversation with a health practitioner that I discovered keeping the back of the neck warm and wrists is key due to blood vessels being close to the skin. So, a higher neckline offers extra coverage which can easily be adjusted to open if needed fits in with this idea. This is a feature which I looked at incorporating, alongside longer sleeves, easier fastenings, and a design feature to control over-heating under the arms.

## Intentions

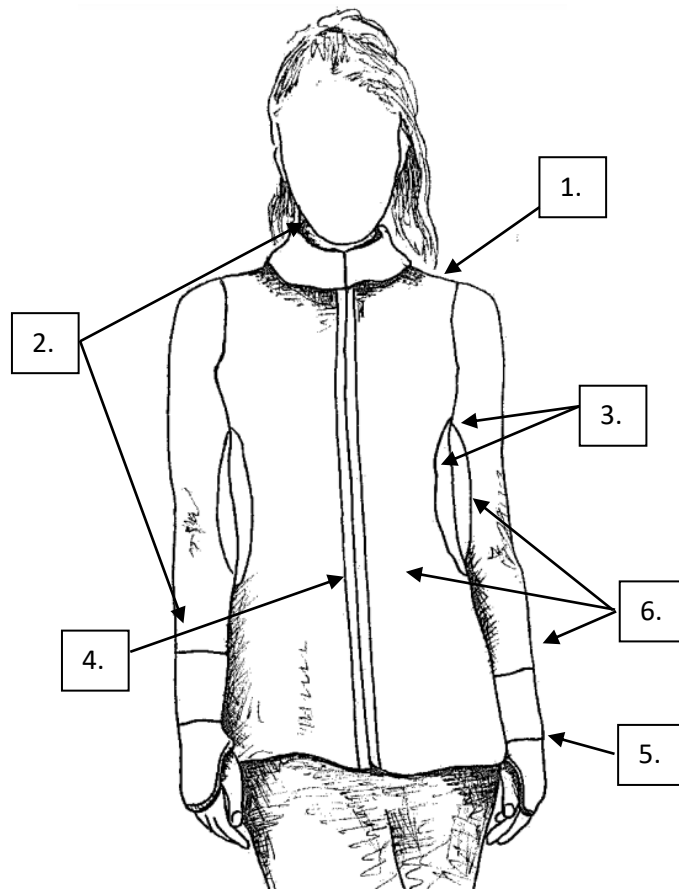


Figure 7-24: Specification of cardigan design, Lisa Shawgi, 2019.

1. Create a fabric combining 'plush' and 'plating', with the 'plush' texture on the inside to enhance insulation.
2. 'Double plush' located surrounding the wrist area and on the collar for extra warmth. This means that the 'plush' loops are on both the right and wrong side of the fabric.
3. 'Plating' for panels under the arms to reduce volume.
4. Pockets housing magnets for ease of opening and closing.
5. Extend the cuff to cover the back of the hands.
6. Contrasting colours for a more aesthetic appearance.

## Development

For the cardigan design, I selected a soft, rose pink for the dominant colour. The yarn selected with this colour tone was a combination of 20% Linen, 30% Cotton and 50% Outlast (acrylic). From the sock sampling, it was clear that the 48% Coolmax (poly), 32% viscose, 20% nylon worked best for the 'Plush' Yarn and the related 'Plated Trailing' Yarn, as it was soft to the touch and withstands the combined use of the techniques. A panel was constructed using these yarns, which worked well (see Figure 7.25). The next step was incorporating the under-arm panels. For these I wanted a silky yarn, similar to the Viscose used for the Joanna jumper, as I was attracted to the contrast in texture. We tested with a yarn found in the storeroom first, to save on materials. The combining of the two panels caused some technical challenges, demonstrated in the following Figures 7.26 to 7.28.



Figure 7-25: Image (a): knit side of back panel; Image (b): purl side of fabric showing the 'plush'; Image (c) is a close up of the 'plush' fabric and some of the 'plated' fabric on the hemline (Lisa Shawgi, 2019).

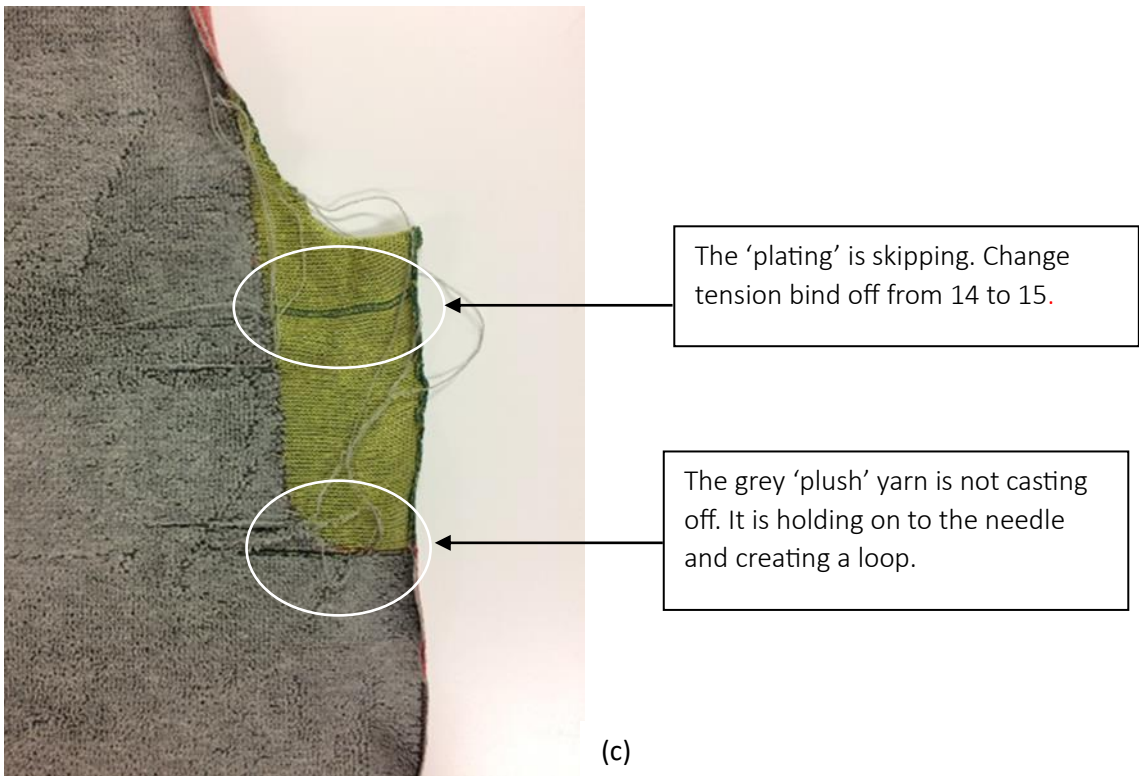
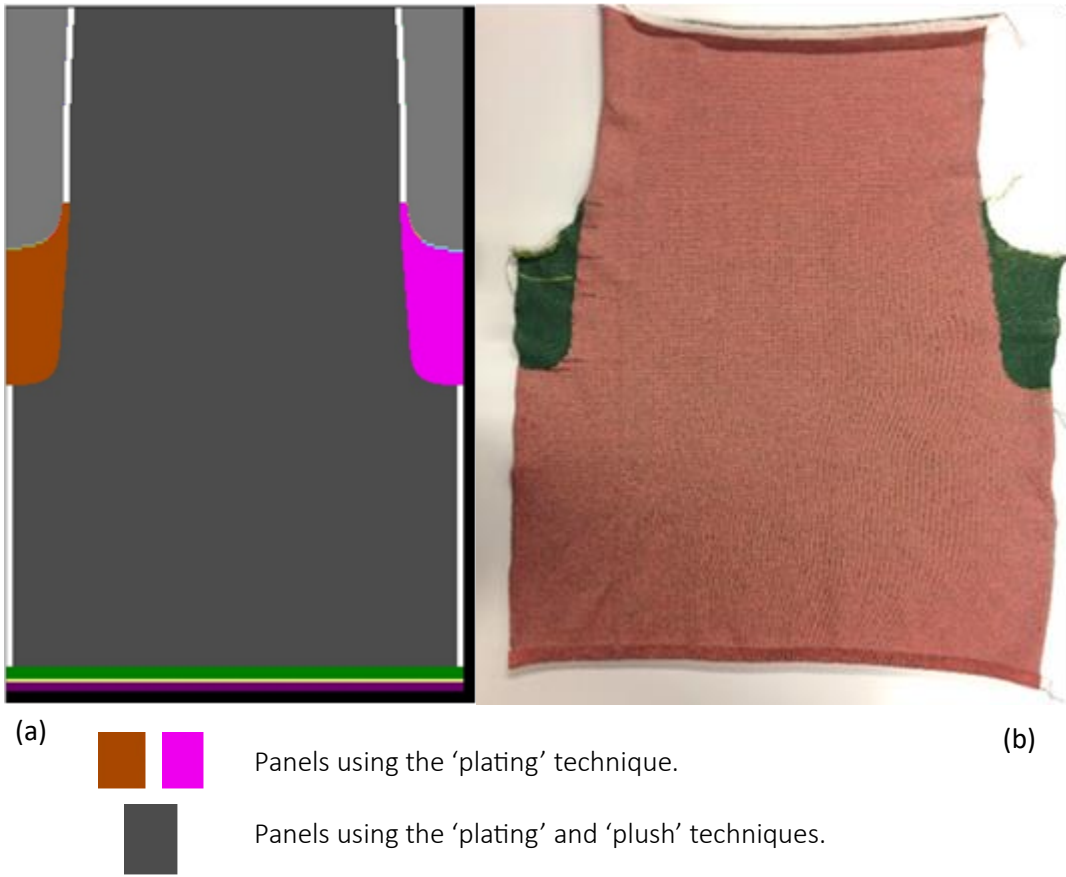
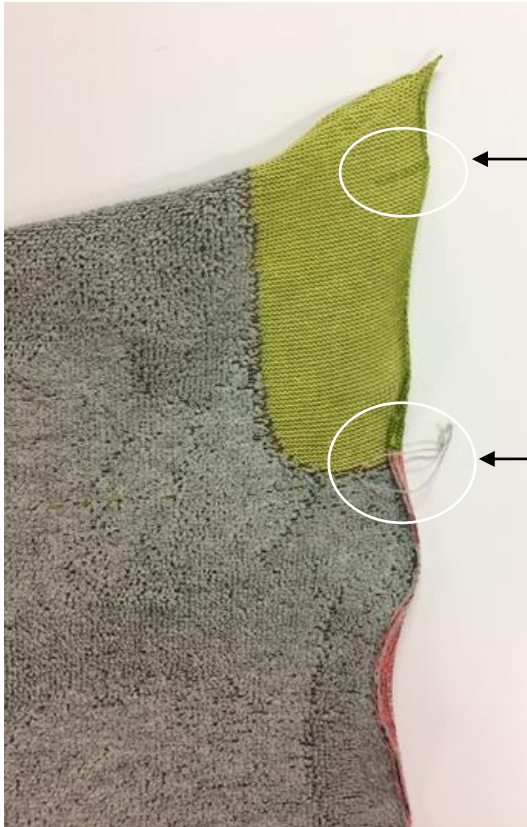


Figure 7-26: Image (a) Stoll pattern; Image (b) knit side of the front knitted panel; Image (b) purl side of the knitted panel (Lisa Shawgi, 2019).



Plating is better but the yarn combo is too thick to bind off.

Tension was changed from 15 to 14 but no improvement.

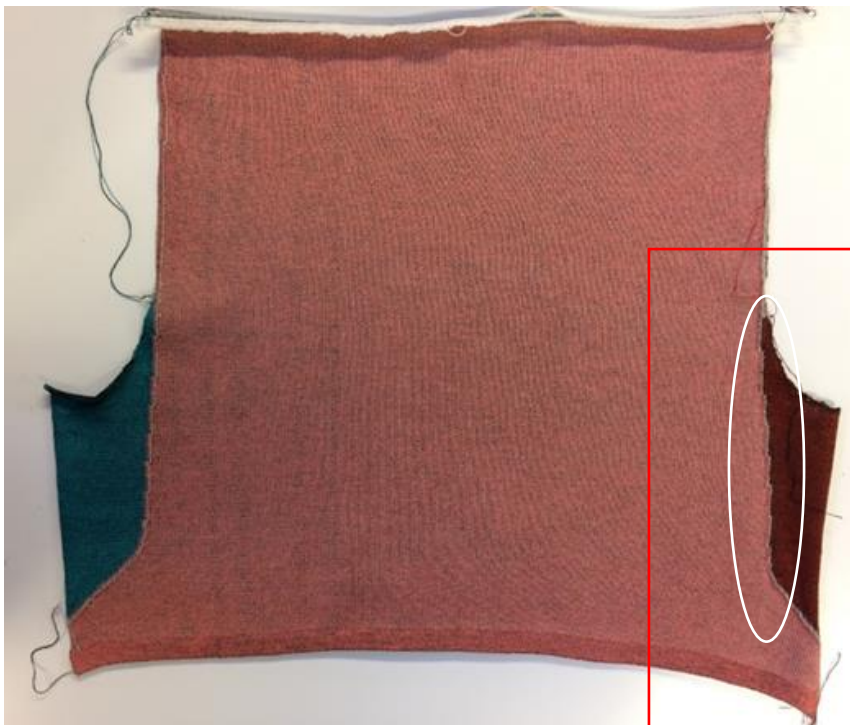
Change plaiting trail yarn from a 2/48nm to a 2/60nm.

Issue with floating thread has improved but remains. Result of carrier placement. Plush loop is holding on.



Intarsia section is causing holding of threads as the carrier is being moved about ten stitches. Alter shape of curve so the carrier is only moving about 2 stitches at a time.

Figure 7-27: Two further iterations trying to resolve combining the 'plated' panels with the 'plush' fabric (Lisa Shawgi, 2019).



Inserting a two-needle jersey to allow a relief between the plush and intarsia and plating techniques. It is successful as there are no loops.

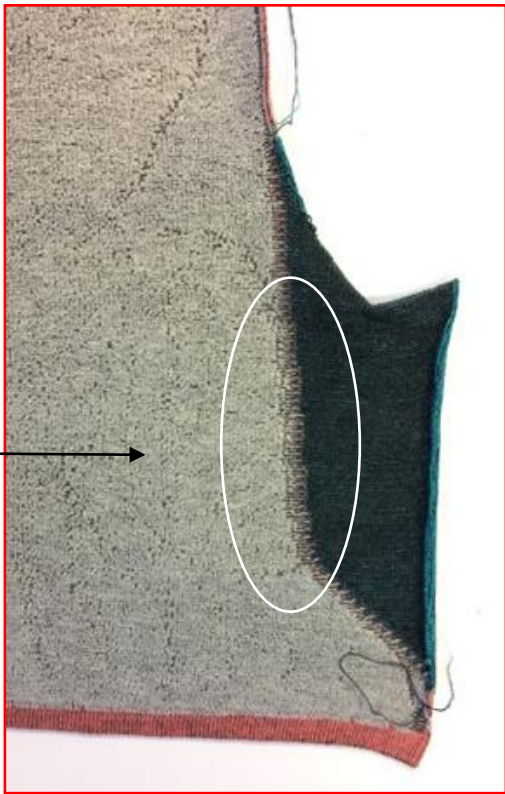


Figure 7-28: Resolution of combining the 'plated' and 'plush' panels (Lisa Shawgi, 2019).



Once the ‘plating’ and joining issues for the under arms were resolved, the next step was to incorporate openings to slide the magnets along the centre front of the cardigan on the front panels. The following figures showcase the Stoll software pattern and the development of the knitted samples.

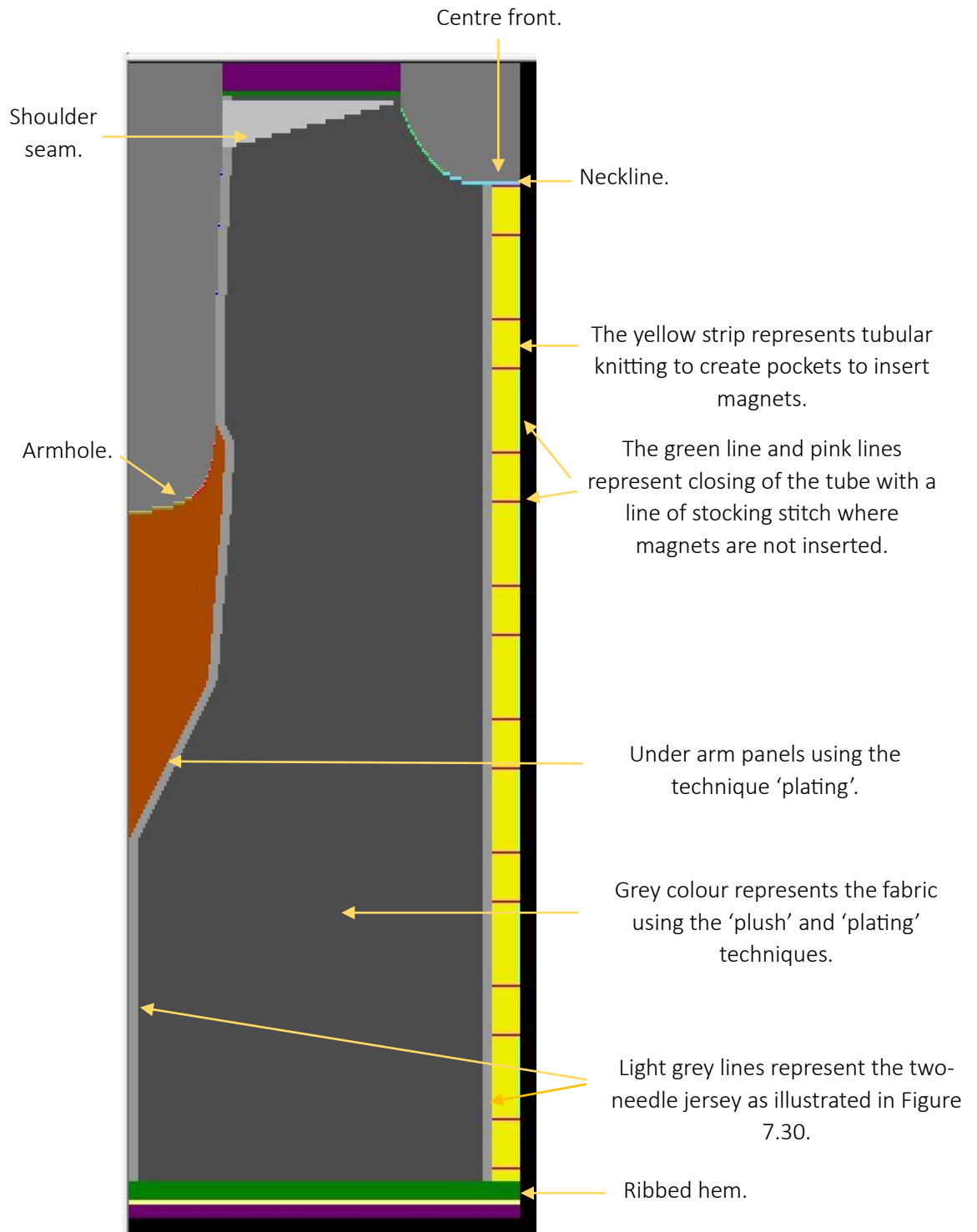
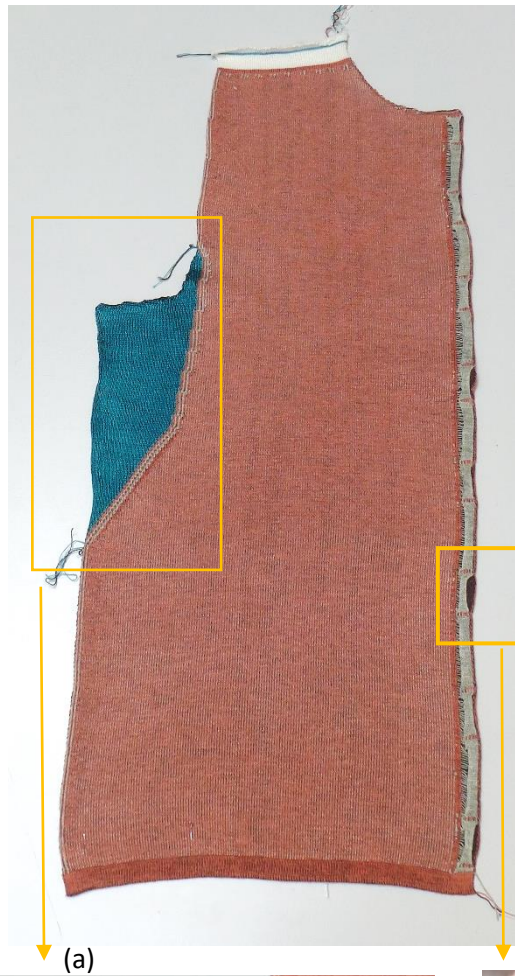


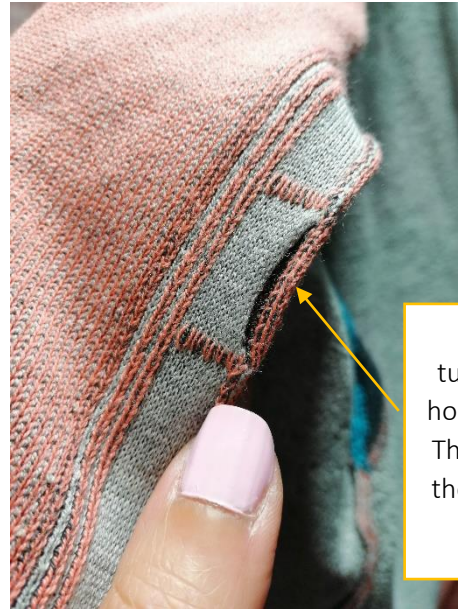
Figure 7-29: Stoll pattern for front left side panel (Lisa Shawgi, 2019).



(a)



(b)



Pockets using tubular knitting to house the magnets. The openings were then hand-stitched closed.

A two-needle jersey knitting technique for a successful join.

(c)

Figure 7-30: Image (a): knit side of front panel; Image (b): purl side of front panel; Image (c): detail showing opening created by tubular knitting to house magnets (Lisa Shawgi, 2019).

The next stage involved developing the sleeve panels. The Figure below shows the Stoll software development for the sleeve panel. Similar to the back and front panels, there were challenges with developing the sleeve panels to avoid striping, joining of the ‘plating’ and ‘plush’ techniques showcased in subsequent Figures 7.31 to 7.35. These are followed by figures demonstrating the creation of the collar. For a more detailed iteration on the development process, see Appendix 12. Once these elements were completed, the garment was joined together using a linker to join the side seams. Once the cardigan design was completed, before I continued to the next design, I decided to contact two participants to receive feedback on the features designed in response to insights produced from the research.

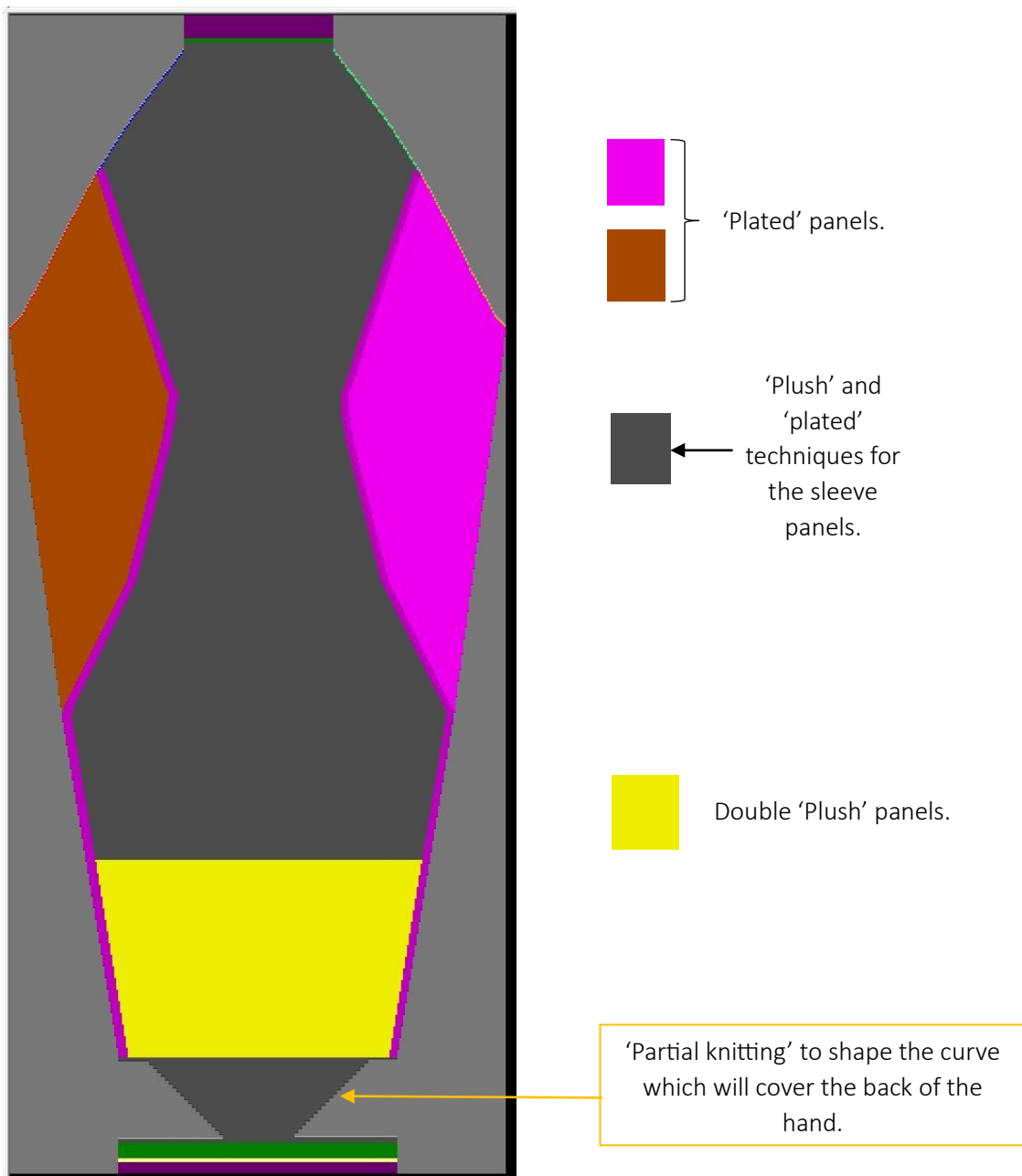
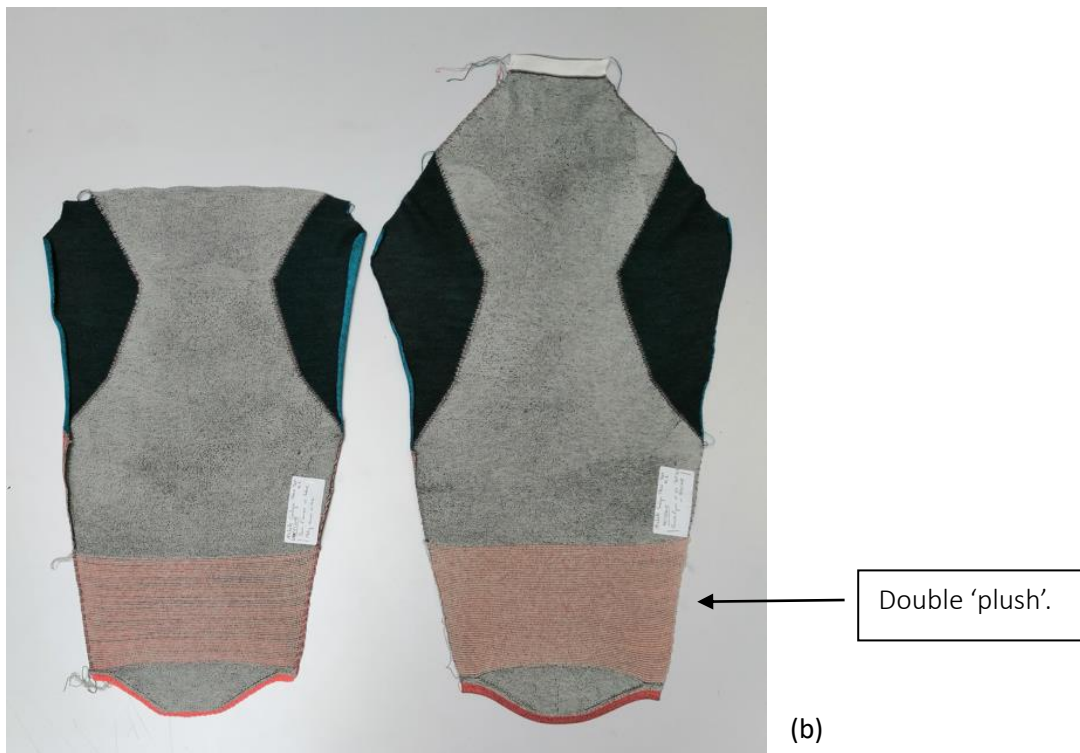
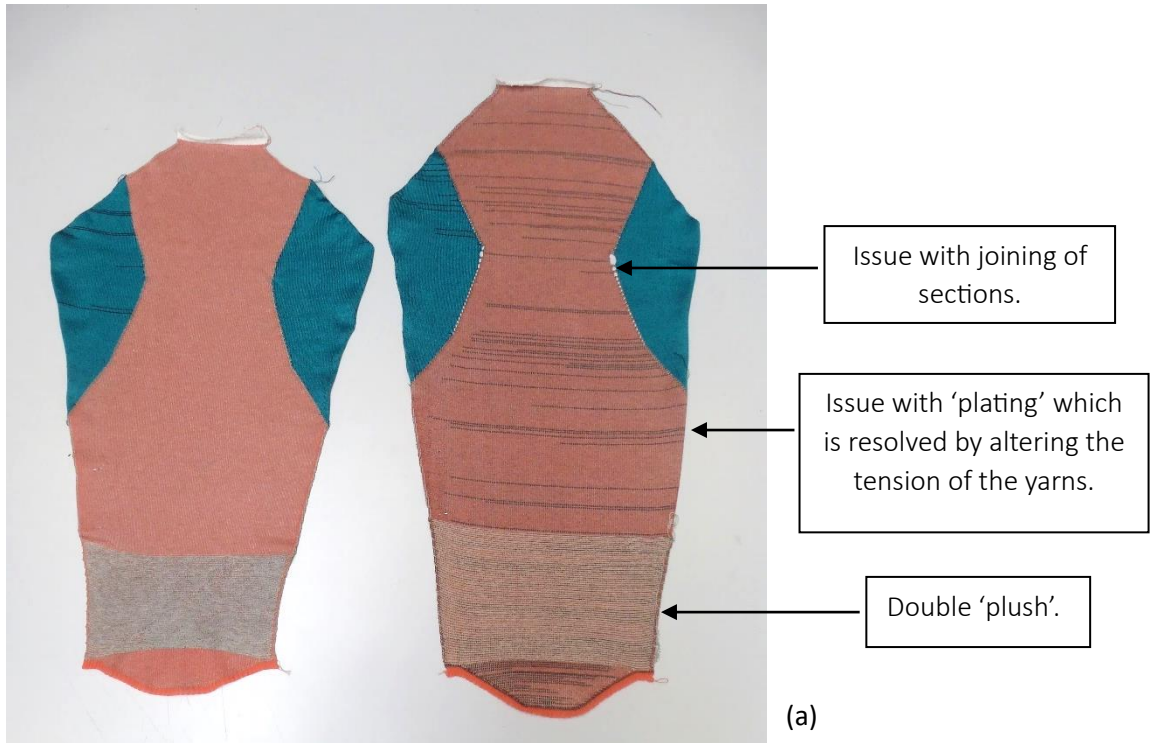
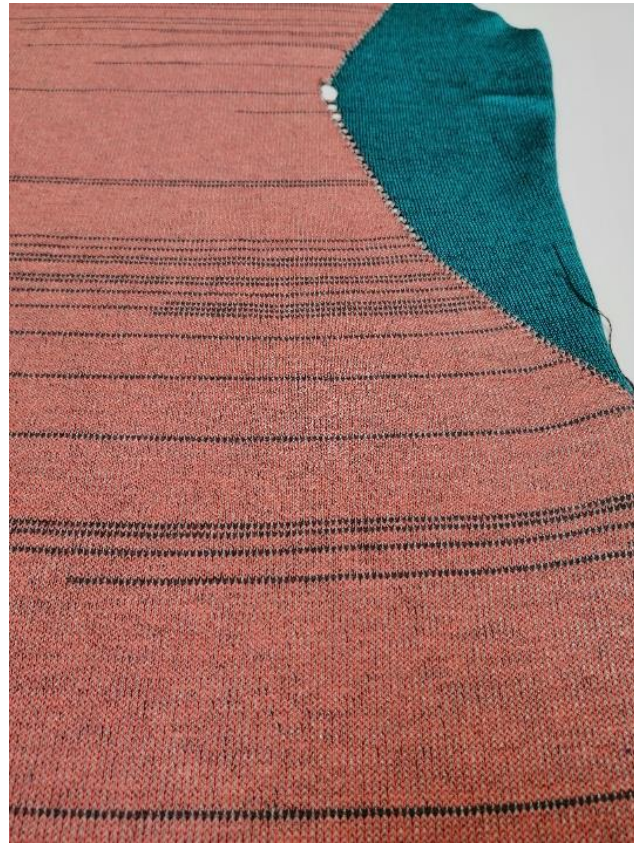


Figure 7-31: Stoll pattern for sleeve (Lisa Shawgi, 2019).



*Figure 7-32: Image (a): development of sleeve panel showing the knit side of the fabric; Image (b); sleeves showing the purl side of the sleeve panels (Lisa Shawgi, 2019).*

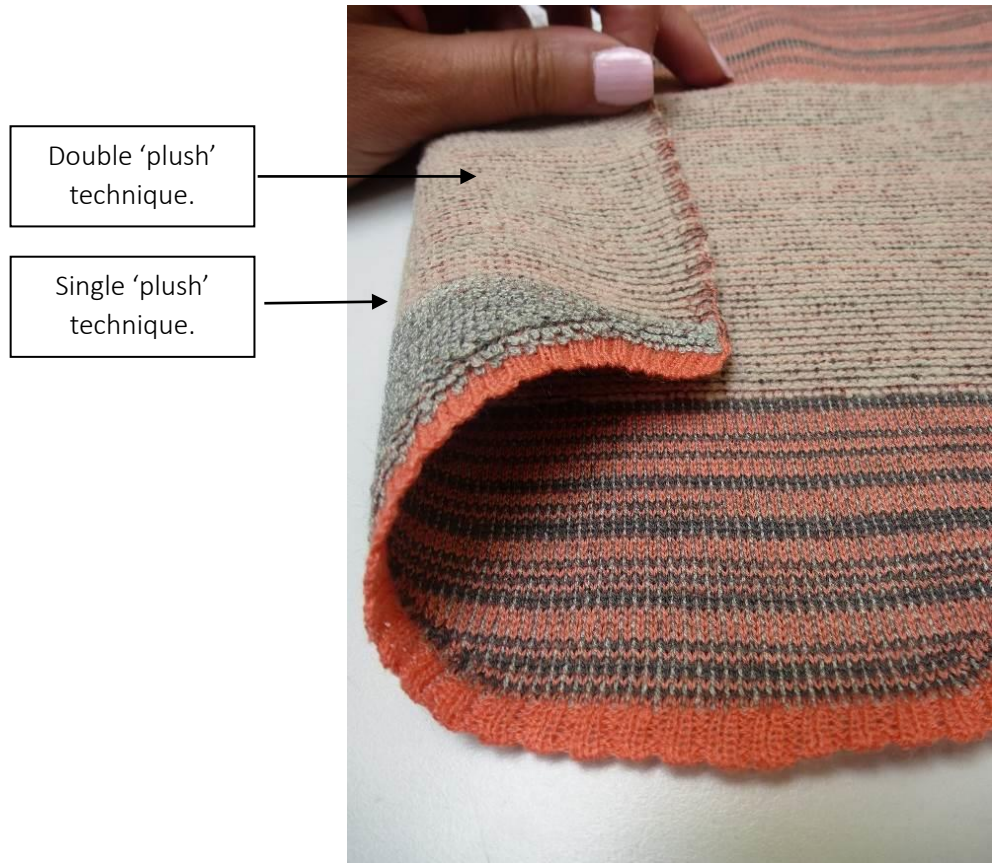


'Plating' issues  
on knit side of  
fabric.



'Plating' issues  
on purl side of  
fabric.

*Figure 7-33: Close up of joining and 'plating' issues (Lisa Shawgi, 2019).*



*Figure 7-34: Close up of bottom of sleeve cuff (Lisa Shawgi, 2019).*



*Figure 7-35: Extra length in the sleeve and curved hem of cuff to cover the back of the hand (Lisa Shawgi, 2019).*



(a)



(b)

*Figure 7-36: Image (a): Iteration of knitted collar for cardigan using 'double plush'; Image (b): images showing the collar folded down and standing up for extra neck coverage (Lisa Shawgi, 2019).*



*Figure 7-37: Michelle cardigan design (Lisa Shawgi, 2019).*

### **7.3 INTERIM REFLECTIONS**

In June 2019, the sock, jumper and cardigan designs were completed. Before moving forward, I decided to gain feedback from two participants to validate my interpretations of the data from the IPA interviews and focus group. I approached two participants: Mandy and Jessie, for the simple reason that they were readily available. Although the sample size was very small, the feedback from both participants offered insights into the level of success in developing designs to meet the physical and subjective attributes. An additional reason for receiving feedback at this stage, related to having this information to share in a paper I composed for the PLATE 2019 conference which took place in Berlin that year. The feedback below is from the recordings and notes recorded during the trying on session. These were about between 45mins and 1hr long.



Both women commented on the aesthetics, sensorial and functional qualities of the designs, describing the garments as warm but lightweight and flexible, making them comfortable to wear. They referred to the garments as stylish, yet very practical in the design detail of the sleeves and collars. Both women referred to the garments as “*feminine*” but “*practical*” as Jessie stated that the cardigan “*it’s practical, it traps heat, but it’s feminine*”. They appreciated design considerations to help with over-heating under the arms in the cardigan and were pleasantly surprised at how ‘cool’ they felt wearing the jumper with the viscose close to their bodies. Jessie commented that “*when I had it on the other way, a few minutes ago, I could feel myself getting warmer and warmer, now, I’m not feeling myself get hot*”.

Regarding the jumper design, Mandy requested to increase the size of the collar on the jumper, to add more coverage for the head, as it is a design feature she liked. Both women commented on how the magnetic closing feature on the cardigan would greatly help when their fingers are too cold to open and close buttons and zips. Mandy commented on the sleeve feature at the cuff, saying that “*the really cool part of that is the sleeves, and the way they just sort of like, they sort of mould to your hand, they’re not gonna get in the way, so you can still be practical, they’re not annoying and get in the way, I think this is a fantastic idea, it’s such a simple thing to like, just extend the sleeve down, but it’s so effective*”.

Because of Mandy’s shoe size being a little bigger, she didn’t try the socks for fear of stretching them out. Mandy did make a comment regarding the ‘plush’ sections saying that she was “*focusing on where you want the warmth to stay, what area of the foot you wanna keep insulated, I think that’s cool*”. Jessie was able to try the socks on and they were a good fit. The socks felt comfortable to wear around the toes and ankle for Jessie, and both noted the lace feature. Jessie remarked about the socks: “*They’re lovely actually, they’re not tight at all around here (toes), they haven’t felt, they’re not gonna fall down, and if I saw them in a shop, I would buy them*”. Mandy suggested a sock entirely knitted in the ‘plush’ fabric and longer in length, ideal for winter.

The feedback from the two participants provided validation for the design approach and concepts so far. Comments regarding the *Re-dress* capsule collection support a multidimensional approach when it comes to material experience, where design elements contribute to the wearer’s wellbeing in terms of physical and sensorial comfort, aesthetical pleasure and ‘feel-good’ factor such as feeling feminine but remaining practical. It indicates the level of success in enhancing positive and meaningful experiences designed from a human-centred approach for ‘Extraordinary’ living. The items of clothing reviewed by the

participants highlighted engagement in terms of choice and opportunity to develop appropriate design features for women living with Raynaud's, further. Furthermore, the approach to the design supports the claim of this thesis for a designer-consumer-manufacture paradigm as opposed to a designer-manufacture-consumer relationship, as it increases the level of success in a product.

From here, I moved on to part 2 of the designing and making activities where my focus was to refine the 'plush' fabric or develop an alternative technique that suited circular knitting. This was because at this stage, my intention was to create a pair of leggings, gloves and undergarments. All these items of clothing fit close to the body and so I looked to increase the level of comfort by constructing a seamless garment. This is a process outlined in the subsequent chapter, where I explain the creation of the leggings, gloves and undergarments using the design framework used to produce the sock, cardigan and jumper designs explained in this chapter. The chapter then concludes with reflections on feedback from six participants on the *Re-dress* capsule collection to support claims made by this thesis, before moving to reflect on the research project in the concluding chapter 9.

**CHAPTER 8: THE *RE-DRESS* COLLECTION: part 2**

## 8.1 INTRODUCTION

This chapter outlines part 2 of the *Re-dress* capsule collection, encompassing the leggings, gloves and two undergarment designs, predominantly composed of the knitting technique ‘floating tuck’ described in chapter 6, section 6.4.3. The process for the remaining designs followed the same design framework (explained in chapter 6, section 6.5) used for producing the sock, jumper and cardigan designs of part 1 of the collection, outlined in the previous chapter. I begin with how the ‘floating tuck’ technique was developed to create a fabric suited to circular knitting as well as holding thermal characteristics. This is followed by explaining the design development of the leggings, gloves and two undergarments. These sections are followed by a discussion using feedback from participants on the *Re-dress* capsule collection. The wearer evaluation of the designs unpacks insights from the women to discuss and support this thesis argument that clothing and textiles for ‘Extraordinary’ people must balance design elements for a multidimensional material experience to support and enhance wearers wellbeing and agency.

## 8.2 RE-DRESS CAPSULE COLLECTION part 2

In the next stage, I sought to refine the ‘plush’ technique to produce seamless clothing to enhance the comfort aspect desired by participants. I attempted to knit the ‘plush’ experimenting with a variety of elasticated yarns from the storeroom. Figure 8.1(a) displays knitting samples of the technique ‘plush’, knitted in a circular fashion on the Shima Seika. Once again, our attempts produced fabrics where the ‘plush’ protruded on the right facing side of the fabric (Figure 8.1(b)). We decided to move away from concentrating on resolving the ‘plush’ issue in circular knitting and sought to develop an alternative knit technique, which mimics the characteristics of ‘plush’: insulating, soft and comfortable. Figure 8.3 illustrates the ‘mock plush’ knitting technique produced on the Stoll ADF machine, a tucking technique to allow the yarn to ‘float’ between each needle tuck, which we referred to as the ‘floating tuck’ knit technique, shown in Figure 8.2. For each knitted row, the carrier tucks the yarn every fifth needle, selecting the first needle to tuck, working inwards on alternative needles, ensuring all needles hold a tuck stitch, before knitting an all-needle row. This process equates to six rows of knitting to produce one knitted course on the back bed, before moving to the front bed. Compared to the ‘plush’ technique, the ‘floating tuck’ technique

shares characteristics in that it feels soft and allows for a cushion affect. Additionally, the build-up of floating yarns provides an extravagance of fabric to aid in keeping warm. Furthermore, the ‘floating tuck’ technique allows for tubular or circular knitting, eliminating side seams. The effect is demonstrated in figure 8.3. With this technique developed, I wanted to use this to create a pair of leggings for the women, outlined in the next section.



(a)



(b)

*Figure 8-1: Image (a): shows sampling of the tubular ‘plush’; Image (b): is a detail of the challenges with this technique (Lisa Shawgi).*

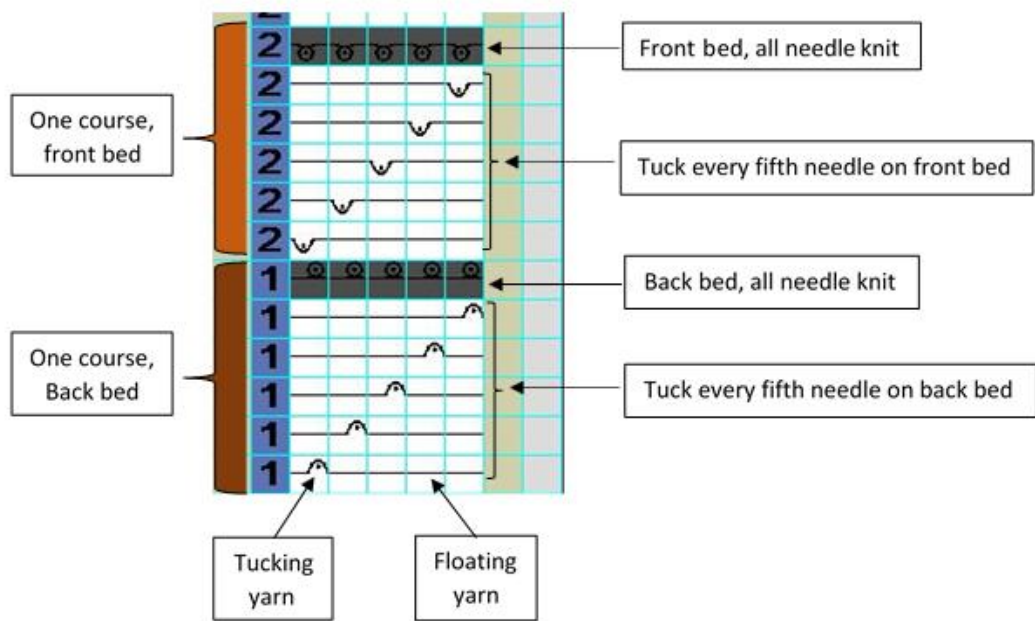


Figure 8-2: Stoll programme showing the 'floating tuck' technique in a tube (Lisa Shawgi, 2019).



Knit side of 'floating tuck' technique.



Purl side of 'floating tuck' technique.

Figure 8-3: 'Floating tuck' technique (Lisa Shawgi, 2019).

### 8.2.1 ALEX: shaped leggings design

#### Inspiration

As discovered in the women's testimonies, Raynaud's affects the entire body, and is not solely associated with the hands and feet. Jessie remembers her Mum taking her to the doctor when she was younger as her legs turned blue in wintertime when playing hockey in shorts and skirts explained in the quote below:

*"Yeah, when I was young, I remember my Mum taking me to the Doctors because my legs used to go blue, right, especially me knees, they, they would be literally, you know, a, a real blue colour, and um... when I was at school, we used to have to play Hockey in winter with like shorts and like a little skirt [laughs] I used to have like the worst legs ever, and um... but the Doctor just said it's bad circulation, and that was it, get on with it"*

(90-96)

Similarly, Valerie regaled us with her experience of the first signs of Raynaud's: *"I developed very, very cold shins, of all things, um, not, not in hands, not in feet, not in anything and I didn't know what it was"* (3-4). Leggings which are fleece-lined are the preferred casual garment for the legs. An example is Margaret's leggings seen in Figure 8.5. On a similar note, Mandy prefers leggings to jeans as *"they feel too tight, and they feel really restrictive"* (568). This is consistent with the women seeking more flexible clothing. But Mandy wears two pairs of leggings for warmth which makes her feel *"lame"* (567) as discussed in the theme *Make(ing) do*, chapter 5, section 5.2.2.2.

In addition to the aforementioned design issues, Valerie finds the seams of tights and leggings along the top irritates her toes and quite often turns her tights inside out, and comments how she does not know of any brand creating a sock shape foot section:

*"I wear these, these, um, thick tights, but ... because of the way they're made, I'm on this eternal battle, they have these horrible seams at the end, again these are, Oh, I wear them inside out, cos, it's, that's easier on the toes [...] nobody makes, um, tights, with what you might call a sock, but I, I wear them all the time, but I do find them uncomfortable, it's, it's, the one, they are the one bane of my life, I like them because, because the cotton is comfortable"*

(353-359)

Seams across the toes was an issue raised in the focus group. Carol avoids wearing tights and leggings due to the compression around her waist. Louise and Jessie mentioned wearing smart trousers but with heat-gen leggings underneath, and Jane wears thick leggings with thick socks underneath dresses and skirts.

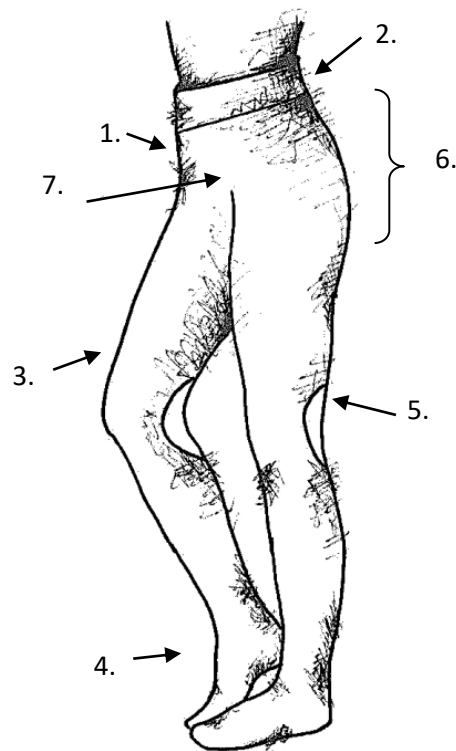
Based on the women’s testimonies, I decided to develop a pair of leggings as opposed to a pair of knitted trousers. These would use the ‘floating tuck’ technique developed to mimic the ‘plush’ fabric. The aim was to create a seamless design shaping the fit of the leggings for a more comfortable feel. I outline the details in the following section.



Figure 8-4: Image (a): sketchbook pages of participant’s clothing and market research; Image (b): Margaret’s leggings; Image (c): sketchbook of participant and market research on leggings (Lisa Shawgi, 2019).



## Intentions

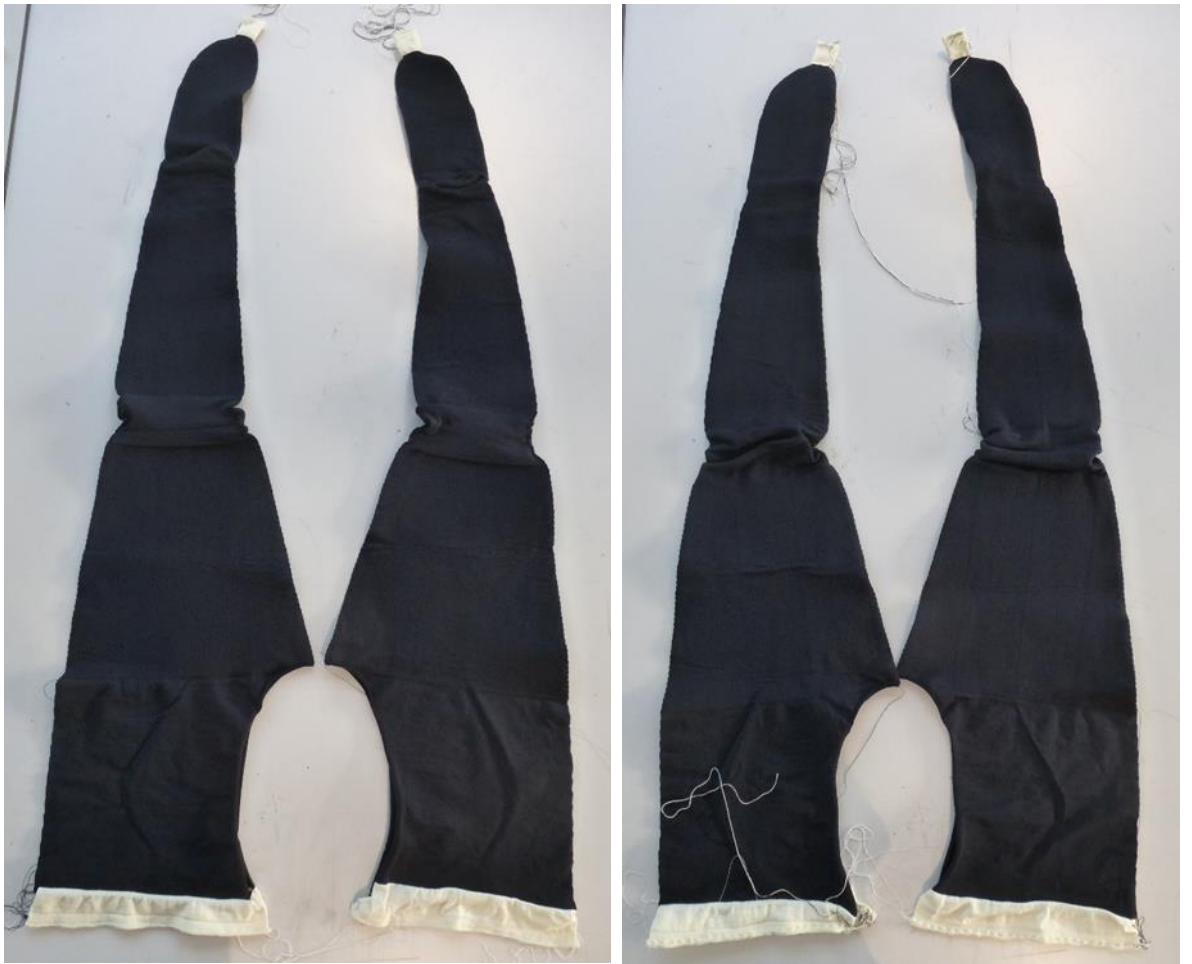


*Figure 8-5: Illustration of the leggings design (Lisa Shawgi, 2019).*

1. Develop the leggings using the ‘floating tuck’ knit technique for a seamless fit.
2. A wide band to be used around the waist for comfort, avoiding discomfort around the stomach area.
3. Shaping around the knees is required for added comfort and fit.
4. Remove abrasive seam around the toes and provide extra comfort by integrating left and right foot shaping into the garment.
5. Insert an elasticated panel behind the knee to remove excess fabric for a closer, comfortable fit.
6. The hip area contains no ‘floating tuck’ knitting so not to create bulk underneath clothing.
7. The pattern is fully fashioned using circular knitting to enhance fit and comfort.
8. For wardrobe flexibility, the leggings are knitted in a dark colour.

## Development

The knitting of the leggings was built up in stages to make it more manageable. The technician and I decided to focus on the foot area and began with a sock sample. This was followed by adding the calf area up until the knee, then working on the knee region, followed by the thigh area and then the hip region. As the design developed, the legs needed to be knitted separately (Figure 8.6) for a better fit around the groin and waist areas as outlined further along the discussion.



*Figure 8-6: Knitted panels for Alex (Lisa Shawgi, 2019).*

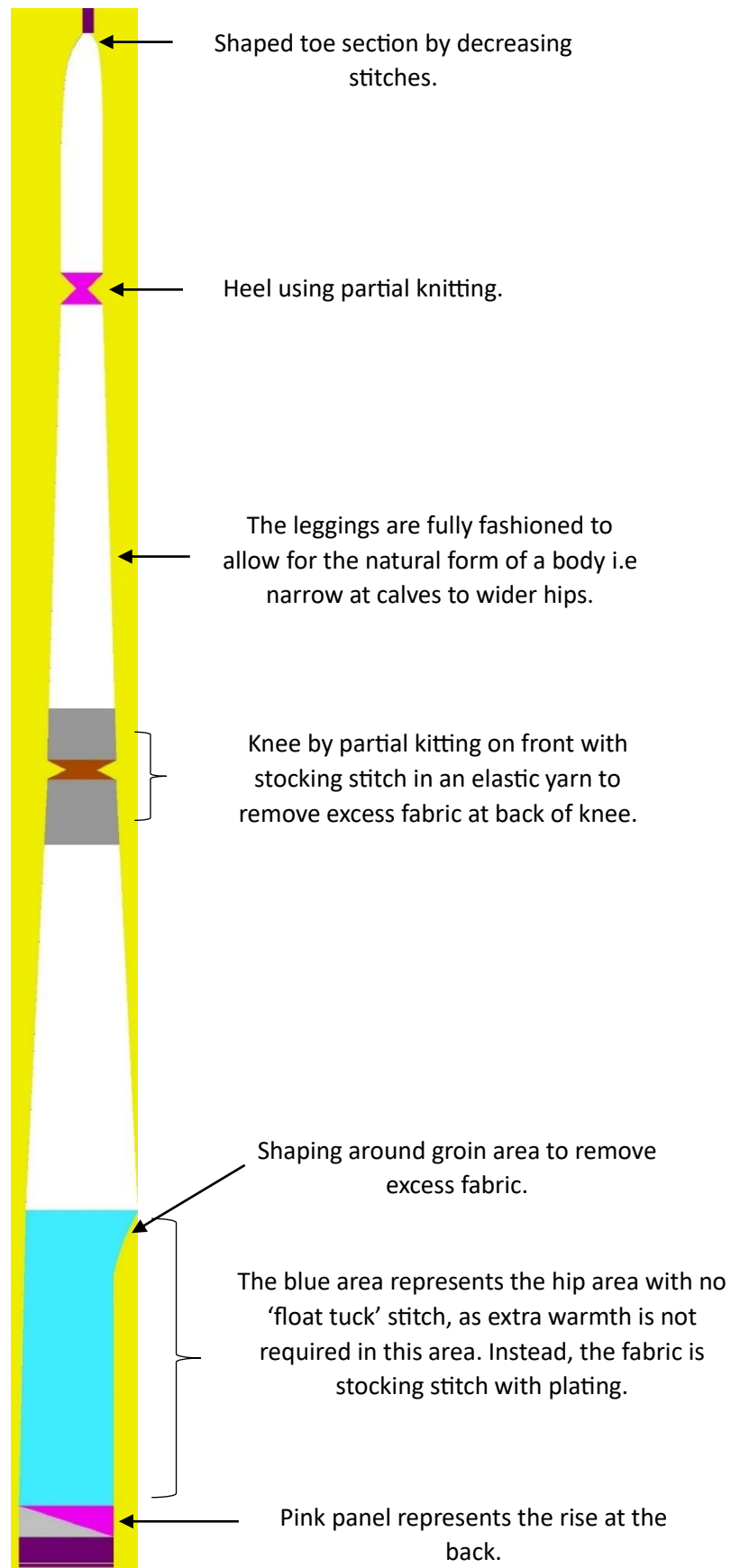


Figure 8-7: Stoll programme demonstrating the make-up of each panel of the leggings (Lisa Shawgi, 2019).

Figure 8.8 is the development of the leggings design from right to left, progressively building each design element. Please note that these are miniature in size for the purpose of saving yarn while testing. No.1 shows the right facing side of the ‘floating tuck’ fabric, portrayed in Figure 8.9(a). Stage No.2 encompasses the heel, which is knitted on the side of the tubular panels, to avoid knitting issues, such as building up of fabric on the machine if the heel were to be knitted in the middle of the panel. Stage No.3 shapes the toe section, later rounded into a curve, as seen in Stage No.4.

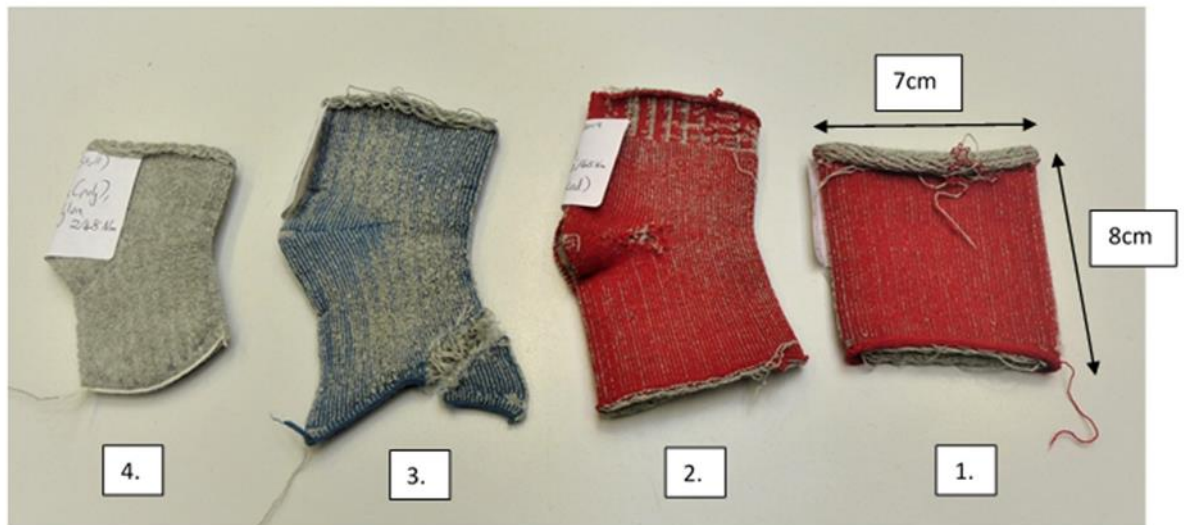
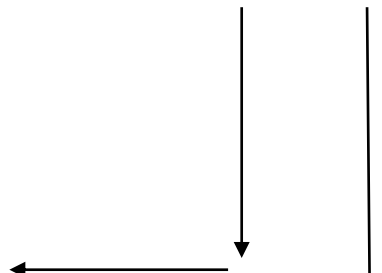
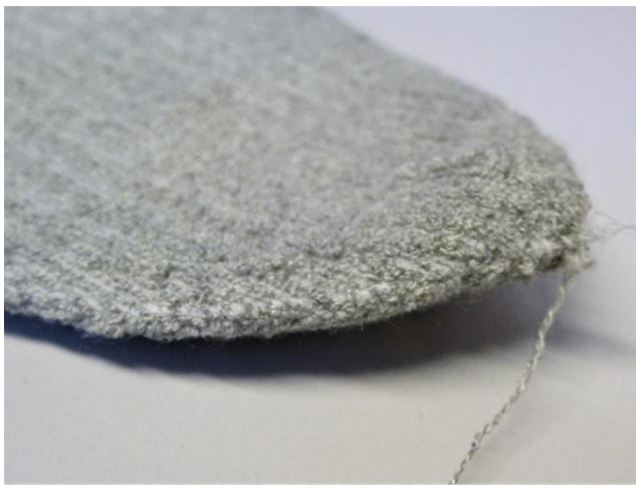
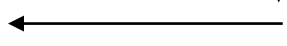


Figure 8-8: From right to left, image shows the early stages of legging fabric development (Lisa Shawgi, 2019).

Figure 8.9 depicts the shaping of the heel and toe sections. Figure 8.9(a) shows the toe section knitted with a bind off technique, while 8.9(b) is shaped by decreasing stitches to a point. The bind-off produces a slightly raised edge compared to the edge seen in Figure 8.9(b), which is the favourable finish. Decreasing adds to the aesthetics of the garment and avoids possible irritation of a raised ridge against the inside of a shoe. However, knitting the heel on the side of the sock panel, rather than in the middle, requires the shaping of the toe seam to run along the bottom and top of the foot (see Figure 8.10(a)). Additionally, the toes felt compressed when I tried them on. Therefore, I decided to test knitting the foot section of the leggings with the heel in the centre of the panel. Due to tucking occurring on the needles along the edge with the circular knitting crossover technique, it was closing the side of the fabric where the seam would be, creating a ridge, as seen in Figure 8.10(b). This was later resolved with carefully selecting needles for tucking to avoid cross over.



(b)



(a)

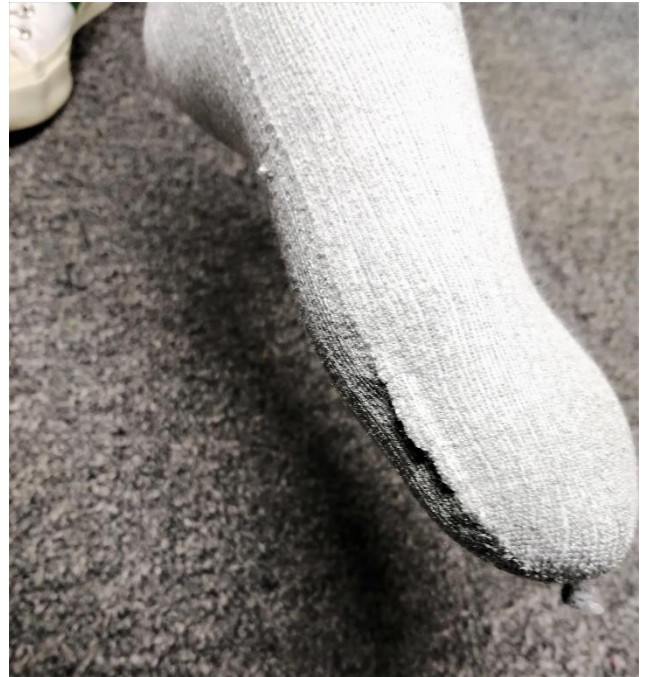
*Figure 8-9: Shaping the toe and heel section. Image (a) depicts the shaping of the toe section by decreasing stitches to a point; and image (b) shows the bind-off outcome of the toe section (Lisa Shawgi, 2019).*



(a)

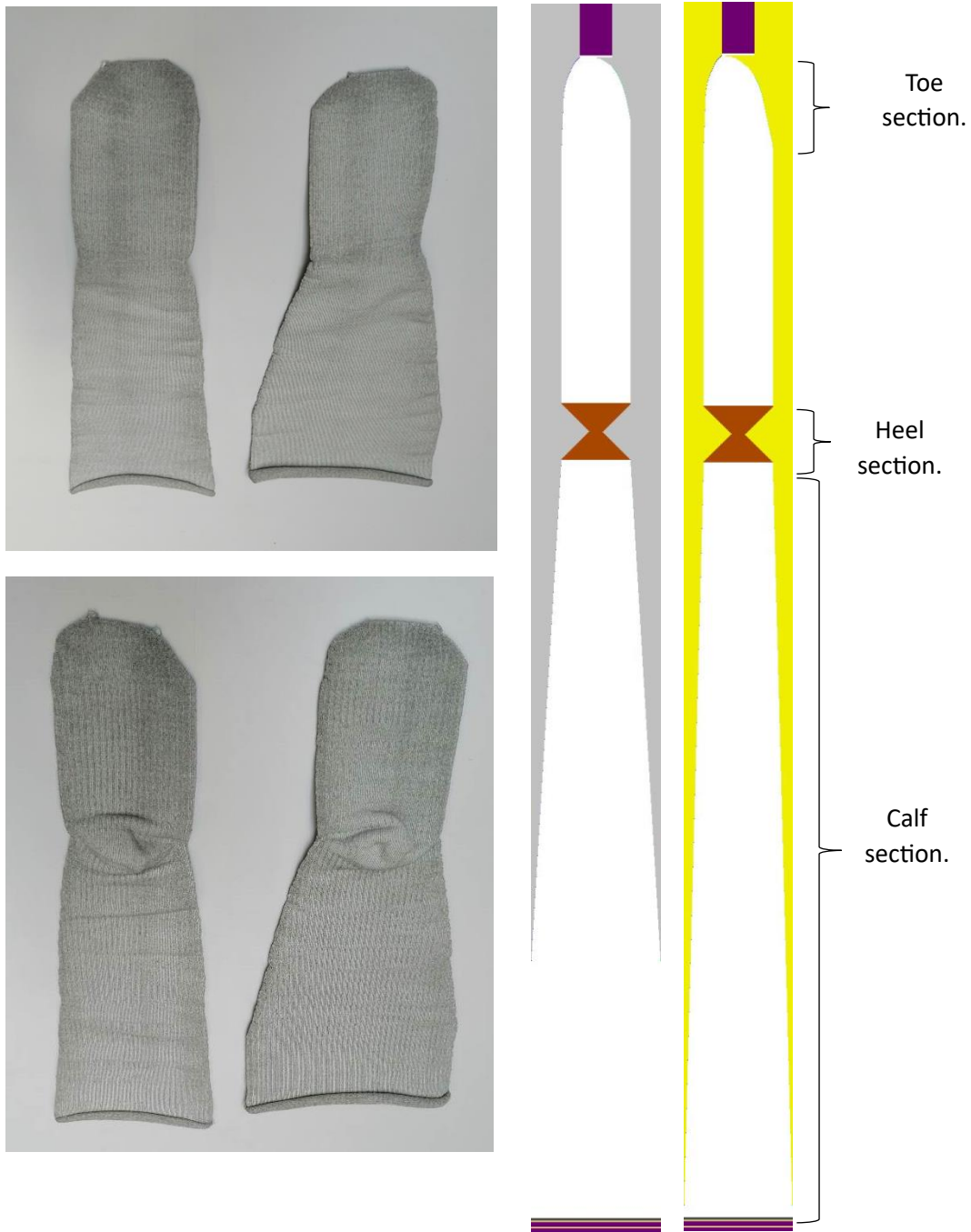


(b)



*Figure 8-10: Testing the comfort of the toe seams. Image (a) shows how the sock with the heel knitted on the side of the panel; and image (b) is where the heel is knitted in the centre of the panel (Lisa Shawgi, 2019).*

The following sections explain the building of the calf and knee sections. Building the calf region was uncomplicated as it required the increase of stitches each side. Adjustments were made as to how many stitches needed taking away along the way until the fit around the lower leg felt comfortable and fitted.



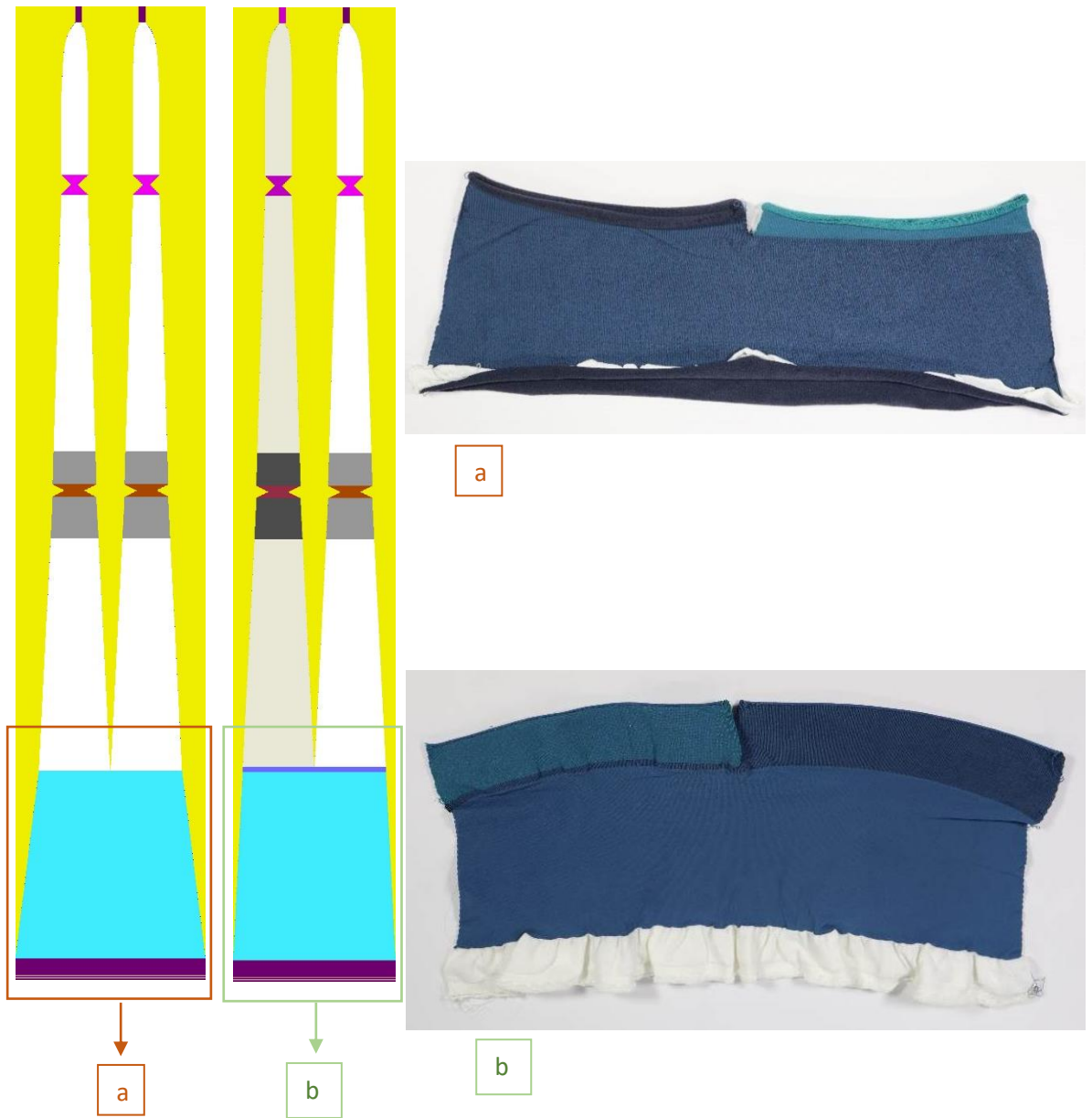
*Figure 8-11: Shaping the calf section (Lisa Shawgi, 2019).*

The next step was building in the knee and thigh area up until the groin. Figure 7.12(b) shows the elasticated fabric positioned behind the knee. The logic for this is to create a more comfortable fit around and to add fabric to the front similar to the heel area. The technique used was partial knitting and Figure 8.12 shows the testing of shaping the knee. The following Figures 8.13 to 8.14 show the development of the hip area.



*Figure 8-12: Iteration of knee section using 'partial knitting' (Lisa Shawgi, 2019).*





*Figure 8-13: Image (a): shaping of fabric by increasing needles using the 'plated' technique; Image (b); shaping of hip area by removing excess fabric and using single jersey with Lycra to pull the fabric in for a closer fit (Lisa Shawgi, 2019).*

The development of the hip area created excess fabric which could not be removed without shaping the section individually as seen in Figure 8.15. This allowed more control over producing a shape for a more comfortable fit for the body.



(a)



(b)

*Figure 8-14: Image (a): from left to right shows the front side of the development of the leg panels for the leggings; Image (b): the back facing side of the leggings and (a) illustrates a section which needed re-shaping for a better fit around the waist (Lisa Shawgi, 2019).*

In Figure 8.14 above, and Figure 8.15 below, section (a) is an area which needed further shaping along the hip line for a better fit. There was a lot of fabric remaining around the waist which needed removing. Another iteration of the leggings was created, and this time both leg panels were fully knitted to sew the entire garment together and insert an elastic band. This would allow the leggings to be worn to analyse the overall fit before making further alterations. Due to Covid-19, I could not gain access to linking equipment at NTU, so the leggings were handstitched together and the top section was folded inwards to create a tube to insert a wide elastic band. When the leggings were put together, there was excess fabric which needed removing for a better fit. Additionally, the rise at the back needed adding to for better coverage and comfort. The ‘floating tuck’ technique was successful during circular seamless knitting, and for this reason, I decided to use it for Sandy, the glove design.



*Figure 8-15: Image (a): detail showing the need for the removal of more fabric alongside the seam of hip and waist areas; Image (b): detail showing rise of leggings; Image (c): detail image showing excess fabric which needed removing (Lisa Shawgi, 2023).*



*Figure 8-16: Alex, leggings design modelled by a Raynaud's sufferer (Lisa Shawgi, 2019).*

## 8.2.2 SANDY: seamless glove design

### Inspiration

One of the most painful symptoms the women struggle with is the level of cold that their hands reach. Additionally, the warming process is equally painful and prevention is key. And so, gloves are a staple item in the women's wardrobes, even during summertime. Unfortunately, 'conventional' gloves are not always successful in keeping the women's hands warm. Jane discloses this issue by explaining that *"to be honest like I never found a pair of gloves that work for me, that's the problem as well, so I'm a bit sceptical about the gloves thing um like even the mittens"* (203-204). Jane's scepticism perhaps stems from her experience of nothing working and being constantly told to wear her gloves. It suggests a reaction of 'What's the point if they don't work fully?' Perhaps it is a sense of frustration of not finding a pair of gloves suited to her condition. This is an experience shared with the other women, a sensation that Louise paints a picture of when a newly purchased pair of gloves seem promising:

*"At first you're out, you must know the sensation, you're walking along and you felt 'oh this is good [laughs] these are gonna work', and then half an hour in you start feeling that feeling of, of your hands getting cold. I don't know if it's the same for you? once they're cold, they're cold, there's not really an option then, there's no turning back until you get that bit of warmth"*

(453-456)

As understood from the theme of constantly searching for a second skin in chapter 5, section 5.2.2.3, Louise and the women have been on a neverending mission to acquire gloves which help to maintain their warmth. And while this search is being continued, 'conventional' gloves do help to some extent as Margaret explains and so are necessary to their attire: *"I don't even go without gloves, I'm so afraid of, of my hands react, they still react with the gloves on, but if I went without gloves, it would be much quicker, cold instantly and then they are not coming back"* (247-250). Similarly, Brenda described how the gloves she has tried *"don't particularly work [...] it's one of those things, I won't give them up just in case"* (117-118). This frustration has moved Mandy to almost give up wearing gloves, as she explained that even if the gloves are *"quite thick and it'll happen like a few fingers will lose consciousness [...] even if I have gloves on so I've kind of stopped wearing gloves now and*

*I'm just aware that if I feel something happening with my fingers I'd put them in my hands in my pockets or I'd move them around to make sure that the circulation is you know there*" (53-56). To return the hands to a comfortable temperature, the women place them under warm water or on a radiator. The women do need an external heat source as their body cannot produce it. This relates to my experience of the focus group discussed in chapter 1, section 1.3.3. Cheryl emphasises this fact that she is now unable to function without constant heat applied to her hands: *"I read about people having episodes of Raynaud's, for me it's just a constant thing, um... without extra heating, my hands will go"* (127-128).

To discover a pair of gloves that work, the women experiment by applying the layering technique, combining *"this fabric with that fabric, maybe that'll work [...] that works for keeping heat in, but [...] lose the mobility"* (Daisy, 189-192). However, wearing several layers often means loss of dexterity. Flexibility is important for the women and that is why knitted fabrics are the preferred choice. Jessie described an occasion when her husband bought thermal-lined leather gloves *"but they were no good because they almost cut off my circulation, so really, just ordinary woolly gloves, or mittens, where I can wriggle me fingers all the time"* (71-73). Moving the fingers naturally keeps your circulation moving. Louise conveys this aspect, that *"I curl my fingers into my palms inside my gloves and just, just squeeze and try and get the aaa... the valves and things in the aaa... veins working it, it helps [sighs] it doesn't really help, but it feels as though it helps a bit"* (121-123). They use other kinds of movement, include rubbing and shaking of the hands to encourage circulation.

There are several other issues with 'conventional' gloves. Daisy describes issues with cuffs: *"cos they have that like ribbed, um, cuff, and it would end up restricting blood flow to my hands, so it did more damage than good"* (129-133). Seams cause discomfort as we discovered when Sandra relayed her experience with finding gloves with seams on the outside:

*"if I, if we're going to the store, um, or leaving the house, I have a pair of dress gloves that I found, and the reason they're nice is because the other issue I have, is the seams, of gloves [...] I take them off and I got all these marks on my fingers, where these dress gloves that I found, the seams are all on the outside, so it's nice I don't have to deal with that"*

(261-268)

Similar to seams in socks and leggings, seams can often cause discomfort when the body is cold, or when the wearer is suffering with chillblains. There is potentially another reason why Sandra prefers the seams on the outside: it is so the marks don't add to the visual effect of Raynaud's by causing indents in the skin. At pre-diagnosis stage, some of the women often wore gloves to hide their skin disorder, without realising that it helped them physically. Quite often people comment on discolouration of the hands and at times it turns into "*an ongoing joke at lunch time that my hands looked like a corpse [laughs]*" (Daisy, 6). Brenda describes how she gets a sense of how people "*they just look at you as if you're some sort of freak*" (361-362). For this reason, Jessie prefers black gloves which don't stand out as she offered us a childhood story: "*I, I can remember the first time I had Raynaud's, my Mum bought me some pink gloves and... I'd go out and I'd feel like everybody is looking at my pink gloves [laughs] it's just so nice to blend in with black gloves*" (525-530).

Related to this, Brenda refers to how through her research online, she read "*that keeping your wrists warm, can help the Raynaud's, well, gloves generally all stop there*" (165-166). An additional element the women find helpful, is a touchscreen feature. Without this feature, Louise refuses to answer her phone: "*I have my phone for emergencies, but anybody rings me I just ignore it because I'd have to take my hand out of my glove*" (46-47). I am reminded how Mandy chose to listen to music over her health:

*"I like to have my music on, and you can't, you can't get to your music or use the touchscreen if you've got gloves on, so I know you should really choose your health over everything, but you know, it's ... sometimes you don't"*

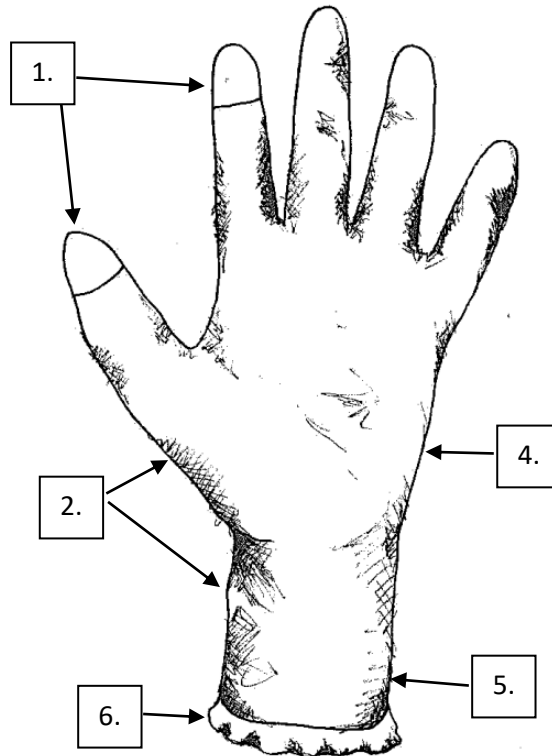
(283-286)

Sometimes it is the experience of enjoyment that overcomes the prospect of potential damage. Without having the freedom to answer one's phone or seek joy while walking can be quite isolating and affects the women's agency as highlighted in chapter 5, section 5.2.3.3 under the theme *Gaining agency through material experience*. For the pair of gloves design, I wanted to incorporate touchscreen features, use the 'floating tuck' technique for warmth and a seamless fit, extend the sleeve to cover the wrist area, and decided on selecting a dark colour for subtlety.



Figure 8-17: Sketchbook pages showing an assortment of participant's gloves and their testimonies (Lisa Shawgi, 2018).





*Figure 8-18: Specification drawing of the gloves (Lisa Shawgi, 2019).*

## **Intentions**

1. Incorporate touchscreen features.
2. Circular knitting to remove seam irritation.
3. The elastic will help with keeping the shape of a fitted glove, so the item does not become baggy.
4. Use 'floating tuck' technique for thermal comfort.
5. Elongate the gloves to cover more of the wrist area.
6. Replace a ribbed hem to avoid tightness with a scalloped lace trim.

## Development

The ‘floating tuck’ technique was used to develop the fabric for the gloves (see Figure 8.19). This allowed for the gloves to be knitted in a seamless circular fashion. Each finger was knitted separately on the machine using the technique ‘partial knitting’. The carrier started with the baby finger and once that was knitted, the finger was held on the machine, and the carrier then moved to knit the next finger until the index finger was completed. The machine then joined all fingers, before moving on to knit part of the palm of the hand until the thumb section was reached. The thumb was knitted before completing the hand region, followed by the wrist area, as shown in Figure 8.20.

Figure 8.21 shows the iteration of the knitted gloves with the Stoll pattern. Once the shape and fit were solved, a copper yarn was knitted into the tips of the index finger and thumb for the women to use their touchscreen phones as shown in Figures 8.22 and 8.23.



*Figure 8-19: Inside of glove showing the ‘floating tuck’ technique (Lisa Shawgi, 2019).*

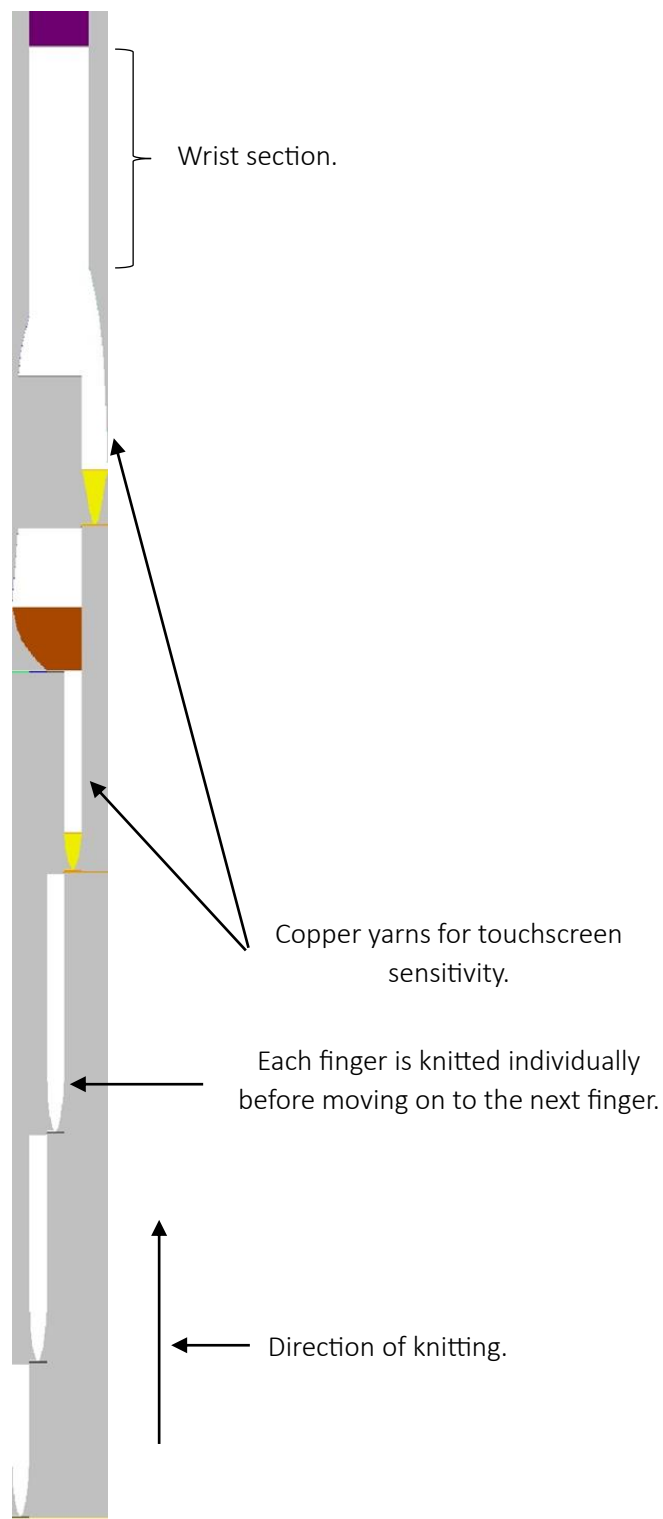
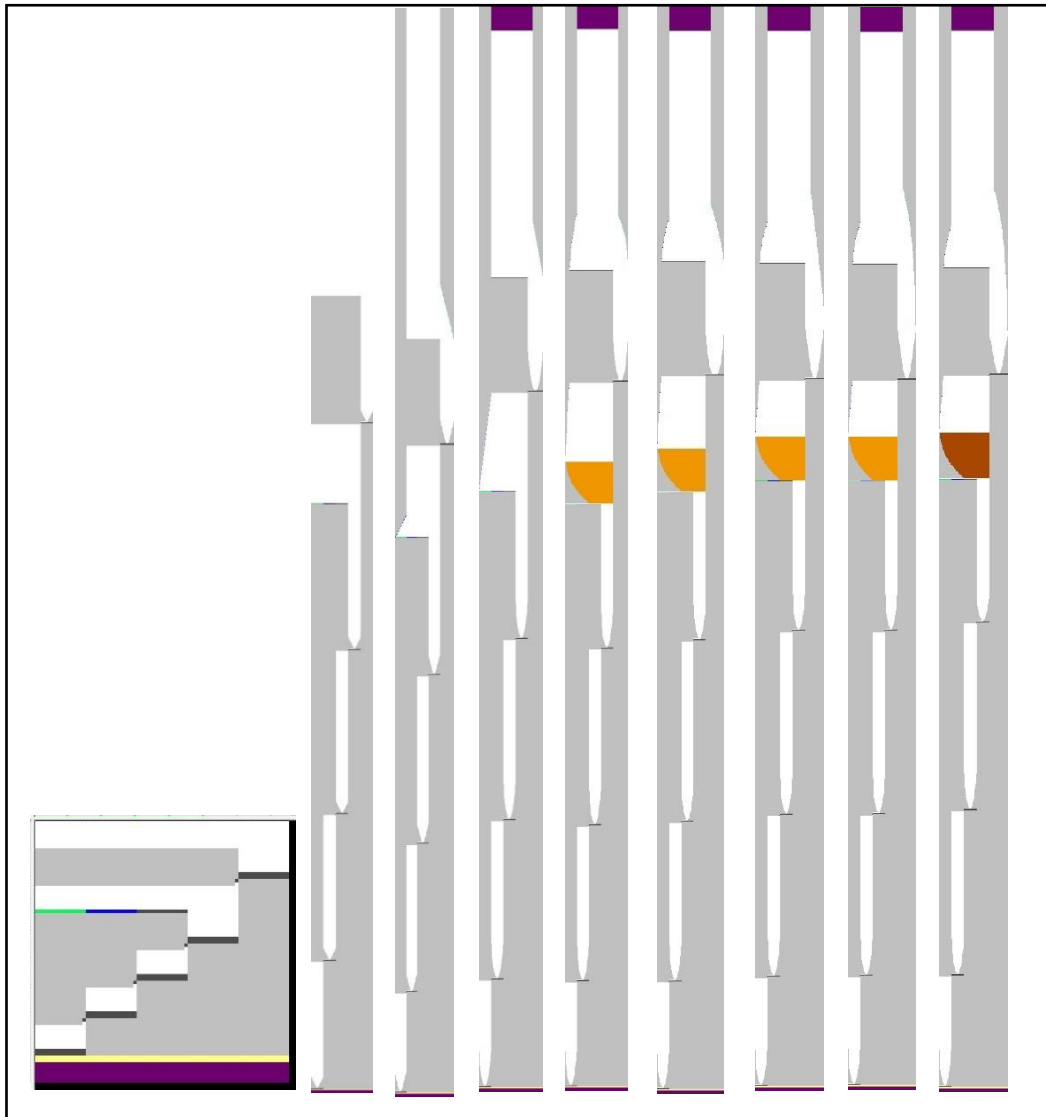


Figure 8-20: Stoll pattern for gloves (Lisa Shawgi, 2019).



(a)



(b)

Figure 8-21: Image (a):from left to right, iteration of glove pattern.; Image (b): Stoll patterns of knitted samples, (Lisa Shawgi, 2019).

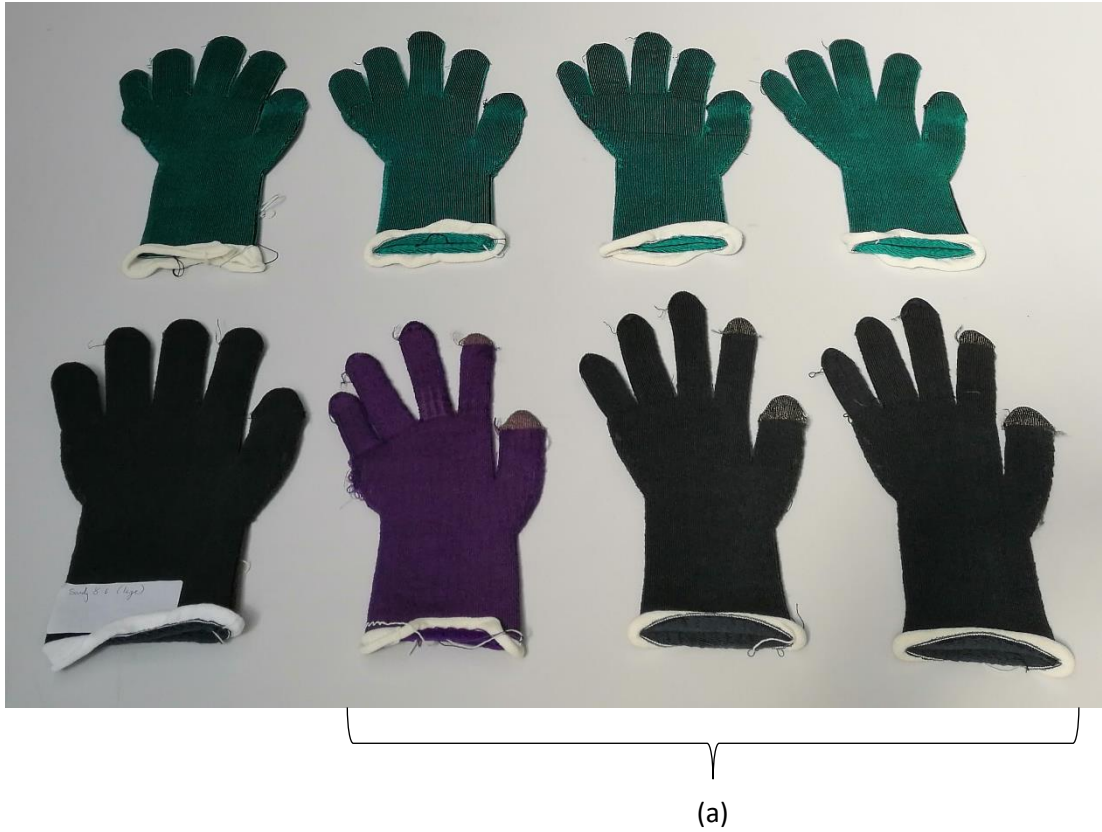
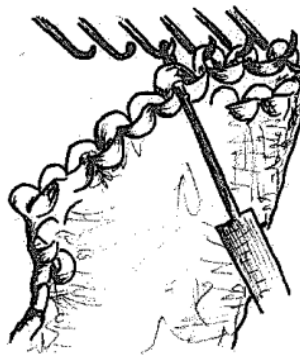


Figure 8-22: From left to right, iteration of shaping gloves. (a) shows samples incorporating the copper yarn on the tip of the index finger and thumb, (Lisa Shawgi, 2019).



Figure 8-23: Close up of the inclusion of the copper yarn into the tips of the index finger and thumb for a touchscreen design feature (Lisa Shawgi, 2019).

Due to the Covid-19 lockdown, the trimmings for the hem of the gloves were knitted using the fine gauge Silver Reed domestic machine, as this was the only machine that I had access to. I did not want a ribbing trim and wanted to knit a scalloped edge for some delicate detail. I did this by hooking the loops along the hem of the glove onto the machine bed, as seen in Figure 8.24. I then knitted a scalloped edge before casting off as shown in Figure 8.25. Although the Silver Reed is a fine gauge machine, placing the hem onto the needles meant stretching the hem line of the glove as it was a finer knit. This produced more of an open fabric than I would have preferred as seen in Figure 8.25, because there could potentially be an issue with catching the trim and pulling the yarn out of shape. The reason for the more open knit was that the yarn used was too thin for the Silver Reed machine. Another issue was that the trim rolled once off the machine and the hem shrunk back to its original form leaving the hem to roll as seen in Figure 8.26. For the second type of trim, I doubled the yarn up and used single jersey. It was more successful as shown in Figure 8.27.



*Figure 8-24: Illustration showing hooking a knitted fabric up onto the bed of the machine (Lisa Shawgi, 2020).*

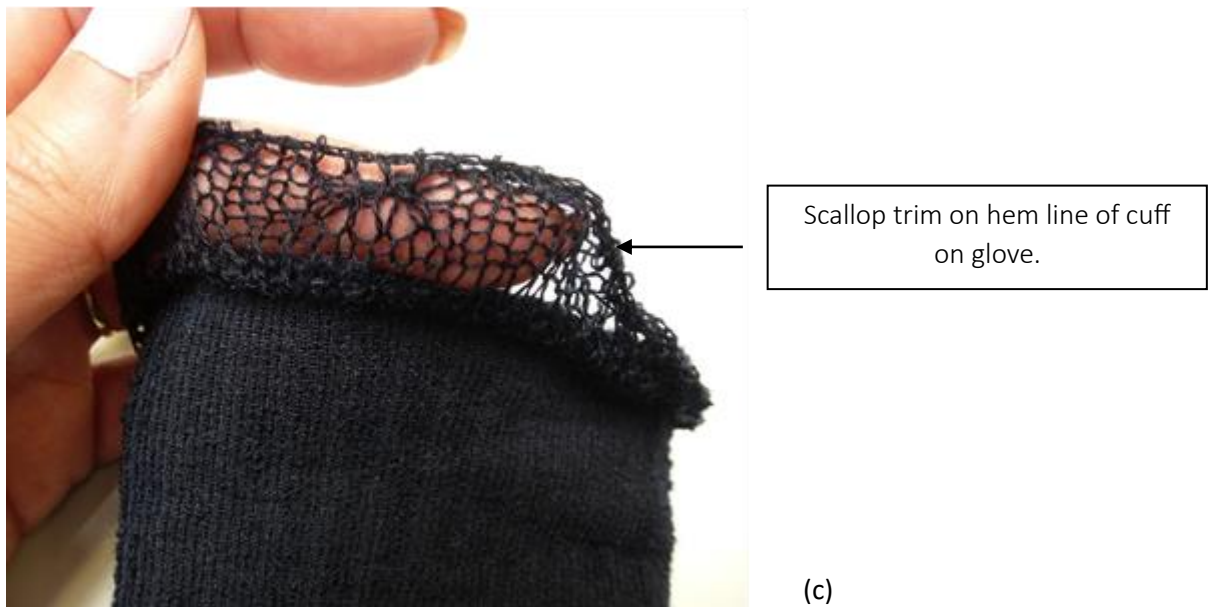
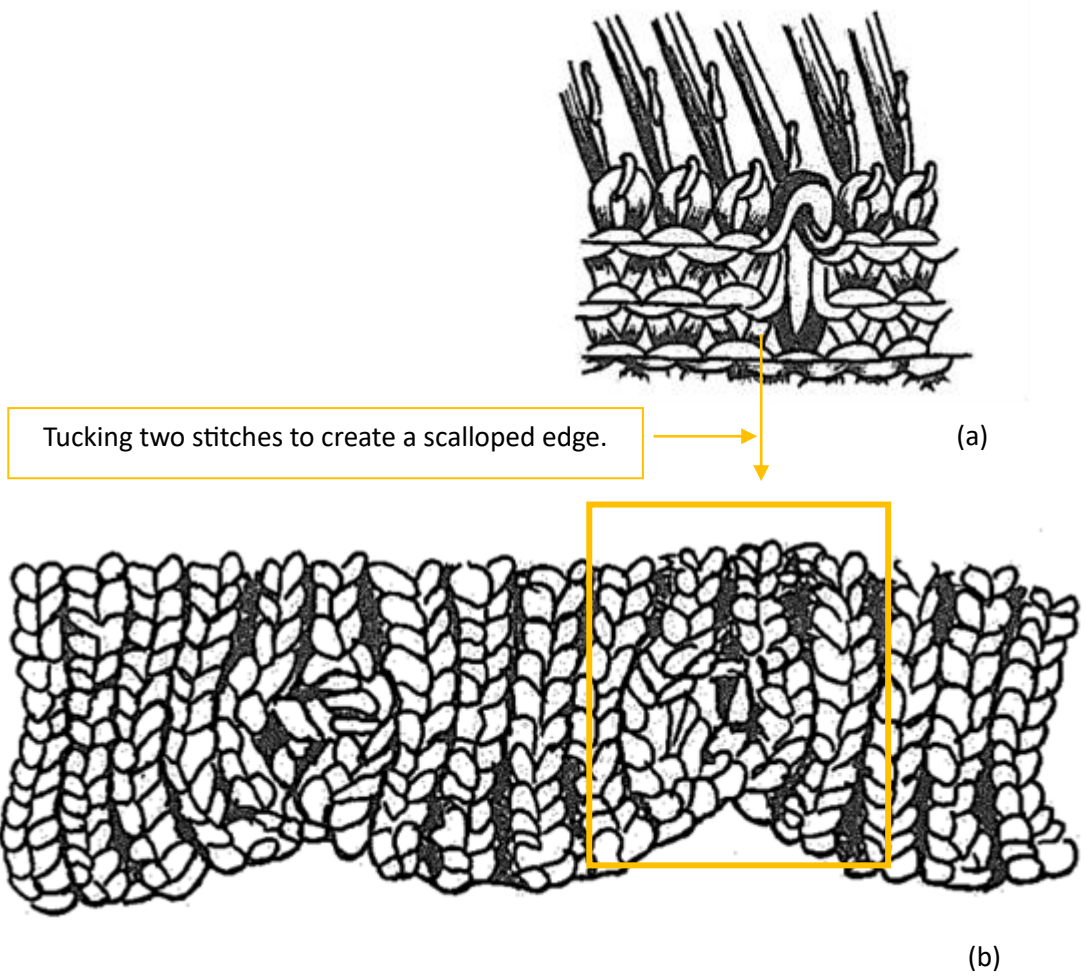


Figure 8-25: Image (a): illustration of tucking a stitch; Image (b); scalloped trim; Image (c); close up of trim on glove (Lisa Shawgi, 2020).



*Figure 8-26: Image demonstrating the rolling of the cuff (Lisa Shawgi, 2020).*



*Figure 8-27: Image of trim knitted in single jersey and doubling up of yarn (Lisa Shawgi, 2020).*





Figure 8-28: Sandy, glove design (Lisa Shawgi, 2023).

### 8.2.3 BETH & CINDY: sweetheart cameo design

#### Inspiration

A key element in layering is wearing thermal under vests to keep the core of the body warm. Sandra was sceptical at first when her health practitioner recommended keeping her core warm: *“keep your core body warm is the biggest thing that they always told me, and in the beginning, I didn’t think that worked until I found these fleeces, fleece jackets”* (306-307). Since Sandra took on board this suggestion, she discovered that it encourages blood flow to the extremities. On a similar note, Daisy expressed that *“if I have enough clothing on the torso to warm me up, then I feel like I need less clothing on my hands, and so that’s another way that I’ll try to give myself functionality”* (300-305). Carrying out tasks is challenging wearing gloves. So Daisy and the women try and keep the rest of their body comfortable. Doing so can help ease the hands by encouraging blood flow to the extremities. It connects to the ‘flight-or-fight’ response, which is over-reactive in people living with Raynaud’s, as discussed in chapter 1, section 1.2.

Due to Raynaud’s affecting the women every day, they prepare by carrying several layers with them. *“I kind of take stuff out for any eventuality, [in] my bag, I carry a big black bag,*

*I have [laughs] cos it fits my little jacket in, that puffy one, um... and I can have me cardies and my hat and my gloves and...*” Jessie (617-619). For example, Louise carries an extra under layer as mentioned in her testimony below:

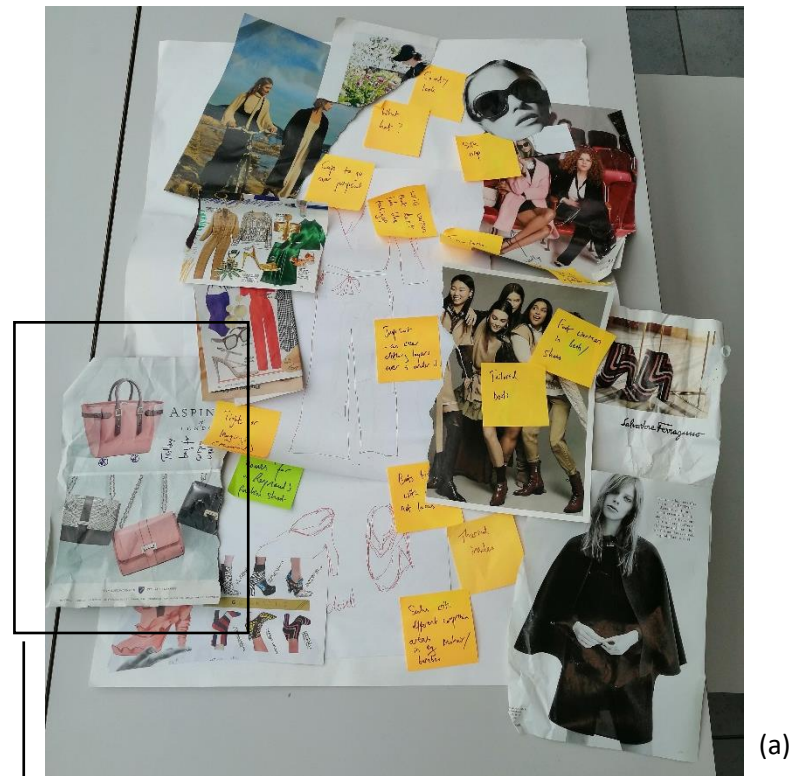
*“oh yes those little tops are great for rolling up and putting in your handbag as well because they’re really thin and so you can bring an extra layer [...] and sometimes I have to go to the toilet to put it on; if I’ve taken a base layer off because it’s hot in the restaurant, I have to go and put it back on again before I, and sometimes I think oh I’ll be fine and then I really, really regret it”*

(884-890)

In the focus group, we see this approach when the women design an outfit for the races. The women designed a jumpsuit but included a wheelie bag to carry around some extra layers.

The women often put up with having cold hands to be able to perform. Daisy is one such case. Keeping the rest of the body layered helps with the hands to some degree, and so the women wear thermal layers beneath their tops. Again, the wearing of several layers draws attention as Cheryl points out: *“but it’s in the summer, where I have to wear extra clothes [laughs] people... find it strange”* (763-764). Similarly, Louise points out: *“now I just say, I just have to, I don’t have a choice um, when I was younger, I was much more self-conscious about always wearing more clothes than everybody else”* (872-873). Brenda has begun to wear several thin layers as one is no longer effective. Having something soft against the skin is important, as it provides physical warmth but sensory comfort. Daisy commented on when she used to play hockey outdoors that the others *“wouldn’t need the like special little micro fibre stuff that’s on the inside of the under-armour winter wear to keep them warm”* (445-446). Louise explained that *“the fabric that is next to my skin needs to be soft”* (558). Related to the above design features, Jessie commented on the lack of colour in thermal wear: *“I like colour, um... but usually find this time of year, if you buy thermal things, they tend to be like wintery clothes”* (593-594).

Moving on from the inspiration stage, I decided to develop two undergarments, with one incorporating the ‘plush’ technique and the other using the ‘floating tuck’.



(a)

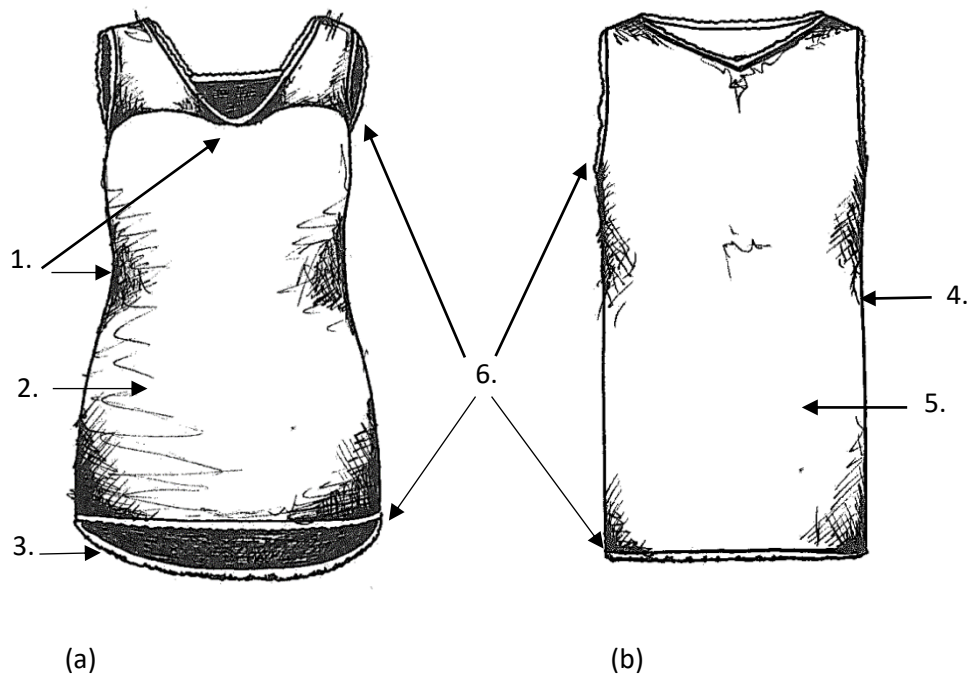
Wheelie  
or trolley  
bag for  
carrying  
around  
extra  
layers.



(b)

Figure 8-29: Image (b): poster collage illustrating design to wear to the races in March; Image 9b): close up of the wheelie or trolley bag for carrying around extra layers (Lisa Shawgi, 2019).

## Intentions



*Figure 8-30: Image (a): Turquoise V-neckline illustration; Image (b): Pink V-neckline illustration (Lisa Shawgi, 2019).*

1. Hourglass shape with a sweetheart neckline.
2. Fabric made from 'floating tuck' technique with elastic.
3. Swooped lower hemline at the back for extra coverage.
4. Straight shape for a close fit.
5. Fabric is made using the 'plush' knitting technique.
6. Frill trims for a more delicate and feminine appearance.

## Development

For the undergarment Beth, I wanted a sleeveless, fitted, seamless garment with a sweetheart neckline, hourglass shape and a scooped hem at the back. For the trimmings I wanted a scalloped edge. I decided on a dark colour but rather than black or navy, I opted for turquoise to keep the aesthetics interesting. Using a different colour to the elastic produced an almost ribbed-like effect, which was appealing as seen in Figure 8.33. The design used partial knitting to shape the neckline and scooped hem at the back. Figures 8.31 to 8.32 demonstrate this sampling development.

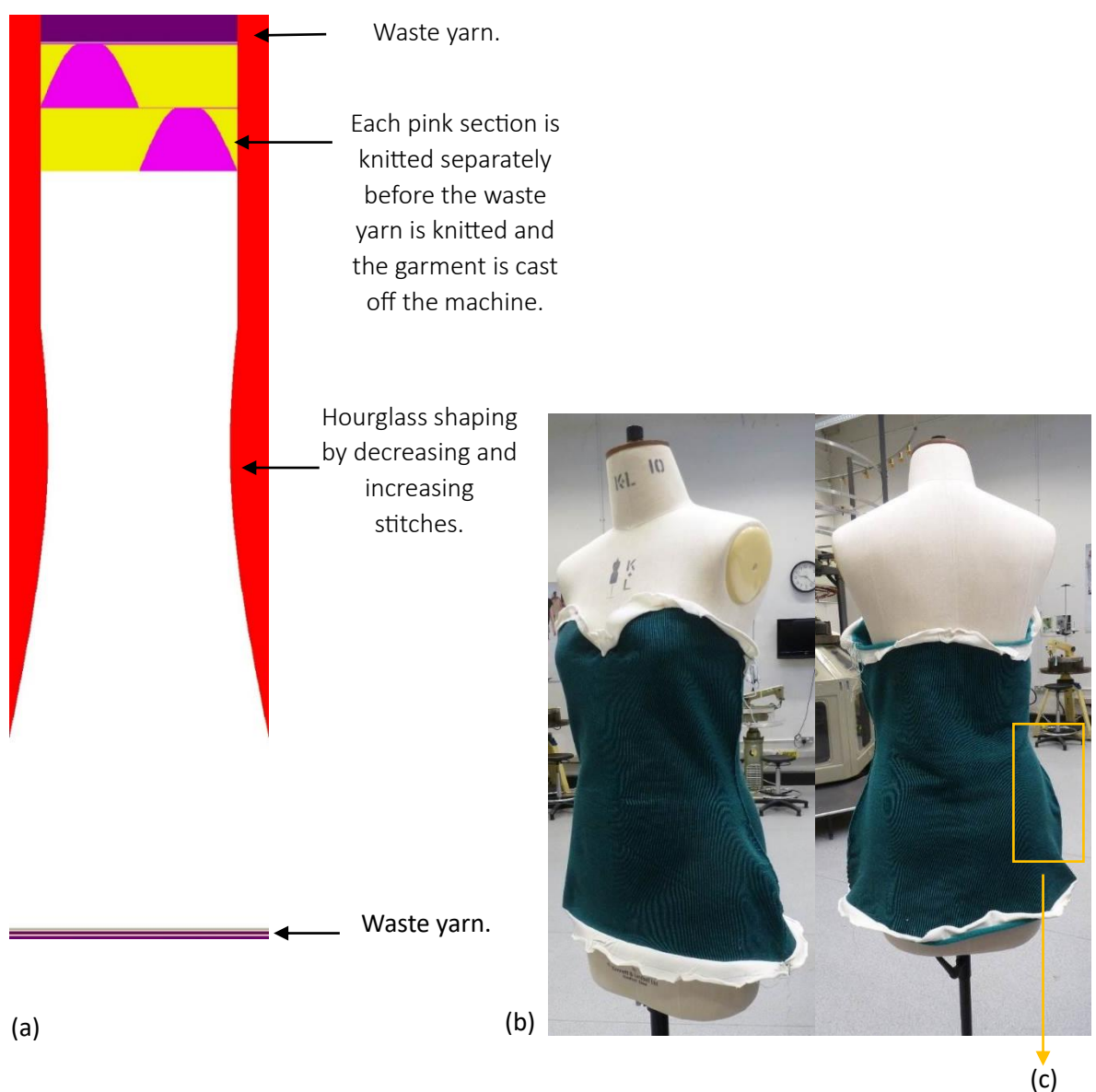
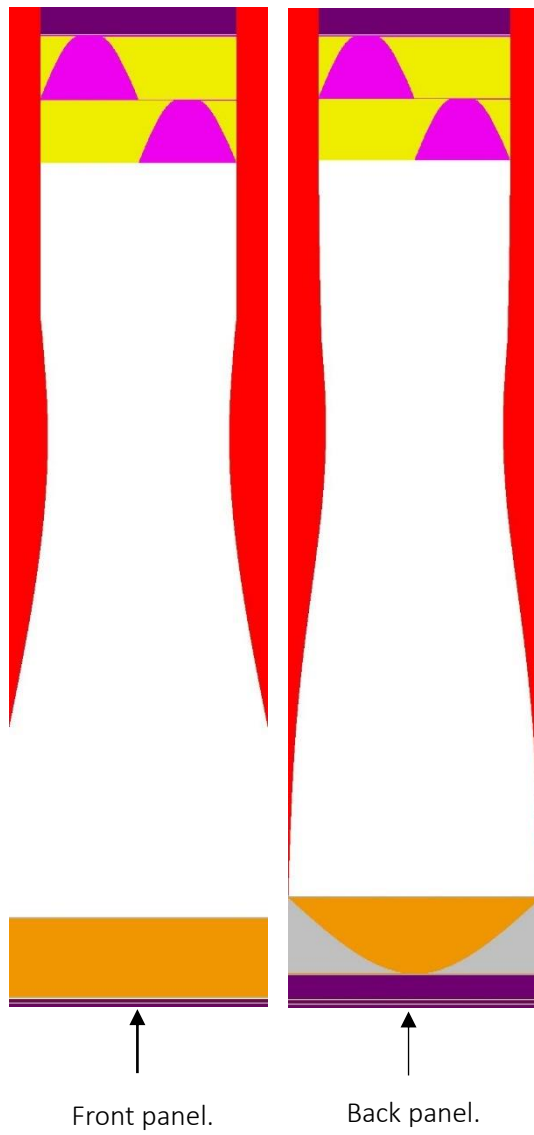


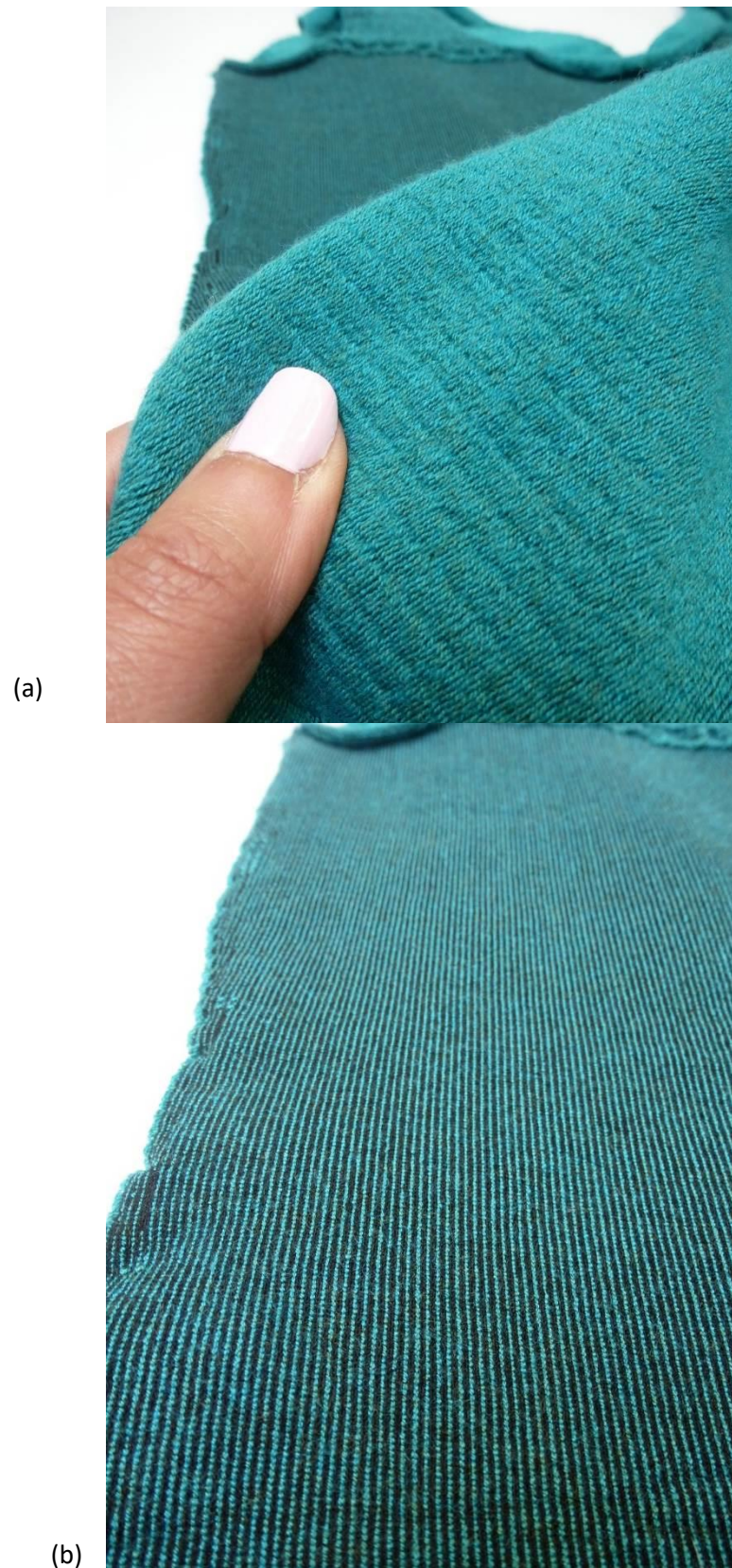
Figure 8-31: Image (a): Stoll software pattern for the turquoise garment; Image (b): Knitted sample of the turquoise garment; Section (c) shows some excess fabric (Lisa Shawgi, 2019).



(b)

(a)

*Figure 8-32: Image (a): Stoll pattern illustrating the front and back panels of the turquoise garment; Image (b): knitted sample produced from Stoll pattern (Lisa Shawgi, 2019).*



*Figure 8-33: Image (a): Close up of 'floating tuck' fabric on inside of turquoise garment; Image (b); outside of garment (Lisa Shawgi, 2020).*

It was at this stage that Covid-19 regulations prevented the access of facilities to complete the garment as I had planned. To finish the garment, I used the Silver Reed fine gauge knitting machine. To knit the scalloped edge, the yarn was doubled up to allow for a less open knit. A section on the front was hooked up to the machine and a panel was knitted using single jersey to the shoulder. The back panel was completed in a similar way. However, the trim rolled in a similar way to the gloves as shown in the images below.



*Figure 8-34: Images illustrate the outcome of the trims created using the Silver Reed fine gauge machine for the turquoise garment (Lisa Shawgi, 2019).*



## CINDY Development

The design development of the pink vest top used the ‘plush’ technique to create the main body. Figure 8.36 illustrates the overall design of the garment. The garment panels were straight for a more fitted shape. Due to Covid-19, the top section of the shoulder and back panels were knitted on the Silver Reed domestic machine. This created a design outcome which I was not entirely satisfied with. Figure 8.35 and 8.36 showcase the openness of the knitted panels created on the domestic machine, which is unsuitable to keep the wearer warm. To pull in the loose fabric, lycra was utilised for the trimmings, which caused some gathering of the main body. The combination of the lycra and main yarn meant that the result looked a little untidy as the lycra was too strong.

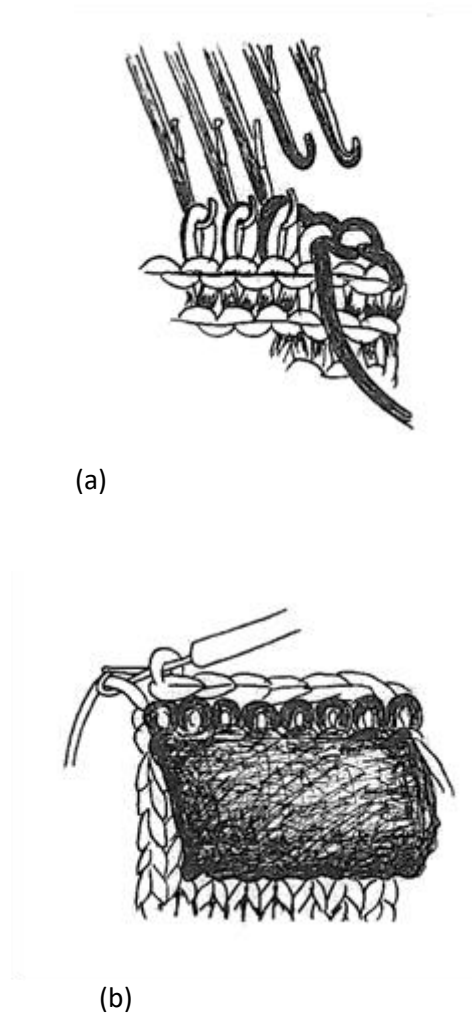


Figure 8-35: Detail of the top portion of the V-neck vest top (Lisa Shawgi, 2019).



*Figure 8-36: Close up of the knitted top panels knitted on the domestic Silver Reed machine (Lisa Shawgi, 2020).*

The side seams of the front and back panels were hooked up onto the Silver Reed knitting machine and cast off to produce a flat seam as seen in Figures 8.37 to 8.39.



*Figure 8-37: Image (a): Casting off panels directly from machine; Image (b): Both seams are joined with one yarn (Lisa Shawgi, 2020).*



*Figure 8-38: Close up of seam on the wrong facing side of the undergarment (Lisa Shawgi, 2019).*



*Figure 8-39: Close up of the side seam where both side seams were placed onto the needles and cast off (Lisa Shawgi, 2020).*



Figure 8-40: Pink V-neckline undergarment (Lisa Shawgi, 2019).



(a)



(b)

Figure 8-41: Image (a): Turquoise v-top; Image (b): Pink v-top (Lisa Shawgi, 2019).

## Reflections on crafting the *Re-dress* capsule collection

The *Re-dress* capsule collection highlighted knitting challenges when developing technical fabrics to support the physical comfort of a person living with Raynaud's. The development of a seamless 'plush' sock and a seamless legging design using the 'floating tuck' technique was not entirely possible and meant that the garments needed some seams including in the sock and legging design. However, as the seams were hand-stitched, they did not cause irritation when the garments were worn. The issue with the change of knitting machines presented potential concerns that the finishings of the garments might affect the visual impression and trying on experience when participants were asked to provide feedback on the designs. While these features were noticed by participants, they did not affect the overall trying-on experience of the collection. The decision to leave the unrefined items of knitwear, was based on the notion that these were tools of research to gain further insights into participant's experiences, rather than focusing on having complete and polished prototypes ready for production.

The selected knitting techniques and yarns proved successful in mitigating the effects of cold as the women commented on how the fabrics-maintained warmth even after garments were taken off. Louise mentioned that the fabrics "*seem to retain some warmth after you've taken them off*" (53-54). Brenda found that when wearing the gloves "*the blood was rushing to my fingertips [...] I could actually feel the blood pumping, even after I took them off, I could still feel that sensation of movement and it felt really good*" (55-57). And Margaret commented on how the cardigan made her feel in her following testimony:

*"feels very good especially the softness on the inside, so as well not feeling too hot at the same time, that was interesting. I felt warm, and soft, but I didn't feel hot, so that was good, because [...] something good about this piece of garment, that it didn't make me too hot, or feel bad, by the way, when I took it off, I felt really cold, so the inside softness was giving that beautiful warmth, you know"*

(131-137)

The women's testimonies suggest that the use of technical yarns and combination of the selected knit techniques created a thermally comfortable garment. It aligns with the discussion on placing equal importance on knit techniques as well as yarn qualities in chapter 6, section 6.4. Most importantly though, the *Re-dress* capsule collection provided insights into how to design for a multidimensional experience for 'Extraordinary' people, and ultimately the role aesthetics play in supporting an 'Extraordinary' 'lived' body's wellbeing

and agency. The following section reflects on insights produced from wearer evaluation of the designs.

### **8.3 REFLECTIONS ON WEARER EVALUATION ON THE *RE-DRESS* CAPSULE COLLECTION**

The *Re-dress* capsule collection allowed me to gather valuable feedback on my design interpretations. Receiving feedback on the collection was important to gauge the success of a designer-customer-manufacturer relationship discussed in section 1.3.3, which linked with the human-centred design approach I adopted (see section 4.3.2). This supported this thesis' argument that fashionable knitted clothing needs to facilitate multidimensions to enhance an 'Extraordinary' wearer's material experience on a physical, emotional, social and aesthetic level. This means balancing performance of the fabric, the sensorial aspects of touch and fit of the garment, alongside visual aesthetics to enhance well-being and agency. This aligns with the perspective of how to address people living with a disability discussed in chapter 2, to understand the 'lived' experience through our interaction with materials. For each item in the collection, the women were asked about their initial reaction, the visual impression, how it felt against their skin and after wearing it, the fit of the garment, how it would integrate with their wardrobe, anything that they would change, any lasting impressions and any other comments. See Appendix 14 for the full details on the protocol for delivering the collection to the participants.

The sections below discuss insights developed from the interviews to understand in more detail, the balance of the multidimensions mentioned above and the complex interweaving of the elements to create a well-balanced fashionable knitted design for an 'Extraordinary' person. It moves from the general to the specific by providing detail on the women's responses to the designs.

#### **8.3.1 Knitted fabrics for health and well-being – performance vs aesthetics**

In 2011, O'Mahony affirm that, in the context of technical textiles or therapeutic garments for health and well-being, *“the coming together of the technical and the aesthetics is key to producing materials that perform, also look good and are pleasant to handle”*



(2011, p19). Furthermore, Schifferstein and Wastiels (2014) argue that designers can enhance a wearer's experience of a scenario through the sensory modalities of a product. This is by carefully considering the intrinsic (raw materials) and extrinsic (shaping of these raw materials) to create a multisensory experience as discussed in chapter 2, section 2.3.2. The goal for the Re-dress capsule collection was to develop knitted fabrics that were sensually soft to the touch, functionally warm, not bulky, and aesthetically attractive. The key was then shaping these knitted fabrics into comfortable and stylish garments or fashionable knitted clothing to support an 'Extraordinary' person's well-being and agency. The merging of all these elements is essential to contributing to the wearer's physical comfort, enhancing emotional joy, positive social engagement and feeling aesthetically stylish. It draws on Laughlin and Howes' notion that "*how a material might function are not simply to do with scientific values of performance but motions of meaning and more qualitative attributes*" (2014, p.40). When the women commented on the collection at the beginning of the interview, the aspects they focused on were their experience of trying things on, the thermal performance and sensorial comfort of wearing the garments. Valerie commented that she "*was struck when I looked at the whole range of garments, how easy to put on and take off [...] to make it easier to use as well as to make it comfortable once you're in it, yeah, so, thank you very much*" (605-609). Louise mentioned "*interesting, nice fabrics [...] it's a good dense, warm, soft fabric, which I quite like*" (55). Jessie referred to the collection as "*some really lovely, items there [...] but what was nice was they were all warm, stretchy and quite fitted*" (11-12). Margaret mentioned that she "*didn't know what to expect, but it was quite a pleasure to go through it*" (5). And Brenda described her trying on experience as "*it went really, really great [...] it was great fun actually [...] a really good time so thank you for that*" (21-22). The women focused on the ease of trying things on, how the fabrics felt against the skin, how warm the fabrics were and the fit of the garments. These physical design aspects connect with the women placing their physical comfort first, which does lead to emotional comfort of doing the right thing and feeling healthy by avoiding an attack as highlighted in chapter 5, in section 5.2.2.1. under the theme *Making Wardrobe Adjustments for Comfort*.

The women enjoyed the overall experience of trying things on, which brought the intrinsic or tangible aspects of the garments to the forefront. That is not to say that aesthetics was not considered or did not play a part in shaping the women's engagement with the designs, as we shall see in the next section. As the interviews continued, the women did go

into detail regarding the visual aesthetics alongside the performance as they discussed their thoughts on each of the items after trying on the designs. In fact, quite often aesthetics influenced a strong emotional reaction and how it fits into their wardrobe and determines where they wear it and if they would wear it at all. But the functional aspects of the garments are a priority to maintain their health and fashion designers need to consider the suitability of the fabrics, alongside aesthetics, to consider the ‘human value’ (Risatti, 2007) of the wearer in terms of meeting the physical needs of ‘Extraordinary’ persons (as discussed in chapter 3, section 3.3.3). Adopting a human-centred design approach directed this project by considering the extraordinary requirements needed by the wearer. This was an approach that the making stage took, by selecting appropriate yarns and knitting techniques suitable for a person living with Raynaud’s. Traditionally, in the design process, often a mood board is developed, followed by selecting the yarn which mimics the identified textures. That is not to say that aesthetics is not equally influential on the wearer’s wellbeing living with a disability, as argued by Dunne (2013) in section 3.2. This is a perspective that this research has confirmed as the visual dynamics of the garments were considered during the design process of the knitted garments.

In the following section, the complex relationship between fabric performance and garment aesthetics is unpacked to understand the type of aesthetics that the women are attracted to, and the role aesthetics play in supporting social engagement. That is how the women appear to engage with others, alongside understanding what about the designs triggers an emotional response.

### **8.3.2 How aesthetics supports social engagement for a multidimensional experience**

As discussed in chapter 3, section 3.3, aesthetics in terms of the body and stylish garments play an important role in supporting people living with a disability’s interaction and participation in society. Understanding the qualities of the garments that support social engagement in terms of the value of aesthetics for comfortable interaction (both physical and emotional comfort) is fundamental to re-address disability, fashion and clothing. This leads us to understand the meanings associated with wearing the designs. An example is Jessie’s reaction to the cardigan as she described it as “*an expensive cardigan, you know, it just looks very nice and it feels nice, and that’s, that’s important really [...] it’s lovely*” (327-328) with

the *“Peter Pan collar [...] made it look a little sweeter; but [...] trendy as well”* (254-257). Jessie is attracted to the cardigan’s style but emphasises the importance of how it looks *and* feels. In this instance, it suggests that once Jessie is satisfied with how the garment feels thermally, the aesthetics comes to the forefront and plays a key role in how she presents herself to others. Furthermore, Jessie commented that *“I’ve people commenting why I’m I wearing a winter jumper in summer? And you know, it’s a bit embarrassing really, but I could wear that, and it still looks delicate and summery, yet warm”* (262-265). This moves us into the realm of how aesthetics creates meaningful experiences and evoke positive emotions as highlighted by Hekkert and Karana (2014) when a situation is evaluated *“as potentially beneficial or harmful to the person’s concerns”* (p.7). Jessie envisioned her experience of wearing the cardigan, which presented a positive emotional reaction by avoiding feeling embarrassed.

Style was an aspect which the women referred to when describing their reactions to the cardigan. Margaret used the terms *“classic”* and *“timeless”* (162) to describe the cardigan. It suggests a long-term attachment to the cardigan. And Louise talked about her initial reaction to the cardigan as *“I like the styling, and I really like that, the long, long sleeve, um, really lovely and soft and warm and light, it felt really, really light weight [...] love the under-arm inserts [...] it feels snug”* (195-215). She refers to the style of the garment in terms of physical comfort in the construction of the garment and what the material has to offer in terms of feeling lightweight but warm. It creates a sense of not feeling burdened by the weight of material or offering some relief from her condition. However, Brenda’s first reaction to the cardigan was *“does it fit in a nursing home? I think the lighter pink made me think of nursing homes”* (123-126). During my conversation with her, it came to light that her mother lived in a nursing home, which shed some light to how this association was created. Once the collar was hidden, she described that *“it changed the whole look of the garment and the feel of it, and thought yes, I would be happy to wear that [...] because I think the grey is great”* (131-139). It is an example of how subjective experiences are and context-sensitive, which links to Hekkert and Karna’s (2014) proposition that the wearer’s relationship with a product is shaped by personal and situational factors in section 2.3.2. Brenda’s overall reaction to the collection is that *“it looks like a normal piece of clothing, like anybody would wear”* (191). Brenda’s reaction indicates the importance of aesthetics over performative elements. The personal association created a strong emotion and once that was removed, it changed how Brenda *felt* about the cardigan, which is an indicator of how

emotions play a part in supporting agency in the wearer. Furthermore, Brenda's comment regarding the normality of the cardigan, suggests the importance aesthetics play in 'normalising' or 'super normalising' (Pullin, 2020) clothing for 'Extraordinary' needs. As Pullin explains, "*super normal objects are accepted [...] for all that they are and are not expected to be anything else besides*" (2020, p.172). In this instance, the cardigan is an object of super normal design, where the question of its therapeutic benefits does not arise from the 'other', which attracts unnecessary attention to Brenda. Overall, the cardigan was the most favoured item from of the collection. It appeared to meet the women's physical, emotional, social and aesthetic needs. Another example of how best to balance these elements are seen in the sock design.

Discussing the sock design, Jessie expressed that "*I love these socks, they're so pretty*" (232). Margaret was attracted to the socks "*for being a bit different design, especially the yellow*" (169-170), and Louise mentioned that "*if they were commercially available, I'd have them in a range of colours*" (179). Additionally, Margaret explained that how the "*colours were great, they didn't confine you to old person wheelchair status [...] they looked stylish [...] they looked fun*" (68-75). Interestingly five out of six of the women commented on the appearance of the socks, before moving on to analysing their performance. This is perhaps for reasons that the socks usually worn by the women have very little visual appeal as they are outdoor socks, discussed on p. [L] of this Chapter. For Valerie, the lack of elastic around the hem meant she no longer needed to wear diabetic socks. And for Jessie, she expressed that "*when I'm at work, I don't want to wear thick socks [...] so something like those would be perfect with my trousers [...] cos they're nice and thick and warm, and, and there's no seam, so they're lovely*" (293-243). For Jessie the combination of how the socks appear visually alongside the functional element presents a desirable garment which produces a more meaningful and positive experience. The socks provide an opportunity for Jessie of choice in what she wears. Another example of performance of a garment overshadowing aesthetics is that Valerie was very much interested in the fabric of the pink vest top as it "*got nice little flecks all over it [...] it's not just a matt colour [...] it's got an interest to it*" (252-253). However, the garment was unsuccessful in its design as it lacked sleeves, which was essential as an undergarment for Valerie. It links back to the women prioritising their health. It is a reminder that, for a successful design, the designer-consumer-manufacturer approach is favourable over a designer-manufacture-consumer paradigm, for effective design iteration before launching a product.

The testimonies above demonstrate the value that aesthetics play in shaping a more positive social experience. In the following section, we see how the balance of aesthetics and performance play a part in influencing agency and ownership of the designs. Interestingly, trying things on was a key factor in shaping these experiences, as it enhanced wearer interaction. It links with this thesis' phenomenological approach of understanding the 'lived' experiences of participants *through* materials discussed in chapter 2, section 2.3. This further aligns with the notion of referring to consumers as wearers rather than users, as it is not solely about using a garment to stay warm, it is about wearing a garment in order to consider the aesthetics in relation to the body and individual. I use the glove and legging designs as examples to unpack this idea further, as they are the plainer items of clothing in the Re-dress capsule collection.

### **8.3.3 Try it on: trying items of clothing highlights key design features and increases wearer-product interaction to enhance agency and ownership**

The act of dressing and trying on garments is key to knowing the suitability of a garment for that individual and to answer the question "*Is this me?*" pointed out by the author Sophie Woodward (2007) in her book *Why women wear what they wear*. The following testimonies explore how trying things on potentially alters the relationship between the wearer and garment, making it a fundamental part of the practice of dressing. This is one which is often impossible for 'Extraordinary' people as there is a lack of access to suitable clothing on the high street, as highlighted in chapter 3, section 3.3.1.

Margaret's instant reaction to the gloves was that she "*didn't like the look of them at all*" (185) although she was attracted to the feel of the material "*even if it doesn't look very nice, it's wonderful for the heat and the softness*" (212-214). While the physical sensorial touch was desirable, the gloves lacked "*something to catch the eye [...] to catch that attention to it*" and recommended using "*some pink [...] plain black is Okay, if you are just looking for warm*" (225-232). The gloves missed that visual stimulation, which attract attention. Although, Margaret didn't fully try the gloves on as they appeared too small. This presents the question: if the gloves had more colour, would Margaret try them on, altering her impression of the design? On a similar note, Brenda's "*first reaction was that they weren't particularly elegant, but then gloves never are, unless you've got leather gloves that you're going to wear somewhere very fine*" (40-41). After looking at the gloves and then trying

them on, Brenda's opinion changed and the benefits were identified "*when we looked at them and tried them on, we thought they'd be great, absolutely fabulous for daily activities [...] what was really interesting [...] and I just sort of thought, I want some because especially when it's cold, that support around here was, was just fabulous, on my wrist area*" (48-52). After wearing the gloves, Brenda formed an attachment and imagines herself wearing them for more casual daily activities. Both Jessie and Louise were drawn to the gloves for their functional elements, as Louise explained: "*I love the gloves, these ones with the tips, I, as soon as I saw them, I thought yeah! My gloves [laughs]*" (410-411). The touchscreen element was the selling point for both women as they could operate their mobile phones without removing the gloves. For Louise, it means answering a call from a friend when walking the dog. The gloves offered her choice of social participation. As Twigg suggests, "*Dress is associated with expressivity, agency and choice*" (2015, p.2).

Trying on and wearing a garment plays a big role in triggering an attachment. Brenda desired the gloves after trying them on, but avoided trying the leggings on as they felt too thick as she wore a thinner pair from another brand and commented that she would "*feel like Granny grey city there*" (243). She implied a sense of dissatisfaction with the aesthetics and their frumpiness as mentioned by Jessie when she commented that "*when I looked at the leggings at first, I thought, Oh my God, these are so frumpy, but when I got them on, they were lovely!*" (111-112). Once she tried the leggings on, her thoughts were: "*they were comfortable and warm, but they looked [...] trendy I suppose then my other leggings, cos they have a little bit more going on, and the knees were comfy*" (118-120). Louise's view on the leggings is one of function as she would not see the leggings as a "*style item*" (131). However, the leggings would "*replicate the feeling of double leggings*" (32) and would make her more physically comfortable when walking the dog and "*in the current climate, of eating outside, they'd be ideal*" (130-132). Similar to the gloves, the leggings offer Louise choice of joining others outside as we must remember that the designs were tried when Covid-19 regulations were imposed.

Trying things on is important as it stimulates the senses and that interaction between body and garment. It relates to how a garment is worn, opposed to how it is used as discussed in chapter 2, section 2.3.2. Similarly, here was Margaret's initial reaction to the jumper design:

*"Was overwhelmed by its size, I mean it's just I thought 'WOW, what is this?' but I though this is too big, especially the polo neck, personally [...] I was*

*surprised, listen to that, I was surprised how the big polo neck which I wasn't sure about, felt good! Once on me, I could use it as a hat or scarf at the same time [...] when I put it on, suddenly the practicality of it came to me, I would make it a bit bigger”.*

(36-48)

She saw the potential in the jumper design, after putting on the item. Once connected to the body, the relationship between body and material transforms from one of uncertainty to one of appreciation, creating meaningful experiences. For her, it meant extra coverage, flexibility and freedom of not having to carry around a scarf or hat, enhancing agency. Similarly, Jessie's first reaction to the jumper was *“when I looked at it, I thought, ummmm, I'm not gonna like that, I think, but, when I put it on, it was really flattering, and it looked like a jumper you could go out in”* (270-271). Once again, aesthetics comes into play when the women interact with the garment when it is on the body. The connection between a body when wearing a garment aligns with Pullin's proposition that when one *wants* to wear a garment rather than the *need* to, creates a sense of ownership. Margaret *“didn't want to take it [cardigan] off”* (153). Brenda mentioned that *“the minute we saw the socks, we both said we want them”* (68). Louise referred to the gloves as *“my gloves”* (411). Valerie made the effort to show her husband the cardigan: *“I put it on, and my, my husband was working in the office, um, further along the corridor, I said, hey, look at this”* (390-392). Regarding the turquoise cami, Jessie said that *“it was an item that I haven't got currently in my wardrobe that, I got a gap in my wardrobe for something like that”* (90). Once again, Jessie was unsure of the garment at first glance, until she tried it on. After trying it, Jessie realised its value:

*“It was thick enough to wear with something lighter, you know sometimes when you wear a shirt, I wear like a camisole underneath, but a cami isn't warm enough, so, I tend to not wear a shirt, whereas that, would have substituted the cami and made sure that I stayed warm and then I could have worn a shirt on the top”.*

(96-99)

In this instance, the material performance came to the forefront which presented the potential value and meaning of wearing the garment. It allowed freedom of choice to wear clothing that Jessie desired, supporting her agency regarding how she dresses and control over their appearance. In accordance with Donald Norman's (2003) 'Emotional Design' framework, the behavioural and reflective element outweighed the initial visceral dimension. However, Jessie commented on the garment being one colour, which suited her as an undergarment, as

it would not be obvious. This element made a smaller contribution compared to the other elements but still played a part in producing a meaningful experience. But the visceral and the behavioural are at times equal when the garment is designed with features closely associated with the body of an Extraordinary' person in mind. The following section discusses these finer details in terms of aesthetic design decisions and how the garment behaves or moulds to the body.

#### **8.3.4 It's in the detail: designing suitable clothes for bodies that wear them**

From the *Re-dress* capsule collection, the cardigan was the most favoured design. This was potentially for its effective balance between the intrinsic and extrinsic qualities. This design approach highlights "*the unique design potential*" suggested by Dunne (2013) when designing for people living with a disability, as designers are motivated to investigate more innovative designs. For example, Valerie describes the cardigan design as follows:

*"on the whole, I just liked it, I liked the colour attachment as well, that, that was sort of linked wasn't it, almost made a feature of the joining, and it reduced the bulk that you tend to get from an attachment to a collar, um, so, so I liked that, and that the shaping of the sleeves felt almost like top stitching you inserted the turquoise panels into but the stitching around that can feature which I thought it was rather nice"*

(448-452)

There is a sense of appreciation for the well-thought-out design. The design features described by Valerie were inspired by the women's testimonies and the features such as the top stitching came about by resolving knitting challenges when combining fabrics selected to accommodate Raynaud's sufferers. Similarly, with the socks, Valerie was "*intrigued by the diamond shapes [...] that was quite nice actually, yeah, the top hem*" (32-39). Jessie commented that she "*likes the different colour banding around the top [...] which is really pretty*" (234-235). Louise mentioned that "*the zig-zag design at the top is really attractive*" (173-174). Margaret referred to the "*bit of decoration there, which is just nice this little, little thing, the hollows*" (181-182). This attraction to the finer details of construction and decoration reminds me of an approach to fashion suggested by Karolinski (2014), where there is a need to move away from a pret-à-porter concept towards a more thoughtful and



considered design perspective. From a more considered approach one focuses on the body and how the item relates to that body. Cementing your designs within the need of the consumer is reminiscent of a more thoughtful and considered design approach, as the women appreciated specific design features created based on insight from their wardrobe analysis. It supports Aimee Mullins' perspective on seeing the potential in 'Extraordinary' people and possibilities, discussed in section 2.1.3. It also links with the *'Make[ing] do'* theme where the women adopt personalised practices to alter their wardrobe to fit their needs.

The women appreciated the overall construction of the sock. The women liked the shape of the foot, the flat seams and the warmth offered from the 'plush' fabric. Valerie commented that *"it's quite a novel way of doing it, that, that the whole construction"* (60). Jessie mentioned that *"they're really, they're warm, they're pretty, great colours, um, you can tell they're really well made, they've got no scratchy seams [...] they're not tight around the ankle [...] they got loads of toe room"* (233-239). Louise also mentions the toe area being larger to avoid *"any kind of compression [...] the toe shaping is a great idea"* (134-180). Margaret also refers to the comfortable fit around the ankle of the socks which *"just fitted me nicely, it was just right for me on my foot"* (328). And apart from wanting the length longer, Margaret gave the socks *"ten out of ten for those"* (75). All of these features relate to the shape of a body living with Raynaud's. Similarly, the women all commented on the shape of the sleeve to cover the back of the hand in the cardigan. Regarding the jumper, the long sleeves with the thumb holes were a success. The cowl neckline feature received mixed reactions. Margaret requested more fabric for extra coverage, Louise and Brenda found it wasn't for them they found it too fussy while Valerie felt that the neckline needed to be higher and similar to a polo shirt. Valerie commented that *"I took one look at it and I thought, you're not for me, and not for me because I'm always cold"* (198-199). However, referring to the longer sleeves, Valerie commented *"that you can hide in that when you're going out into the outside world, yes, yes, splendid"* (216). Louise said *"you could snuggle down into them"* (310). The design features offer a sense of shelter from the environment and security. These features were informed by the women's testimonies, and stories relating to clothing and the body, specifically issues with existing clothing when worn. Placing the body or wearer at the centre of the design allows the move away from the traditional practice of working from 2D patterns and on mannequins, where aesthetics is the focus. This aligns with the theory of why standard clothing or pret-à-porter garments are quite often ill-fitting, as they are designs based on a flat surface or the mannequin which depicts an unnatural human

shape. In this instance, the mannequin is an object used to design for a living subject in constant flux. It aligns with Martin Heidegger's (1962) notion of moving from 'ready-at-handness' to 'present-at-handness' when we interact with tools discussed in section 2.3.1. As the designs were fitted to the women's extraordinary requirements, they become 'ready-at-hand' as the garments disappear from consciousness and the women focus on their experience of wearing the item instead. Furthermore, designing from a human-centredness means designing for real bodies as opposed to "*socially constructed ideals*" (Klepp and Rysst, 2016, p.79).

#### **8.4 A MOVE TOWARDS CLOSING THE LOOP**

Participant feedback on the *Re-dress* capsule collection highlighted that to design fashionable knitted clothing, the performance of the fabrics is key for physical and emotional comfort. While fabrics supporting a person's health is a priority, there is implicit value when considering the role of aesthetics on the wearer in terms of initial impression, motivation for trying a garment and imagining pleasurable experiences when wearing a stylish therapeutic design. Furthermore, by placing the body centre stage in the design process, a more thoughtful and considered approach is taken leading to potentially unique design features, which opens out the women's world, offering more choice to participate in social activities and carry out everyday tasks, without compromising on their health. Trying on garments is significant when deciding their suitability and instigating an attachment, particularly when it comes to answering questions such as "*is this me?*" (Woodward, 2007), as the women decided whether the garments were right in terms of supporting their condition, but also imagining what possibilities the design creates for them through the material experience. Ultimately, the *Re-dress* capsule collection demonstrates how fashion designers can support the overall wellbeing and agency of a person living with a disability through a human-centred design approach.

## **CHAPTER 9. CLOSING THE LOOP AND CARRYING ON THE THREAD**

The conclusion first outlines the purpose of the study, in which I revisit the aims of the research and how these were addressed within the thesis. The chapter moves on to present the thesis' contributions to knowledge, followed by reflections on the research process; participant benefits and beneficiaries; study limitations and future opportunities on how to move the research forward.

## **9.1 PURPOSE OF THE STUDY**

The practice-based research set out to explore how knitted clothing can support women living with Raynaud's. As a designer-maker, I aimed to readdress disability, fashion and clothing to enhance the material experience supporting wellbeing and agency. I would like to remind the reader the reason for my play on the word readdress, which is to emphasise the relationship between uses of language around clothing, dress and disability when readdressing Raynaud's. The study took a human-centred design approach where the wearer's 'lived experience' was understood to develop holistic designs. This facilitated a multi-faceted style, where the wearer's biological, emotional, social and aesthetic wellbeing were considered as of equal emphasis to create positive meaningful experiences. The study was positioned from the perspective of a woman living with Raynaud's phenomenon to raise awareness of the need for a designer-consumer-manufacturer paradigm to produce successful designs accommodating extraordinary requirements.

### **Aims of the study**

In chapter 1, I specified three aims for the research. I will now return to each aim individually and how each was addressed throughout the thesis.

- 1. To investigate factors affecting a person living with Raynaud's in the context of disability, fashion.*

In chapter 2, I gained an understanding of how disability scholars and activists called for new ways to approach disability and treat people living with disabilities. I drew on scholars such as Mike Oliver (1983) who developed the 'social model of disability', emphasising that it was society that disabled people and Liz Crow's call (1996) for re-engaging the embodiment of disability to conceptualise disability within a social theory. I explain how

disability scholars and activists support a multi-factorial perspective where disability should be addressed in terms of physical, emotional and social aspects. These aspects take a person's biological impairments, the psychological effects of dealing with disability and how society presents barriers for their participation into account. Adding to this perspective, I proposed the need for a more explicit aesthetic dimension when readdressing both personal and external factors that shape the 'lived' experiences of a person living with a disability. For this reason, in chapter 3, the research explored clothing and fashion in relation to the body. Clothing was defined as the 'second skin' encompassing practical garments and accessories to self-manage the wearer's biological condition, while fashion as a concept was defined as understanding the 'cultured body' by Entwistle (2002). This represented the aesthetic experience of clothing in relation to how the wearer 'fits' into society's expectations within social constructs of what is deemed acceptable, and how the wearer *wants* to represent themselves in the public domain. Both these aspects influence how the wearer *feels* personally, which leads to the need to understand the emotional dimension of disability, clothing and fashion to create positive meaningful experiences through wearing appropriate designed clothing that meets the functional and aesthetic requirements of the wearer.

2. *To examine the relationship between clothing and women living with Raynaud's, and garments effect on the wearer's daily experiences and activities.*

In chapter 4, I described my approach and activities carried out with participants to understand their embodied experience of Raynaud's. Qualitative methods of semi-structured interviews and a design workshop with a focus on Raynaud's using co-design methods allowed the research to investigate the relationship between clothing and the women. To produce insights into participant's 'lived' experiences, I adopted an interpretive phenomenological approach to analyse the data gathered by the semi-structured interviews discussed in chapter 2. Within chapter 5, I demonstrated the complex interweaving of the embodied and external factors which shape the womens' 'lived' experiences with Raynaud's. I identified themes to unpack this complexity to provide knowledge on the physical, emotional, social and aesthetic aspects of living with a disability. I discovered self-management strategies of making adjustments to daily practices for physical and emotional comfort; the adoption of DIY techniques to support health and wellbeing; issues with designs that do not accommodate extraordinary needs to motivate social engagement and societal

participation; and how aesthetics plays a key role in enhancing pleasurable and inclusive experiences.

3. *Adopted a human-centred design approach, to explore novel knitted textile developments to help Raynaud's sufferers 'self-manage' symptoms and enhance physical, emotional, social and aesthetic well-being.*

In chapter 6, I developed methods to support the designing and making activities to explore ways in which a fashion knitwear designer-maker can support the wellbeing and agency of a Raynaud's sufferer. I explained the two methods for selecting yarns and knitted structures appropriate to the research: *Interpreting Marketing Material* and *Intuitive Diagnosis*. Both approaches were underpinned by my experiential knitwear knowledge and secondary research carried out to underpin my design approach. I outlined ways in which a designer can draw directly on their sensorial understanding of fibres and tacit knowledge to support the decision-making process of selecting yarns. This also applied to identifying suitable material structures to accommodate the physical needs of participants. It highlights the role that tacit knowledge and direct handling of materials play in making informed judgment calls. In chapters 7 and 8, I presented the creation of eight designs which made up the *Re-dress* capsule collection in response to insights gained from participant's testimonies. This allowed generation of knowledge by research *through* design. I drew on Giacomini's (2014) definition of human-centred design where the approach focuses on understanding the needs, desires and experiences of the people involved within the research to inform the designs. Through participant feedback on the *Re-dress* capsule collection, I gained further insights into the material experience of women living with Raynaud's. I understood the importance of balancing both the performance and aesthetic appeal of fabrics; the role aesthetics plays in supporting social equilibrium; value of design features for a person living with Raynaud's and how trying things on contributes to wearer attachment.

## 9.2 CONTRIBUTIONS

After reviewing the research aims, I will now highlight and discuss the three key contributions of this research.

1. *A theoretical contribution to fashion and textile research. Overcoming the false division between 'fashion' and 'clothing' by drawing on a body of disability studies research to frame my analysis.*

This research uses a unique combination of theoretical underpinnings from the field of disability to extend current models and perspectives applied to understand the relationship of people living with disabilities and fashionable clothing. In chapter 2, I emphasised the importance of extending the social model of disability presented by Mike Oliver (1983) and WHO'S bio-psycho-social approach to include aesthetics as a dimension when readdressing disability. Because fashion, clothing and disability are emerging academic topics I felt that the material experience of wearing an item of clothing, designed for extraordinary requirements, was more complex in terms of the aesthetic value in creating positive meaningful experiences. And while my contextual research highlighted disability and textiles studies touching on the visual appearance of clothing in terms of 'fitting in' socially, this research provides insights into how aesthetics increases wearer-garment attachment; shapes wearers' positive emotions; motivates the wearer to try things on; enhances textile pleasure; highlights gender barriers and allows authenticity. These factors support agency of a wearer living with a disability in *wanting* to wear a therapeutic garment. Furthermore, in chapter 3 I highlighted theoretical frameworks for supporting user's wellbeing to stimulate *psychological* happiness by concentrating on designing for subjective pleasurable experiences. This thesis adds to this area of research by highlighting the importance of aesthetics in terms of promoting wearers' 'feel-good' factor.

2. *A methodological contribution to studying disability, fashion and clothing.*

The project adopted a human-centred design (HCD) approach to inform fashionable knitted clothing as opposed to a user-centred method. Adopting a HCD approach allowed for a multi-dimensional style of designing and making to consider both extrinsic and intrinsic garment elements. Combining these two elements means creating design concepts which take into account the physical requirements to relieve symptoms of a condition, *and* implicit

values essential for subjective wellbeing. In chapter 6, the research established methods to combine theoretical and practical data gathered from the one-to-one interviews, wardrobe items and design workshop. This required a multi-layered analysis to interpret design elements for a multi-dimensional experience. A framework was provided to demonstrate four elements to guide a reflective practice. The model was divided to accommodate the extrinsic and intrinsic sensory modalities to stimulate a holistic interaction between wearer and clothes as suggested by Schifferstein and Wastiels (2014). The first half comprised of two methods which were *Interpreting Marketing Material* and *Intuitive Diagnosis* to select appropriate yarns and knit structures appropriate for an individual's physical needs underpinned by practical information gathered from participants' wardrobe items. The second half of the model incorporated *Critical Analysis of Phenomenological Insights and Subjective Understandings from Experiential Fashion Practice* to inform notions of style.

3. *A contribution to textile design research by deriving guidance that designers can adopt in the future.*

The research demonstrated a move from a theoretical study in fashion to an applied practical outcome embodied in the designing and making of the *Re-dress* capsule collection. The development of the *Re-dress* Design Framework (Figure 6.6) established a design approach that supports a designer-consumer-manufacturer paradigm to increase the success of a product. The *Red-dress* Design Framework outlines the various design stages to follow which places consumers' experiences throughout the process to balance function, performance and aesthetic elements. The stages within the framework include a Design Inspiration stage, which informs Design Intentions, followed by Design Development and Wearer Validation to understand the value of receiving qualitative feedback from potential consumers to refine a design. Within the *Re-dress* Design Framework, guidelines in the form of a table (see table 6.2) presented to assist designers on how to distinguish tangible and intangible design considerations. These were focusing on design features in the construction of a garment for the intended consumer; the role colour and texture play in the style of a therapeutic garment; and the performance of fabrics for physical and emotional comfort. The *Re-dress* capsule collection explicitly outlines how to marry performance, aesthetics and sensorial modalities in a garment designed for health and wellbeing, as O'Mahony (2011) argues.



### **9.3 RESEARCH PROCESS**

The project is an example of research *for* and *through* design (Frayling 1993-94), aligning with my position as a researcher and designer-maker. The human-centred design methodology adopted successfully accommodated a participatory research approach to inform the *Re-dress* capsule collection and gather further insights through the designs. The project also contained a unique quality where the research was carried out by a fashion knitwear designer living with the condition under investigation. On a personal note, it was a pleasure learning more about Raynaud's and supporting a community of women with similar interests and a passion for holistically self-managing their condition. During the research, I valued participants opening up their wardrobes and sharing personal insights providing invaluable data and feedback. While the design workshop with a focus on Raynaud's was not the primary source of information, it allowed confirmation of the direction of the research project to focus on developing fashionable knitted clothing as opposed to a service design solution. It was also a joy to see the women working together as a community.

The research methods and designed outcomes are important theoretical and design practice contributions further manifested in a collection of eight knitwear designs. The one-to-one interviews provided an abundance of qualitative data suitable for IPA to understand the subjective experience of Raynaud's. The interviews also produced more practical data needed for a designer such as the women's experience with fabrics, feel and fit of a garment. Although this data was managed differently, the information was needed for a successful HCD approach as it identified explicit and implicit qualities for stylish therapeutic clothing. It was a challenge moving between different forms of empirical work as discussed in chapter 6. In addition, the designing and making process provided honest accounts of the challenges faced when creating style, and comfortable knitted items of clothing in line with design intentions.

### **9.4 PARTICIPANT BENEFITS AND BENEFICIARIES**

Throughout the research project, I felt it important that those involved found the experience worthwhile. The women enjoyed participating in the project and expressed how

grateful they felt sharing their experiences with a researcher and designer interested in developing stylish clothing that suited their condition. The focus group particularly benefitted the women as they met like-minded people and felt part of a community where members could learn from each other. They enjoyed the creative, collaborative activities and one woman expressed how by taking part in the co-design of a garment ideal for the races in March, this eased her anxiety as she was attending the races and was uncertain of what to wear.

The research holds value for a breadth of researchers and students of fashion, textile and craft. This field is embracing wider social issues such as designing for health and wellbeing, designing for various types of body shapes and mental disabilities. This work in turn provides an exemplar of a craft and participatory methodology. For example, within Nottingham Trent University, there is a move towards designing for the wearer's needs and desires. Adopting a human-centred design approach allows for a more considerate style of designing and making by responding to people's experiences through either primary or secondary research. A unique quality of this research is that it provides insights into how to cater for 'sensory dysfunction' (Emmons and Anderson, 2005). The tactile system of touch plays an important part in the development of our sensory integration of how we feel things around us, comprehend these things and how we organise this information to "*make sense of who we are and the world around us*" (ibid, p. 15). Textiles and clothing are an aspect which can act as a barrier to this process, and this research supports designers considering the tactile qualities alongside performance and aesthetics. In addition, the research will also be of interest to fashion businesses with an interest in developing successful designs for people living with a disability as there is a call for the fashion industry to take heed of those who are differently abled.

## **9.5 STUDY LIMITATIONS**

Naturally, there were some limitations to the research project. In this instance, participants of the study comprised of entirely women. As mentioned in chapter 4 section 4.5, males made contact expressing their desire for gloves, and mentioned that some control their symptoms using medication, when necessary, but that was where their commitment stopped. The reason for this was possibly due to the design of the recruitment flyer, where

the emphasis was on designing future garments to self-manage their condition. Therefore, the findings of this study are solely from the perspective of women.

Another possible criticism of the project was it did not carry out experimental laboratory tests on the fabrics developed to measure thermal qualities from a quantifiable approach, or how effective the knitted structures were to mitigate the necessary heat in quantifiable measures and the measuring of both fibre quality and knitted structure to measure the best material combination to maintain a comfortable body temperature for a Raynaud's sufferer. This could have provided insights into the physical requirements of the wearer, but not an understanding of the wearer's emotional, social and aesthetic effect of wearing an item of clothing within a cultural context. While the technical ability of the fabrics to produce and control body heat was not tested, the sensory measurement against the wearer's skin was captured alongside the intrinsic qualities important for enhancing the subjective experience. In addition, the research understood the dressing practice of how the fabric and item of clothing works with participants wardrobe and not in isolation, fundamental when a wearer composes and presents oneself to society.

It could also be argued that, while the *Re-dress* capsule collection conceptualises the insights from the theoretical and empirical work into my practice of designing and making, further research is required to capture the 'lived' experience of wearing the items. To apply the Interpretative Phenomenological Approach to capture this 'lived' perspective, the items of clothing need wearing for several days in real-life scenarios. This potentially offers information on how others view the women's attire, which was an aspect highlighted by the research as participants moved from the private to the public domain.

## **9.6 MOVING FORWARD**

As I move forward, there is an opportunity to develop a research project where the focus is on male participants living with Raynaud's. The fact that men did not fully commit to this research indicates a possible stigma which is still associated with men comfortably discussing their health, wellbeing and interest in clothes. Developing a study in this regard widens the scope of the research.

I have considered the viability of commercialising the designs produced from the research. There is an opportunity to gain funding to source yarns and manufacture samples

to understand the cost of producing the clothing items and calculate the retail cost for consumers. The garments would also be tested in terms of maintenance. This further moves the research into the realm of retail, consumption and sustainability. To explore the viability of commercialising the designs, a conversation with Stoll Knit Design Centre in Leicester took place. The centre has the ability to cater for small production runs and one-off orders, which is ideal for on-demand orders from consumers. This reduces unnecessary stock and is cost effective for small scale designers. The goal is to begin with the glove design and produce a small number in various sizes, which can be promoted on the Scleroderma and Raynaud's UK Association online store. This shall measure the success of the gloves and potential future development.

As part of Stage 4 of the research design, my aim is to disseminate the research to academic and non-academic audiences. I have identified several conferences to share knowledge generated such as the Design Research Society and International Fashion and Textile Institutes conferences. There is an opportunity to showcase the *Re-dress* capsule collection in a modest setting within Nottingham Trent University and De Montfort University to highlight a multi-dimensional layer to design and encourage further discussions on the topic of fashion, clothing and disability.

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## APPENDICES

### **Appendix 1: Flyer advertising the project for recruitment of people living with Raynaud's phenomenon, Diabetes and Rheumatoid Arthritis.**



A Chance to Re-Design Future Fashion

Nottingham Trent University is looking to speak with people living with Raynauds, Diabetes, or Arthritis. The purpose of this is to support research into the understanding of daily challenges associated with these conditions. Should you wish to take part, you will be working with Lisa, a PhD student, who herself lives with a 'hidden disability', Raynauds.

Lisa ([www.lisashawgi.com](http://www.lisashawgi.com)) has a long history of designing fashion wear, and is now developing 'assistive/therapeutic' clothing with sufferers of these types of conditions. Interested participants would be taking part in structured discussions and/or workshops between July 2017 and March 2018.

Lisa would be happy to hear from you via:  
Email: [lisashawgi@gmail.com](mailto:lisashawgi@gmail.com)  
[lisa.shawgi2015@my.ntu.ac.uk](mailto:lisa.shawgi2015@my.ntu.ac.uk)  
Mobile: 07507 265332 (Mon-Fri 9am-5pm)

Thank You

## Appendix 2: Scleroderma & Raynaud's News magazine

**S R SCLERODERMA & RAYNAUD'S UK**  
**UK**

# SRUK NEWS

**Riding Pillion**  
How Lisa overcomes her Raynaud's attacks

**Doc Spot**  
Your questions answered by our medical professional

**Exploring the Digestive System**

**New Heights**  
Rebecca raises awareness of early diagnosis of scleroderma after dreams dashed of climbing Mount Everest

Issue 4  
October 2018

### Lisa holds a 'Masters class' for those with Raynaud's

Lisa Shawgl, 37, from Nottingham has lived with Raynaud's since her teenage years. We speak to her about how the condition has developed and why she has decided to focus her PhD on an area that could help thousands of people, in the future.

Lisa originally grew up in The Sudan and moved to Ireland when she was 3 years old. "I was in my late teens when large red welts started appearing on my hands, which turned out to be chilblains. After months of tests, we found out I had Raynaud's. I had always remained cool (often cold) in a very hot country, while the rest of my family were melting from the heat in The Sudan, so the diagnosis made sense to me".

Unfortunately, moving to a cold country brought her Raynaud's to the surface. Clear symptoms manifested themselves as well, such as, feeling extremely lethargic and joint pain. Lisa also, suddenly lost a huge amount of weight, shedding 16 lb's (4 stone) in 4-6 months.

"There would be days where all I wanted to do was sleep, not having the energy to even walk down the street to get the bus to college. My local GP put it down to depression as he reported all blood tests were normal, but my Mum and I knew it had to be something else".



Lisa, with Franco Scott and soon to be step son, Henry II, enjoyed a day out at Weston Castle

After several months, Lisa was finally diagnosed with Lupus and was given medication to assist with symptoms.

"I take Adalat and Hydroxychloroquine" twice a day and sometimes, several doses of steroids are necessary when my hands are at their worst. The medication I am on gives me headaches and have to get my eyes tested once a year, at least, as it might cause some issues. It's still difficult to find the right balance of medication and is something we are still working on."

"It has made me stronger in character and more determined to succeed in whatever I wish to achieve."

Lisa's family and close friends have an understanding of her condition, and are very supportive. They know what she needs to stay healthy and always take this into consideration when organising events and social arrangements.

Lisa told us: "I have had to change my life style completely. It has taken several years to learn how to best manage my conditions and it is, and will always remain a challenge. I do my best to stay away from dairy and gluten in my diet. I have learned to listen to my body when it needs rest. I do my best to get a good night sleep. Exercise helps to keep my joints flexible and improve my blood circulation, and it helps towards my mental well-being as well. I also decided to do a lot of research and look at suggestions from others. It is only trial and error as to see what works for you personally, but worth the time."

"Hydroxychloroquine is a well-tolerated medication for various rheumatologic and dermatologic conditions. Its main side effects are gastrointestinal upset, skin rash, headache, and ocular toxicity (eye problems). Within the eye, hydroxychloroquine may negatively impact the cornea, the ciliary body, and the retina, so it's important to get your eyes tested once a year if you are taking this medication, to monitor any potential changes.

Lisa has also discovered the joy of biking, since her fiancé introduced her to it recently. "I manage with the help of my partner and absolutely love it! We have tractor bled all over England, Scotland and Europe this year! It requires a lot of prep to avoid my Raynaud's flaring up and it helps that my partner supports me with the prep and checks in to make sure I'm warm enough whilst riding along. I have heated glove liners which work wonders and wear multiple layers of the right warm clothing. It's all about making sure you prepare for all conditions."

Lisa is currently doing a PhD at the School of Architecture at Nottingham Trent University. With a history of designing fashion wear, she decided to involve her condition and work towards something that other people may benefit from in the future. She is currently developing 'assistive' therapeutic clothing for people with connective tissue related conditions. So far, she is going well but Lisa is looking to recruit some more people before the study closes at the end of March 2019.

"It is important to talk others of your condition as it explains why you may not be able to do certain things. There are things where you can feel frustrated at not being able to carry out simple tasks, but having a great support network really helps with your mental attitude! It may be your family, friends or a charity. Being able to talk to someone with a positive attitude helps you keep you positive!"

### Future fashion: assistive clothing for Raynaud's

Clothing is an integral part of our lives and yet if you have difficulties putting on or taking off garments, struggle to stay warm or need additional physical support, every day can prove challenging.

With Raynaud's it can be difficult to prevent your extremities from getting cold, and research has led to the use of insulated lining and fabric containing silver which help more heat to prevent heat loss and can prevent or reduce the severity of attacks.

To gain a better understanding of the difficulties associated with living with Raynaud's, scleroderma and several other conditions, including diabetes and arthritis, research is being carried out at Nottingham Trent University into supporting these hidden disabilities through better developments.

To find out more or to take part in Lisa Shawgl's research programme visit: [www.ntnu.ac.uk/research/lisa-part](http://www.ntnu.ac.uk/research/lisa-part)

Lisa was awarded funding to carry out this research from The AHRC-funded Midlands Cities Doctoral Training Partnership (MDC)



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### **Appendix 3: Ethical considerations**

As I was working with extraordinary women, who were considered vulnerable, I needed to ensure their comfort and safety at every step of their involvement with the project. As I have already revealed, informed consent was acquired before each interview and workshop. I made explicit the nature of the research investigation, the type of questions asked and what the data will be used for. That is, to inform garment designs or services, academic literature and my thesis. All participation was voluntary and anonymous. Data was stored in a protective and secure manner in compliance with data protection legislation.

Although I was honest about my situation as a secondary Raynaud's sufferer, during the interviews I was conscious not to influence the conversation and approached each interview as if I had no prior knowledge of the condition. More importantly, as I had years of experience of the diagnosis process and forms of managing my condition, I was very careful not to provide advice on any form of treatment if asked by younger participants. I only advised on seeking professional advice for clarification to what they were experiencing. That is not to say I was secretive with my experience. I simply made clear that my practice and experience worked for me on a personal level, but to please seek professional assistance from their GP.

The interviews which were carried out at participants' homes required a risk assessment to ensure my safety as a stranger entering an unknown space. To manage this risk, I spoke with each participant to ensure their genuine interest in the project and informed my family of my location for each interview. There was another element which I needed to consider, and that was the emotional effect on myself from delving into such a personal subject, as this was a path of discovery of possible future scenarios. I needed to protect myself as much as my participants. For this, I contacted the wellbeing centre at Nottingham Trent University on the advice of my advisor and put in place a support system.



#### **Appendix 4: Interview protocol and schedule**

The interview schedule consisted of nine open-ended questions about different aspects of the women's experience with Raynaud's. Prior to all interviews, an information sheet explaining the nature of the research (what type of questions will be asked) and how the information would be utilised, along with a consent form, were emailed to each participant. This included an option for the interviewee to have a friend present for emotional support if they needed it. At the beginning of each interview, I emphasised the voluntary aspect of participation in the study and that participants were free to withdraw at any time without explanation. In addition, as the nature of the topic was a personal and sensitive matter, I highlighted the fact that they were not required to answer questions if they felt uncomfortable and were free to stop and take a break during the interview. In addition, I asked each participant permission to audio record the interview and use photography to capture personal objects. I also reassured each participant of their anonymity by using pseudo names. Although an interview schedule was drawn up, I found I was able to adhere to the questions and their sequence without reference. I did ensure to check the schedule at the end of each interview to confirm all questions were covered. At the end of each interview, I asked if there was anything else interviewees wished to add. Participants were also given the opportunity to ask questions about the project or anything else they wished to enquire about. Finally, I followed up each interview with an email expressing my gratitude for their time and contribution.

## Semi Structured Interview

By Lisa Shawgi

Supporting people living with a 'hidden disability' through textile developments

Interviewee \_\_\_\_\_ Date \_\_\_\_\_ Location \_\_\_\_\_

.....  
.....

1. Can you tell me about your experience with Raynaud's please?

- When did you realise something was wrong?
- How did you find out you have Raynaud's?
- What do you think Raynaud's is?
- How often does it affect you?
- How does it affect you?
- Can you describe to me when your Raynaud's was at its worst?

2. What do you do to help you manage your Raynaud's?

- Can you tell me if you use clothing to help relieve your symptoms?
- Is there a particular piece of clothing that helps you manage your Raynaud's? What was it?

How does it do this?

- Have you developed a coping strategy?

3. Can you tell me of any activities you find challenging?

- What do you do to help you carry out these activities?
- How do you feel in these situations?

3. Tell me more about the clothing/accessory that helps relieve your symptoms that you would wear for any specific occasion.

- Have you any that you would wear only in private?

4. Can you tell me about any clothing or accessories that you would like to try, but are unable to acquire?

- What is it?
- Why do you want to try it?
- Why can't you acquire it?

5. Can you tell me about any clothing or accessories you find helps relieve your Raynaud's that you don't wear?

- How did you find it?
- Why don't you wear it?

6. What would be your ideal clothing or accessory be to help you manage your Raynaud's?

- Can you describe how it would look?
- Can you tell me what you would wear it for?

7. Can you tell me about recommendations or advice from your health practitioner?

- Was any clothing recommended to help you with your Raynaud's.
- How were you diagnosed?
- Can you tell me about your experience when you went to your health practitioner?

8. I asked you to prepare items of clothing/accessories/products that helps/doesn't help you manage your Raynaud's...

- How did you select these?
- What do these items mean to you?

- How do they make you feel?

\*Is there anything else you would like to share with me?

**Appendix 5: Participants' profiles for Raynaud's study**

Name	Age	Occupation	Condition	Living In
<b>Mandy</b>	26	MA Student	Primary Raynaud's	Leicestershire
<b>Jane</b>	35	Fashion Buyer	Primary Raynaud's	London
<b>Jessie</b>	48	Estate Agent	Secondary Raynaud's	Northamptonshire
<b>Louise</b>	61	Teacher	Primary Raynaud's	Nottinghamshire
<b>Margaret</b>	58	Retired	Secondary Raynaud's	Lincoln
<b>Valerie</b>	64	Retired	Secondary Raynaud's	Lincoln
<b>Carol</b>	55	Retired	Secondary Raynaud's	Leicestershire
<b>Brenda</b>	57	Retired	Secondary Raynaud's	Essex
<b>Daisy</b>	28	Full time Mum	Raynaud's	Las Vegas
<b>Sandra</b>	61	Housewife	Secondary Raynaud's	South Dakota

## **Appendix 6: Design workshop with a focus on Raynaud's**

Design Workshop with a Focus on Raynaud's

29/04/2018

Broadway Cinema, Nottingham

The design workshop with a focus on Raynaud's took place at Broadway Cinema in Nottingham on Sunday 29<sup>th</sup> of April 2018. The reason for the choice of venue, as opposed to Nottingham Trent University, is due to participants working Monday to Friday requiring the workshop to be held on a Sunday. Some participants travelled from quite a distance, requiring the workshop to begin no earlier than midday and NTU's opening times are 10am-2pm.

The event ran for 3hours with an hour each side allocated for set up, meet and greet, and take down. I presented a summary of my research and what to expect, followed by facilitating several activities with the participants. A short break consisting of a light lunch was provided mid-way through the workshop to allow participants a chance to revitalise themselves. Lunch took place in a second room to avoid catering staff disrupting the workshop and allow the women to move around freely while the facilitators prepare the workshop room for the next activity.

One on one semi-structured interviews and a focus group are the two key qualitative methods of my PhD's research design. The semi-structured interview design uses open ended questions to allow the interviewees to express their own experiences and provides an understanding of how they live and cope with Raynaud's Phenomenon.

The design workshop with a focus on Raynaud's is to develop activities where participants are given space and tools to express, share and design their future needs-based solutions. The activities are designed to help empower women living with Raynaud's, to gain a sense of control in a positive and dynamic atmosphere. This positive mindset can free people from entrenched positions and negative mindsets. It can uncover and point to new ways forward no one had thought of before.

Holding a workshop will contribute to my studies in the following ways:

- A focus group environment might give rise to different themes that may not appear in an individual interview. (Pooling knowledge, perspectives and views).
- To identify key issues/challenges for women living with Raynaud's. (Achieved by expressing their future desires of what they would see as a positive and affective change in their lives.)
- To discover, in more depth, the clothing characteristics desired by women living with Raynaud's. (To identify the sensorial, aesthetic and functional needs in a garment designed for a woman living with Raynaud's).
- How design activities facilitate new ways of generating and sharing new knowledge to gain insights in to the experiences of women living with Raynaud's. (Generating creativity and scoping ideas).

This will be the first focus group with design led activities with women living with Raynaud's. It is a unique opportunity to gain new knowledge in the field of material experience, health and welling and design research. The findings of the workshop factors in to my research process by supporting the next phase of my research project; the development of knitted prototypes, which will also be used in an exhibition to disseminate the research to an academic and non-academic audience.

The data gathered will contribute to my PhD thesis and future research papers. Dorothy Hardy (a member of the Advanced Textiles Research Group) is a co-facilitator at the workshop and this provides an opportunity to write up a piece of work we can submit as an article to a journal.

This method is a hybrid embodying the characteristics of a workshop and a focus group.

Below is a table listing the characteristics of a focus group and workshop.

<b>Focus Group</b>	<b>Workshop</b>
Interviews focusing on asking about people's perceptions, opinions, beliefs about a product, service or concept.	Interactive activities working on an issue or question.
Dialogue used as a tool to explore and capture thoughts and emotions of participants.	Deliberation used as a tool to problem solve.

Concept development.	Co-Design activities. Design thinking. Textile Making.
Understanding the lived experience of garment trials in a naturalistic setting.	Understanding issue in textiles, clothing and accessories to help manage a ‘hidden disability’.
User’s knowledge of using a product or service to improve.	Knowledge exchange/share (multidisciplinary) to create new products and services.

### The Prep

A personalised email was sent out to known participants already involved in the study inviting to take part. Additionally, an add was designed and emailed to the Scleroderma and Raynaud’s Association where it was promoted on their social media platforms.

Twelve women confirmed attendance, however on the day, 10 turned up.

The workshop was meticulously planned out and discussed with supervisors. Although I had visited the venue beforehand for a tour, I

returned after choosing the rooms to familiarise myself with the heating system and computer software available to run a slide presentation.

Facilitators met at 11am to work at creating a comfortable environment for the participants and prep the room for the first two activities.

The room needed to be warm, so the heating system was switched on and catering delivered tea, coffee, biscuits and fruit at 11:30am.

Time	Activity
12.00 – 12.10	Welcome, Introductions, aims
12.10 – 12.15	The Plan
12.15 – 12.25	Activity 1 – Future Visioning
12:25 – 12:35	Activity 1 – Display & Categorise
12.35 – 12:50	Activity 2 – Mapping Change
12:50 – 1:05	Activity 2 – Group Discussion
<b>1:05 – 1.35</b>	<b>Lunch – The Library</b>
1.35 – 2.15	Activity 2 – Bring to Being
2.15 – 2.20	Break
2.20 – 2.50	Activity 2 – Group Discussion
2.50 – 3.00	What’s next?
3.00	End

### Commencement and laying a foundation for the 3hours to follow

The design workshop with a focus on Raynaud’s commenced with a welcome, thank you and appreciation for their involvement. I introduced myself and asked the co-facilitators to do the same. I then asked everyone else to introduce themselves by telling



everyone their name and where they are from. I deliberately asked them to tell us their name and where they are from to manage the time it would take to go around the room for the introductions. For this reason, I decided not to ask them to tell us about their condition, as they could share this information and stories during the planned activities. However, they automatically began sharing their experiences about what they suffered with, challenges etc. To try and keep it short, I needed to sometimes step in saying thank you for sharing and asking the person next to them to introduce themselves. In this instance, knowing their names was crucial! As I felt it kept a friendly connection but remaining firm and in control of moving the introductions along. Next time, I would need to include this in the introduction request but also emphasis the fact that there will be plenty of opportunities for sharing in more depth during the activities.

### **Activity One – Future Visioning**

This activity was borrowed from the Dialogue course. *Takes a positive look at what people want in the future. By focusing on the future and on positive visions, this step can free people from entrenched positions and negative mindsets. It can reveal unexpected surprising common ground and point to ways forward no-one had thought of before.*

The women were asked to take three post-it and to write three things which they are please with in the future. This part was an individual task. Once they were finished, they were encouraged to have a discussion with the person next to them about what each one wrote. This process of going from an individual task to speaking with whomever was sat next to them was essential in slowly making the women feel comfortable and participation before taking part in a group activity.

The women were then asked to place the post-it on the wall and take a few minutes break while the facilitators grouped them together to form categories and headings.

I had pre-written headings or categories, which were informed by the data gathered in the one-on-one interviews. The reason was to try and remain in control and manage the group and time. However, it was also in the plan to invite women to crate headings.

When the women stood up to place the post-it on the wall, some of them automatically began putting grouping their post-its with others. I remained on the side lines allowing them space to continue this surprising act, and only stepped in to complete the task once

everyone stopped what they were doing and started having a discussion with the person next to them.

I grouped the final post-it and created headings for each group/category. I then asked for everyone's attention and called out what was on each post-it and the heading created, inviting any one to change or add anything. Asking if everyone was happy, I then explained the next activity. Each group will take a heading and have a group discussion about it. I allocated one group with clothing category and then the other with health practitioner visits. This was intentionally as they are the two main topics the PhD will focus on.

### **Activity Two – Mapping Change**

The second activity was to Map out ideas of what they would like to see changed to work towards having better....

After a group discussion, each group shared what they had discussed.

### **Activity Three – Bring to Being**

Each group were given six scenarios of events to design an outfit for and asked to choose one. Table 1 was asked to create a 2D design using magazines and table 2 was asked to create a 3D design using fabrics.

Group 1 chose a real case scenario of going to the races, this was because one of the women was planning on attending a ladies day out at the horse racing and was eager to design what she could wear.

The group then showcased what they had designed to the room and a discussion followed by an impromptu show and tell.

## Advertisement for the Design Workshop for Raynaud's

YOU ARE INVITED  
to join us for a

### DESIGN WORKSHOP FOR RAYNAUD'S

Nottingham Trent University is looking for women who live with Raynaud's to take part in a design workshop.

You will be involved in a small group discussion to explore the everyday challenges of living and coping with Raynaud's. Through tailored design activities, you will get the chance to share your experiences and voice your needs and desires with like-minded women. The information gathered will be used to inform new designs in products and services.

**When:** 29th of April

**Where:** Broadway Cinema Nottingham

**Duration:** 12pm-3pm with a light lunch.

**Expenses:** Your travel costs will be covered.

If you wish to take part or would like to know more,  
please contact:

**Lisa Shawgi**

**Email:** [lisa.shawgi2015@my.ntu.ac.uk](mailto:lisa.shawgi2015@my.ntu.ac.uk)

[lisashawgi@gmail.com](mailto:lisashawgi@gmail.com)

**Phone:** 044 7507 265332

## PowerPoint presentation for the Design Workshop with a Focus on Raynaud's

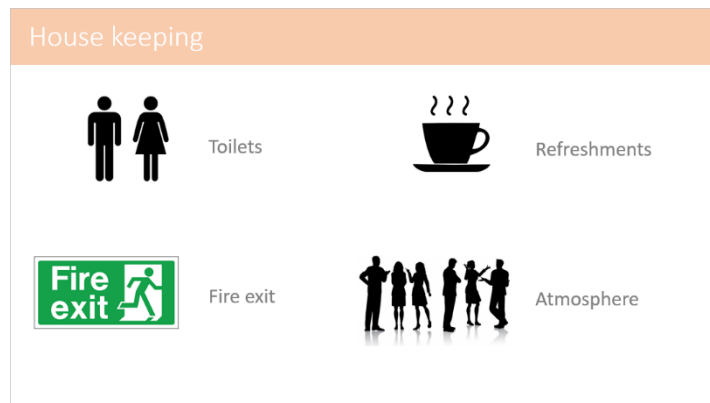
29<sup>th</sup>/04/2018

### Slide 1



- Welcome participants to the workshop and thank them for their time.
- Introductions of facilitators (names, backgrounds and their interest for taking part in the workshop).

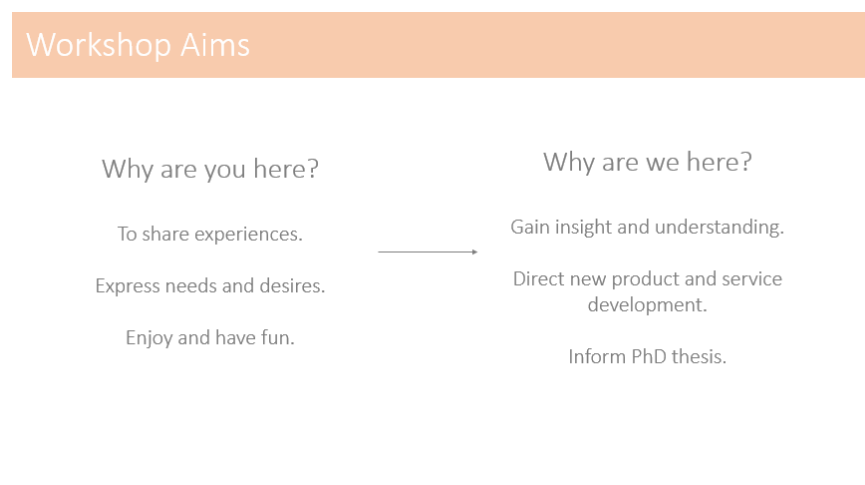
### Slide 2



- Housekeeping (toilets, fire exits)
- Refreshments (tea, coffee, water in corner of room and a 30min lunch break)
- Atmosphere (ground rules):
  - we are here to work together
  - everyone has something to contribute

- give everyone space to speak ‘one voice at a time’
  - no judgement and respect everyone’s views.
  - Have fun!
- So this would be a good time to ask everyone to introduce write a name tag for yourself and introduce yourself to everyone by telling us your name and where you are from.

### Slide 3



- To share your experiences of living with Raynaud’s.
- To voice your own needs and desires.
- To enjoy.

This will help us, and others to:


- Gain insights and understanding in to personal experiences of what it means to live with Raynaud’s.
- To gather information to guide future and existing products and services.
- To identify the main issues and challenges you face.
- To help me with my own research.

## Slide 4

### The Plan

Time	Activity
12.00 – 12.10	Welcome, Introductions, aims
12.10 – 12.15	The Plan
12.15 – 12.25	Activity 1 – Future Visioning
12.25 – 12.35	Break – categorising post-its
12.35 – 1:00	Activity 1 – Group Discussion
<b>1:00 – 1.30</b>	<b>Lunch – The Library</b>
1.30 – 2.10	Activity 2 – Bring to Being
2.10 – 2.15	Break
2.15 – 2.50	Activity 2 – Group Discussion
2.50 – 3.00	What's next?
3.00	End

- Consent form



- Workshop schedule.
- Consent form (the workshop will be recorded using photographs and audio, photographs will be re-produced in thesis and papers, please let us know if you have any issues with being photographed and recorded, personal details are confidential, names will be changed to protect anonymity).
- Please feel free to get up and move around, get a coffee, take a break, get some fresh air and feel free to leave at any time. There will be scheduled short breaks factored in along the way.
- We have a lot to cover and time will go quiet quickly without us realising it, so I will be strict with time.

## Slide 5

### Activity 1 – Future Visioning

The year is 2036 and there has been substantial progress in the Field of Raynaud's Phenomenon.

**What three things please you most?**

## Activity 1 - Future Visioning

- As most of you know, I have been involved in one-to-one interviews and have gathered a lot of information, which has raised challenges, faced by you and others on a daily basis. The workshop focuses on design and future solutions, so we would like to adopt a positive and optimistic mind-set for its duration.
- Which leads me to our first activity. Future Visioning.
- We would like you to take three post-its and write on each post-it, separately; something that you are pleased with in the future, this is an individual task. Then work in pairs to have a chat about what you have written to each other. Take 5-10mins to do this. A general example of something might be: how 90% of energy are generated by renewables. Another could be how the driverless car turned out to be not so great, which is fine as chauffeurs and taxi drivers get to keep their jobs.
- But first, we would like to go around the room and get each of you to introduce yourself by telling us your name and where you are from, please.

## Slide 6

Activity 1 – Display & Categories ( 12:25 – 12:35) 10mins



- Place post-it on glass panels.
- Can we group them in to categories?
- Can we create headings for the categories?

- Afterwards, we will place all of the post-its on the glass panels, take a few minutes to walk around and have a read of everyone else's post-it's and you can also take the chance to get a drink if you wish.
- The post-its will be re-arranged into categories and given headings by the facilitators during this time.
- The facilitators will than read out each heading and see if everyone is happy with them.
- Are there new headings to be created?

## Slide 7

### Activity 2 – Mapping Change (12:35 – 12:50) 15mins

Choose a heading and discuss in your group

What can be done to move towards having an improved, effective, satisfactory and desirable.....  
to help you with managing your Raynaud's?

- Each group will be allocated one or two of the headings to discuss in more detail.
- The heading will be placed in the middle of a large horizontal sheet of paper.
- Participants will work around the heading to write down key ideas and thoughts around the heading, mapping solutions for change.
- Each heading will have a number which coincides with an envelope with prepared questions to help guide the group discussion.

## Slide 8

### Activity 2 – Group Discussion (12:50 – 1:03) 15mins



- Place your map on the glass wall panels.

- The maps will be placed on the wall for the room to see.
- Each group will be asked to share what they have mapped out to help guide the discussion.



## Slide 9

Lunch  
30mins

- 30 minute lunch break
- Give out design scenario cards.
- **Scenario cards for activity 3 (Bring to Being)**
  - Design your perfect garment, outfit or accessory for the following scenarios:
  - You are invited to a wedding in February.
  - You are invited to a New Year's Eve, garden roof terrace cocktail party in January.
  - You are going to a bonfire night in October.
  - You are invited to an engagement party in the Botanic Gardens in November.
  - You are invited to Ladies day at the Horses in September.
  - You are invited to a Halloween wig party at the Hilton.

## Slide 10

### Activity 2 – Bring to Being (1:35-2:15) 40mins

Table 1 – 2D



- Collage of... things you like, how you feel...
- Sharing a story about...a garment, what would you change?
- Expressing an idea for a garment through images & words...

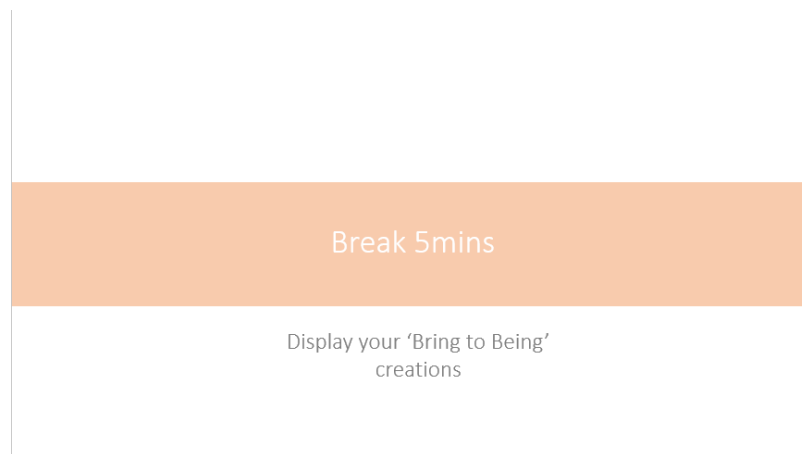
Table 2 – 3D



- Placing fabrics on body....how does it feel, fit?
- Combining different fabrics... texture, performance, colour..
- Trying things on...

- You can do ....
  - 2D will have magazines, templates of clothes, templates of dolls, large paper.
  - 3D will have large fabric, tape, full body mannequin and camera.
- The group are separated in two groups and will have 45mins to complete each activity.
- 5mins min break will follow before bringing everything together to discuss what has been made.

### Slide 11



- Ask participants to display what they have done on the wall.

### Slide 12

## Activity 2 – Bring together (2:20-2:50) 40mins



- Lets share our 'Bring into Being' creations.
- What do you like?
- What don't you like?
- How would it help with your RS?
- Would you add to it?

- Participants will share what they have made in the 'Bring into Being' activity.
- This will have displayed on the back wall and discussed as a group.
- Prepared questions will be displayed on the wall to help guide the discussion.
- Try and tie in what they have done to the first exercise of their needs and desires.

Thank you for coming!

Contact:

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- There will be a 10min gap at the end to thank everyone for coming and say a little about what is next for the project and how these ideas may shape it.
- Comments cards will be given out to allow participants to share something which they want to add.

## Section 1:

### *Future Visioning*

The first activity was designed as a preparatory phase for a participatory session. The activity *Future Visioning* eased participants into an ‘interactive’ environment synonymous of a focus group (Millward, 2012). The women were asked to take three post-it each and write three things, which they are pleased with in the future, discuss what they had written with the person next to them, followed by placing all post-its onto one large wall and grouping them into categories as a team. The purpose of this exercise was it began with a positive mind-set by envisioning a better future by thinking about where they would like efforts of change to be (Escobar et al, 2014). An exercise borrowed from the Public Engagement Beyond Public Lectures Workshop described in Chapter 1. It also allowed participants to slowly become comfortable working within a collective environment, starting as an individual exercise, moving to a partnership, and then working as a group to pool their knowledge and perspectives by “*sharing and comparing*” through exploring and discovering similarities and differences (Morgan, p.12). This was to understand what primary issues, main challenges or primary concerns participants shared regarding living with Raynaud’s phenomenon.

### *Mapping Change*

Having identified several key headings of the challenges participants shared when living with Raynaud’s, the second activity *Mapping Change* was designed to explore two of these challenges in more depth. Two groups of five were asked to map out ideas in response to the question ‘*what can be done to work towards having a more effective, improved, satisfactory and desirable.....?*’ The aim was to “*identify and discuss the barriers or strategies to achieving these changes*” as a community, very much in keeping with a participatory approach to research (Hennink, 2014, p15).

## Section 2:

### *Bring to Being*

Each group were given six scenarios of events to design an outfit for and asked to choose one. Table 1 was asked to create a 2D design using magazines and table 2 was asked to create a 3D design using fabrics.

Group 1 chose a real case scenario of going to the races, this was because one of the women was planning on attending a lady's day out at the horse racing and was eager to design what she could wear.

The group then showcased what they had designed to the room and a discussion followed by an impromptu show and tell.

### **Data from design workshop with a focus on Raynaud's**

#### **Activity one**

**Forming categories by grouping together what the women wrote on post-its to answer the question *What three things pleased you most in the future?***

<b>KNOWLEDGE</b>
Find answer Why? & solution!
Preventing NOT waiting for worse
Everyone knows what it is
Much earlier diagnosis, using family history & gut biome info
More out there to help, be it something given, took/wore etc
<b>TECHNOLOGY</b>
Remote controlled (? Voice controlled) door & car keys

**ENVIRONMENTS**

To be recognised as an official hidden Disability

Electricity/gas allowances for sufferers

Cheaper energy to keep us warm

Free or subsidised heating as R recognised & acknowledged

For public venues to be warm

For there to be a decreasing use of air conditioning

All houses are warm & dry. Funding for heating/insulation etc

**HEALTH PRACTITIONER VISITS**

Medication with no-side effects

Medication – no side effects

Hopefully no more digital ulcers!

It's reversible

That there is progress with diagnosis commonly found with related diseases

Targeted treatment manages it safely, with minimal side effects

Doctors more understanding – Prescribe drugs when necessary; not to get rid of you

(if progress has given effective treatment) not having to juggle gloves all the time
Easy non-invasive surgery to fix Raynaud's
<b>CLOTHING</b>
One layer clothing to keep me warm
Longer sleeves, longer length tops, natural material
Clothing that is lightweight & warm – not expensive
Ultra-thin gloves – not mittens
<u>Gloves</u> to be able to do all work and feel warm
Warm clothing is available that is suitable for a business environment
Smart fabric that regulates itself
<u>2036</u> The development of thermostat – controlled electricity heated fabrics that adjust the temp to suit your hands/feet etc
Clothing made of recycled/env friendly material – fleeces = microplastic fibres
Magical clothing to keep you warm e.g gloves still use tech but also keep warm

Potential headings for categories

Tops  
Accessories, hats, and scarves  
Outwear jackets  
Shoes  
Gloves  
Planning & preparation  
Wellbeing, mental, emotional  
Leisure activities  
Social events  
Work support



Image: participants grouping post-its together

### Activity two

**What can be done to move towards having improved, effective, satisfactory, and desirable clothing to help you with managing your Raynaud's?**

### **CLOTHING**



Fashionable clothing

2 pairs of socks

Alpaca socks (Perilla)

Gloves with finger only, waterproof too (drawing with it)

Fingers end covers

Shoes with memory foam, sketches

Ankle warmers

Wrist warmers shaped to fit

Battery operated gloves (heated)

Gloves you can feel through the fingers but warm

12% silver gloves ( I feel very soft in them)

Cotton – ticking underclothing to prevent wool fibre coming through & irritating

Blaze wear failed – heated insoles with drawn / wiring not up to flexing of foot

Moisturising cream e.g Atrixo for hands & feet. Urea based cream

Cream or lotion to cover hands & keep warm (gloves in a bottle from Superdrug)

### **Facilitator's notes from the Raynaud's Syndrome workshop**

29/4/18

#### **Clothing design**

There's often a need to be smart as well as warm

Clothes should be windproof outdoors

#### **Socks**

Heated socks are useful. There's a difficulty with the heating elements wearing out in socks, so one maker ?Blaze had stopped producing socks. One recommendation was HK heated socks from Vulcan.

Toes get especially cold. There's a need to avoid rubbing from seams around the toes in any sock or tights. Alternatives are to put the seams across the top of the sock, not the toes? Hand-knitted socks can be made without seams eg hand-knitted socks eg from John Arbon.

About 20% Nylon mixed with alpaca or mohair can lengthen the life of warm socks. But socks made with these are still not robust enough to last more than 4 days carrying out farm work in boots. Bamboo is considered a good sock material, but is often insufficiently robust.

Socks with extra padding on the toes and heels are appreciated for comfort and warmth.

Tights can be a problem, as they tend to pull on the toes. Tights with stirrups can help, so can thin, but warm leggings.

## **Tops**

Tops with thumb-holes in the sleeves are useful.

Fleece-lined tops eg M&S Heat-gen extra

Windproof tops are useful for keeping warm outdoors eg Montane brand

## **Hands, pockets and gloves**

Keeping hands warm is a big issue. Techniques used include a heat lamp UV nail dryer.

Scarves with pockets are useful for warming hands. The scarves can have buttons to fasten them at the front.

Wrist warmers are good. There's a need for better, smart design that don't look like tubigrip elasticated support for injuries.

There's a need to be able to feel with fingers as well as keeping them warm. Undoing knots and bailing twine on a farm is a difficulty without getting very cold hands. There's a need for gloves with reinforced, warm tips that you can feel through. The opposite of fingerless gloves are needed: finger end covers to warm the pads of the fingers, without the rest of the glove. Suggestions: attach the finger covers to a wrist strap or bracelet.

## **What can be done to move towards having improved, effective, satisfactory, and desirable health practitioner visit to help you with managing your Raynaud's?**

Public awareness

Education for practitioners

Posters for public awareness

Transparency with medication

More time for visits

Letter from GP to help with support at work      Education

Sign posting to accurate reliable information

Bubble hat, everyone is wearing one

Use of the right language

Fashionable clothing for younger sufferers

Leaflets – with medication advice (including natural remedy)

Keeping fit

Dr. listening to the patient

Raising awareness of secondary Raynaud's complications

GP suggests, considers alternatives

– acupuncture

– reflexology

- Dietary – hydration

Consistency in consultations

- Some GP

- Consistency in knowledge understanding

Holistic approach

- Primary?

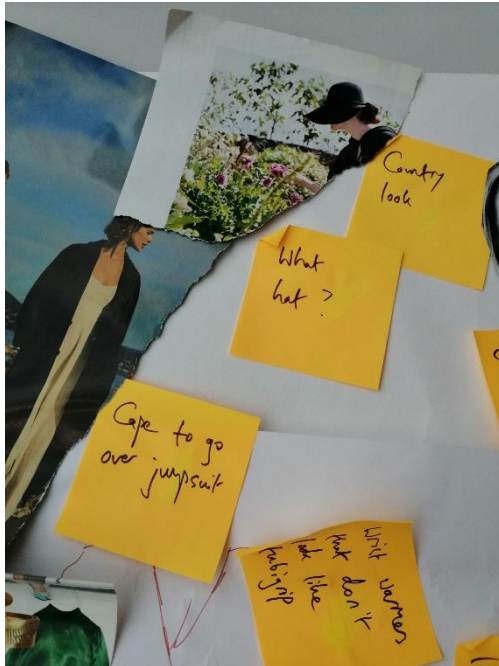
- Secondary?





The jumpsuit design.

As the women adopt layering of clothing, a suggestion was presented that a bag on wheels would be ideal for carrying around discarded layers, gloves etc.

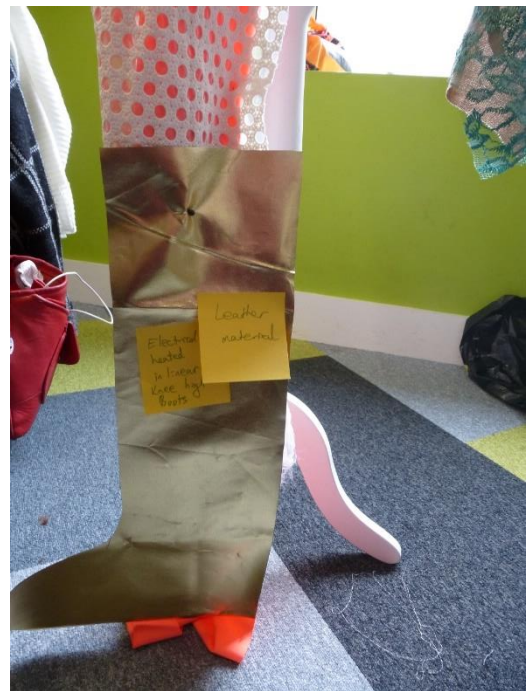


A country look of wearing a cape over the jumpsuit and a decorative hat for extra coverage.



Design an outfit to attend a roof top terrace New

Year's Eve party.



The women went for fabrics such as lace, organza, patent leather and a transparent fabric which is the white textile with cut out circles. A soft jersey fabric was used to wear underneath the white cut out fabric to act as a thermal layer. The green lace like fabric is meant to be gloves which are elbow length. These are also lined with a lighter fabric for warmth but also to show off the lace pattern. The patent gold leather fabric was used to create a little jacket which was more for a decorative purpose as they would be warm enough from the thermal layers. Matching knee-high boots were created with electric heated liners to keep their feet and legs warm.

There were thicker fabrics available such as wool and corduroy, but the women were more interested in finer materials, ones which had an aesthetic appeal to them, with an interesting texture as well. The women also went for fabrics with colour.





Louise – Initial Themes
1. Trying to make sense of where RS comes from (hereditary?) <i>“Always felt the cold”</i> . Mum is Greek.
2. Recalls the <i>“trigger point”</i> in her life where the RS manifests itself and becomes visual, when she got <i>“very, very cold”</i> in minus temperatures. <i>“your nose is going blue”</i> . RS appears to others.
3. Louise goes from just having bad circulation and feeling cold to <i>“physical evidence”</i> – hands go white, blue, and tingly and feel pain. Her symptoms have become worse over the years.
4. When Louise gets cold and wet, she feels worse. <i>“feel like somebody else’s fingers and feet”</i> . A sense of body disconnected. Mind-body disconnect. Embodied disconnection.
5. Reaching <i>“that level of cold”</i> makes you feel <i>“completely miserable”</i> because she cannot enjoy being outdoors.
6. At this time of year (winter), you <i>“have to make plans”</i> , you constantly ask questions about what you should wear, how best to keep warm, how long you’ll be out for. Mentally exhausting.
7. You get so cold outdoors that a <i>“happy experience”</i> turns in to a <i>“miserable”</i> one – so you don’t go with friends to outdoor events such as Nottingham Light Night.
8. With RS, you are aware of time – how much time you have before you stop enjoying yourself because of how you are feeling <i>“I just know that I’ve got maybe half an hour before I got no sensation at all”</i>
9. You <i>“miss out on a lot of things really”</i> making you to <i>“just feel really sad”</i> and <i>“I, I can’t resent it cos it’s nothing to resent”</i> . Conflicting feelings. A feeling of resentment towards a part of you but you can’t justify it by putting the blame on it, so it leads to sadness. Feeling deflated nothing you can do about it.
10. Upsetting that when the <i>“ball of the foot across the end was completely without feeling”</i> you can’t <i>“hardly walk”</i> and you had to ask <i>“him to slow down cos I just couldn’t walk properly and I explained why”</i> Is this making you aware of not being <i>“normal”</i>
11. Feeling bewildered, your fingers go <i>“completely numb but [to] feel pain”</i> – pain is transmitted but sensation/touch is not – making it impossible to use keys to open doors.
12. With RS you have to look for something to see if you got a hold of the object because you will not feel it in your hands. You have to rely on sense of sight as oppose to touch. Sense substitution.
13. A sense of uselessness. Hands go <i>“white and just useless, completely useless”</i>
14. <i>“yeah I do this [shakes her hands in front of her] and they don’t feel as if they are there you know”</i> Feels disconnected from her hands.
15. Feeling that an Alien object has attached itself to her hands <i>“feel like something else has been attached to the end of my hand”</i> .
16. Barrier to connecting with friends. <i>“I have my phone for emergencies”</i> When you are outdoors, you do not want to take your hand out of your glove to answer any calls. You just ignore them.
17. Dreading the moment when you feel your hands start to get cold, as you <i>“know there is no way back [...] I mean the emotional thing is dread”</i>
18. Doing what you can to try and prevent your hands getting cold – <i>“the trick is not to let your hands or feet get cold in the first place [...] out with warm hands and feet and keep them warm”</i> .
19. You want to stay home to keep warm, but you have no choice if you walk the dogs.
20. Carrying with you a feeling of dread <i>“you know, walking and talking with your friend is a nice thing to do, but I did know that, yeah, I dreaded the moment when I’d have to actually use my hands”</i>
21. Time frame awareness <i>“I just know that I’ve got maybe half an hour before I got no sensation at all, hands or feet”</i>

22. Feeling frustration/helpless of level of difficulty to carry out daily small tasks – undoing shoelaces. <i>“I just couldn’t, couldn’t, I had to wait until I had some sensation in my fingers so that I would be able to undo the laces of my shoes”</i>
23. An awareness of the waiting time to try and get hands to a stage of moving them slightly with force <i>“it was five or ten minutes, so even then they weren’t, they weren’t um, normal, but I could actually use them, I could force my fingers to movements”</i>
24. Have to be extra vigilant when touching hot surfaces. You cannot rely on or trust your sense of touch. <i>“I can’t feel my hands right on the radiator I have to put the towel over otherwise I’d burn them because you do the damage before you feel the pain”</i>
25. Isolation in a group. Even though you’re in a crowd with body heat, your exposed hands and face are still cold. Making you aware of not being part of the group because you sit there cold and miserable. <i>“although you’ve got the press of people either side of you, your face is in the cold and your extremities are, you know and um”</i>
26. Disappointment follows promising so <i>“I bought these new pair of boots and I thought they were fur lined and I thought they were going to do the trick”</i>
27. Feeling a sense of alarm/fright/shock for what can happen to isolated parts of the body. <i>“so that, that, that’s something that’s a little bit alarming you can damage yourself without realising it cos you got no touch sensation”</i>
28. RS isolates parts of the body and causes physical harm within that area <i>“I didn’t, I didn’t feel the pain of the blister huge, huge blisters on the back of my feet so my whole, the whole of my feet were numb”</i>
29. She points out that her shoes are two sizes too big to accommodate thick sock linings. Almost as if to make sure you know she hasn’t got huge feet. Her feet are a smaller size.
30. Wearing shoe sizes, two sizes too big so you can wear thick socks.
31. Trying to find opportunities to warm up amongst the busyness of everyday life must be difficult. It’s a downward trajectory once the feet hit that cold stage causing them to turn blue, unless you have a chance to warm them up, it’s a downward slope <i>“right so first my feet start going blue, first of all um, yeah and I know then it’s a downward trajectory and from, unless I’m, unless I’ve got the opportunity to warm up when my feet are at the blue stage then it’s straight on in to the white stage and they’re completely sort of waxy colour not, yeah sort of dead, dead looking”</i>
32. A sense of horror of how your feet must look when the blood is “pulled to the core [...] they’re completely sort of waxy colour not, yeah sort of dead, dead looking” The use of dead twice emphasises a disconnection of part of her body.
33. Close embodied gestural movements such as curling fingers in to palms inside gloves and <i>“just, just squeeze”</i> to try to get the <i>“veins working”</i> .
34. Physical uncertainty of how you feel. Mix feelings of hope and disheartens doing things that you think helps but it does not. <i>“it helps [sighs] it doesn’t really help, but it feels as though it helps a bit”</i>
35. Amused that friends buy gloves for her out of sympathy <i>“somebody gave them to me actually, they felt sorry for me [laughs]”</i>
36. Friends buying gloves leads to embarrassment because you have to tell them they don’t work, so you don’t wear them. <i>“I felt really embarrassed telling them no they didn’t work either”</i> .
37. You buy <b>winter</b> gloves in the hope that they should be warm enough, but they don’t help.
38. Activities such as cycling in the winter <i>“is tricky”</i> because you can’t feel the brakes.
39. Continuously experimenting with different materials to try and figure out what works best.
40. Cost plays a role in deciding whether to buy an expensive pair of gloves unless they could be road tested. <i>“I couldn’t bring myself to walk out of the shop with a two-hundred-pound pair mittiny gloves on the off chance that they would work”</i>
41. Experiencing the performance of a fabric leads to reassurance that it works. <i>“if I came across down gloves or mittens now I would certainly think about it, when they said two hundred</i>

<i>pounds I just said I can't possibly, but I hadn't had the ongoing experience of wearing a down jacket"</i>
<b>42.</b> A waterproof down jacket <i>"seems to be a really effective way of keeping the core warm"</i>
<b>43.</b> Having the right clothing allows you to be sociable, experience a sense of enjoyment and living. Also creates an attachment to a garment for years. <i>"it's fantastic, I absolutely love it um, and I've worn it for the last I think five years, something like that... in the height of summer but I do go to festivals which means I'm out of doors in the evening till late and it's perfect, absolutely perfect"</i>
<b>44.</b> Sense of bewilderment how other people stay warm in the things such as ponchos, they don't seem practical. So how could they keep you warm?!!
<b>45.</b> Researching and reading report of what fibre works best still leaves sense of uncertainty and not reassurance. <i>"I think wool is better than anything that reports to be um, what you call it, you know insulating, that is synthetic possibly, I don't know"</i>
<b>46.</b> RS disables you and you need to ask for assistance with simple tasks. <i>"doing up a zip when my hand's cold I can't do it I have to ask somebody else"</i>
<b>47.</b> Exhausting constantly overcoming difficulties such as managing fastenings on garments. Always battling to stay warm. <i>"I just I just think I have to find a way around it, because the fastening, the fastening isn't gonna keep me warm, the garment is gonna keep me warm, so I'll overcome the difficulty of how it fastens"</i>
<b>48.</b> A lack of understanding of RS from others forces you to lose control in self-managing your RS to avoid discomfort and harm to yourself. Lack of self-control/self-empowerment of your symptoms. <i>"everybody knows I've got Raynaud's... but there's no kind of recognition that it would cause discomfort or damage, so I have to do it, I don't have a choice"</i>
<b>49.</b> SELF-CONSCIOUS IN YOUR APPEARANCE. WEARING WHAT YOU WANT CAUSES PAIN. DISTINCTION OF "ORDINARY" SHOES TO "ASSISTIVE" SHOES
<b>50.</b> Finding clothes that are warm and attractive is exciting. <i>"my nose goes completely blue and so I wear a snood the whole time... ] great aren't they?! really nice things"</i>
<b>51.</b> Wearing snoods helps to keep your nose warm and tries to stop it changing colour attracting unwanted attention. <i>"people say "you've got something on your nose"... children say you're nose has gone blue, yeah so I have to pull that, I wear it, I wear them all the time and I just pull them up and my breath inside the snood sort of warms my nose up"</i>
<b>52.</b> Becoming some one you are not by doing things you are unaccustomed to, out of character. <i>"they gave me um, some foundation that people use when they've got scaring, it was horrible, I hate, I don't wear a lot of makeup um, but I sort of slavered it over my nose and then thinly over the rest of my face"</i>
<b>53.</b> Wearing loads of layers (thermal) helps keep your core warm.
<b>54.</b> Having RS means that you are not a part of what society deems aesthetically acceptable. <i>"it's not part of the aesthetic, the acceptable aesthetic"</i>
<b>55.</b> Silver gloves are better than silk or merino wool.
<b>56.</b> Replacing gloves you know will not last very long (not durable) but no choice as "they're probably the least worst" in helping relieve RS symptoms.
<b>57.</b> Finding very warm clothing at a reasonable price leads to a sense of amazement describing a garment as "super-duper". Magical powers.
<b>58.</b> Layering of garments is ideal to accommodate various ambient temps at work <i>"I would be wearing that one in the morning so the old part of the school which is freezing and um, that would be underneath and then in the afternoon I can take whatever top layer off and just wear that on its own"</i>
<b>59.</b> Heat Gen leggings worn underneath ordinary trousers to keep warm <i>"I wear, I would just wear ordinary trousers with um heat gen leggings underneath um, I don't, I haven't I did used to have some woollen trousers, but I just found them uncomfortable, itchy"</i>

60. RS creates embarrassment as you need to go up one or two shoe sizes to cater for layering of socks <i>"I'm just not embarrassed about it anymore, I just think who cares, they think I'm a size nine, I don't care, or nine and a half"</i>
61. Seeking reassurance you are not alone in the pain you experience during the warming up period <i>"it's really unbearable and I'm weeping when I come in, it's just, and the pain... there is significant pain as they warm up you know... does yours hurt, does yours hurt as it starts to warm up?"</i>
62. Your hands get so unbearably cold it makes you cry and when your hands warm up it causes significant pain <i>"there's a deep achy pain and you go through that and then it's pins and needles and then it's, then it's back to you know, you being able to use your hands, immersing my hands in warm water that helps, not with the pain, the pain is there"</i>
63. Parts of your body feels alien. <i>"my hands, they don't feel like ice blocks, they just feel like somebody else's hands attached to my wrists because they don't, they're not doing what I want them to do"</i>
64. Going through emotions of elation to disappointment after discovering a pair of shoes designed to keep your feet warm. But do not.
65. Annoyance of not being able to carry out tasks you automatically did in the past. <i>"those sorts of things I find really annoying, things that you do automatically and have always done automatically"</i>
66. <i>"God just make it stop"</i>
67. RS does not give you the choice/option to fully experience nature because you are covered up so much. <i>"I like being out of doors and experiencing being out of doors, I've a head set with cups, keeps my ears warm and then the hat on top um, is, is really good actually but it's not always what I want"</i>
68. THERE IS A SMALL WINDOW DURING THE YEAR THAT YOU DON'T THINK ABOUT THE RS. BUT AS SOON AS THE LIGHT CHANGES AND IT IS APPARENT AUTMUN IS AROUND THE CORNER YOU THINK "GOD IT'S COMING".
69. RS affects your body behaviour in social situations, creating negative assumptions of how people read your body language. Such as keeping your hands in your pockets.
70. Having so many layers on still means your hands will get cold. <i>"Heat Gen and two more tops..."</i>
71. Continuously assessing future situations to make the best judgement call of what to wear and use to help you manage your RS. Mentally exhausting.
72. Hand warmers work to some extent.
73. Electrical heated gloves produce continuous heat, but the heated elements must reach the finger tips.
74. Lack of support from GP due to a policy which states that the NHS only get involved once ulcers develop. <i>"when winter was coming on again or it was getting really cold and I, I went to the GP to see if there was anything that I could get from the GP that I could use to get out of having to stand outside in the freezing cold for twenty minutes at a time, and loose the feeling in my hands and feet.. NHS doesn't get involved with Raynaud's until you start developing ulcers"</i>
75. I came away thinking oh my God, that nothing I've read had prepared me for that, soooo but actually I was already doing all I felt, I feel I'm doing all I can anyway to, and, and just try and not to let my feet get cold really
76. <i>"and I said, and I, it really um, shocked me to hear the word ulcer, because from the reading I'd done I knew that you'd have to protect against tissue damage um, and I hadn't equated that with ulcers cos I'm not a medic"</i>
77. Doing all you can to try and not get cold. All might be in vain though. <i>"I feel I'm doing all I can anyway to, and, and just try and not to let my feet get cold really"</i>
78. Lack of interest from the GP. Reasons could be because there is nothing you can do.
79. A sense of dis-heartened. You do everything you can and none of it works.

<b>80.</b> Self-diagnosis.
<b>81.</b> No procedure for official diagnosis of Raynaud's.
<b>81.</b> Requires something to keep her hands and feet warm for more than half an hour.
<b>82.</b> Putting a name to something you already know you had a problem with creates initial optimism, especially with the discovery of the RS website and online shop. This slowly turns to realisation that nothing promoted works.
<b>83.</b> Planning for the journey and destination and having to make a choice between being comfortable and warm during the journey or for the duration of the event.
<b>84.</b> An unassuming act for an RS sufferer, such as wearing sandals, elicits strong emotions of love and joy.
<b>85.</b> The experience of testing a product by wearing it would lead to a consideration of purchasing more expensive items.
<b>86.</b> A fabric that could control body temperature and caters for the body's inability to boost circulation to assist with warming up and cooling down.
<b>87.</b> A circulation booster to avoid the need to cover your nose to stop people from commenting.
<b>88.</b> Length of time it takes for your hands to gain any feeling is half an hour minimum which causes issues if you have to do something immediately.
<b>89.</b> Positioning your body in certain positions can aggravate the RS and make tasks challenging and disrupt your life.
<b>90.</b> Easier to manage RS when you are indoors, use hot drinks, fleece blankets, heating and fires to stay warm.
<b>91.</b> Building designs and architecture from colder countries works in favour of how RS sufferers dress and wear what they want to wear at social events.
<b>92.</b> THE VISUAL AESTHETIC OF A FUNCTIONAL THERMAL GARMENT PERFORMING TO KEEP YOU WARM ADDS TO USER ATTACHMENT. AND IF THE COST IS RIGHT, IT IS A BONUS.
<b>93.</b> You just get on with it. You cannot afford to feel self-conscious about the number of layers you have on compared to the people around you. Even if it is mid-summer.
<b>94.</b> Desire to be layer free. A sense of envy towards people who are able to wear t-shirts no matter what the season is.
<b>95.</b> Always carrying an extra layer. Ideally, a light weight and thermal top so rolls up neatly in your bag.
<b>96.</b> Re-treating to the toilet in public places to re-arrange layers to accommodate change in conditions from inside to outside a building.
<b>97.</b> A lack of understanding of the implications of Raynaud's creates a less than sympathetic mindset. Lack of empathy. Unwillingness to make work environment comfortable for RS sufferers.
<b>98.</b> NHS provide no care package and have in place any preventative measures for ulcers.
<b>99.</b> Once your hands and feet are cold, it is very difficult to get the circulation back without anything significant.
<b>100.</b> Taking precaution to keep your hands and feet warm, even though you know they will not make a difference, helps psychologically if not physically, avoids disappointment/discontent in oneself.
<b>101.</b> Men's shoes are wider at the toe front giving more room for layering of socks.
<b>102.</b> Have to just bite the bullet and remove socks to do what you want to do in yoga.
<b>103.</b> Ongoing jokes from other people about socks when you don't need to.
<b>104.</b> Observing someone with RS to open a door can create empathy and a true understanding of how RS can affect the sufferer to the point of debilitation. "an eye opener"
<b>105.</b> With RS you take ten minutes to prepare to get out the door creating a sense/awareness of impenitence from others

**106.** The “fashionable” society deems what looks acceptable. And wearing Ug boots with a dress or skirt makes the RS sufferer think it “looks strange”. Therefore, not acceptable and does not do it.

**107.** RS makes you look bulky with so many layers on during winter.

**108.** Small details such as fleece lined pockets greatly adds to the delay of experiencing RS symptoms.

**109.** The change in **to ordinary shoes** with aaa... **an ordinary sole**, my feet they are so sore you know, they got so cold, they were painful in the evenings, I was going, I went to a yoga class and **I couldn't role over on my toes**, you know when you go from downward dog, upward dog because the ends of my toes have got so cold during the day that they were painful in the evening, so I went straight back to you know **never mind how I looked**

**110.** “I came away thinking oh my God, that nothing I've read had prepared me for that, soooo but actually I was already doing all I felt, I feel I'm doing all I can anyway to, and, and just try and not to let my feet get cold really”

#### Grouping of Sub-ordinate themes

##### **Visual effects of RS in the public domain/sphere**

1. Friends draw your attention to your nose turning blue and advise covering it up

46. Being the centre of “*an ongoing joke*” because you wear socks and jumpers when no one else does. Playful joke

47. Having “*everybody comments now*” on how your nose looks, so wears a snood the whole time

48. Self-awareness. Wearing a “*snood the whole time*” because “*everybody comments now*” on her nose going blue

##### **Riding a rollercoaster of emotions**

2. Finding it “*completely miserable*” being outdoors

7. Having frozen hands, feet and having to cover up your nose, “*it's just, um, it's not a happy experience*”

8. Feeling sad because “*I miss out on a lot of things really*”

##### Working within a time-frame

6. Awareness of a time-frame “*I know that after half an hour I'll be so miserable*”

16. Facing emotional dread of experiencing “*no sensation at all*”

25. Facing “*a downward trajectory*” once the cold sets in

20. Alarming the lack of sensation in feet delayed the onset of feeling pain of huge blisters from shoes

### Despair

30. Desperation leads to wearing two pairs of “assistive” gloves in tandem *“I thought wearing both might help... yeah”*

64. *“God just make it stop”* a sense of despair throughout the winter

32. Always hoping something you discover might help

### Anticipation

69. As soon as you notice the light changing going in to autumn, you become anxious with anticipation

94. Finding it “frustrating” others are unaware of the “implications” of RS

### **Excessive planning and thinking ahead**

3. *“have to make plans”* and *“have to think”* what to wear, how to get there and how long spent out. What, How, Where?

72. Assessing situations *“Making judgements about the least worst options”*

79. Excessive planning for going out. Planning what to wear for the journey, it’s duration and for when she reaches the venue.

### **A shrinking world**

4. *“probably won’t go”* to Light night” because it’s out of doors.

7. Not attending events you want to go to because they take place out of doors.

29. No chance of gardening now!

### **The decision is made for you**

4. Influences future decisions negatively on attending a cultural event, *“now I probably won’t go”*

### **Self-worth**

13. Sense of uselessness, as your hands are *“just useless, completely useless”*

### **Material Comfort; discomfort**

21. Discovering wearing a slightly rougher fabric against your skin causes pain

22. Discovering that softness provides a *“cushioning”* experience against being cold

34. Attracted to fluffy material things for comfort

37. Managing to *“put off the moment”* by keeping your hands in fleece lined pockets

40. Developing a loving attachment for a jacket *“it’s fantastic, I absolutely love it, um, and I’ve worn it for the last, I think, Five years, something like that, um”*

48. Self-awareness. Wearing a *“snood the whole time”* because *“everybody comments now”* on her nose going blue

49. Exciting discovering *“really nice things”* to keep you warm

57. Avoiding discomfort of woollen trousers (smart warm trousers) by wearing *“ordinary”* trousers with leggings underneath them

71. Comforting, important to have soft fabric next to her skin

80. Balancing comfort and dis-comfort *“but you know I have to wear lots of layers and they’re all wrapped around my waist in the end so, but the feet, is, really, really uncomfortable because your feet get, expand as they warm as well you, horrible”*

86. Feeling softness against the skin is comforting

96. *“psychological effect if not an actual physical effect”* of wearing soft and fresh socks

#### **Disconnection/Barriers to connection**

14. Ignoring phone calls *“cos I’d have to take my hand out of my glove so....”*

66. Keeping your hands in your pockets the whole time when you’re with your friends

68. Unable to experience nature because you are covered up so much. Feeling disconnected from nature

#### **Choice**

56. Desire for socks that have glitter in them

81. Loving wearing sandals for its freedom from encasement of her feet

83. Seeking freedom *“I don’t want to be encumbered”* desire for a smart fabric

84. Desire for a *“skin perforation”* to avoid the need for hiding half your face away.

54. Exciting at discovering *“super-duper”* thermal garments

95. Disappointed the NHS have no care package, preventative measures, offer a way to avoid ultimate outcome of ulcers.

#### **A cycle of repetition**

5. *“I haven’t been any of the years”* repetition of not attending a re-curing cultural event. An endless cycle of missed opportunity to experience an evening of entertainment

#### **Not feeling “normal” / Left out**

10. Being left behind *“I asked him to slow down cos I just couldn’t walk properly”*



<p>17. Sensing your hands don't feel <i>"normal"</i></p> <p>41. Aware of what other people wear, how they dress</p> <p>53. Having RS means that you are not part of what society deems aesthetically acceptable <i>"it's not part of the aesthetic, the acceptable aesthetic"</i></p> <p>51. <i>"it doesn't look like anything else"</i> feeling your appearance is abnormal</p> <p>52. Fitting in by behaving out of character to avoid standing out. Wearing scaring make-up to hide visual effects of nose.</p> <p>91. Developing a <i>"huge envy"</i> towards people who <i>"walk around in t-shirts, winter and summer..."</i></p>
<p><b>Sense substitution</b></p> <p>11. Relying on your eyesight instead of touch <i>"touch isn't so I have to actually look at my keys um, I have to look and find them from actually feel them"</i></p>
<p><b>Disembodiment / Body snatcher</b></p> <p>12. Feel like <i>"something else has been attached to the end of my hand"</i></p>
<p><b>DIY Management/DIY "MAKE DO"</b></p> <p>15. Trick is not to <i>"get cold in the first place"</i> challenge is trying to stay warm</p> <p>23. Make do. Placing heat packs in boots</p> <p>27. Curling fingers inside gloves <i>"It helps [sighs] it doesn't really help, but it feels as though it helps"</i></p> <p>55. Constantly managing layers of clothing to stay at a comfortable body temp. Exhausting taking layers on and off, on and off</p> <p>59. Trial and error, trial and error, to find out what works best in clothing</p> <p>60. Assembling an <i>"emergency kit"</i> in the car to help cope with a RS attack</p> <p>74. Continuously researching on how RS can affect you physically to avoid tissue damage (consumed)</p> <p>92. Depending on layering. Finding comfort in carrying extra layers in hand bag</p>
<p><b>Self-will</b></p> <p>18. Being forceful with your movements/ acquiring force to move fingers</p> <p>35. Continuing an on-going quest to work out what materials help manage her RS</p> <p>70. Enduring symptoms <i>"I'm kind of used to..."</i></p> <p>85. Being patient with time and waiting to have full control over her hands so you are confident in using your hands with knives</p>

<p>90. <i>"Riding out"</i> feeling self-conscious for covering up more than others</p> <p>89. Developing a focused mindset on being sensible with wrapping up and being less concerned with appearance (style)</p>
<p><b>Self-perception</b></p> <p>28. Perceiving friends to pity you, giving charity bought gloves <i>"they felt sorry for me [laughs]"</i></p>
<p><b>Self-awareness</b></p> <p>31. Embarrassment sets in as you confess to friends they're gift doesn't help</p> <p>58. Overcoming embarrassment of wearing big shoes for comfort of thick socks</p> <p>88. <i>"sparkly"</i> thermal tops <i>"appeal"</i> to her as <i>"you weren't wearing something your mad aunt"</i> would wear. Conscious of her appearance.</p> <p>98. Desiring to wear a dress or skirt being conscious of appearance of Ug boots look with them.</p>
<p>33. Discovering yourself in a <i>"tricky"</i> situation when cycling because you can't feel the brakes</p> <p>63. Annoying not being able to carry out tasks you automatically did in the past</p> <p>65. A day out in town is tedious because you must keep nipping into shops to warm up</p>
<p><b>Behaviour</b></p> <p>36. Developing a systematic <i>"cost benefit analysis"</i> approach to buying</p> <p>38. Purchasing clothing based on <i>"the ongoing experience"</i> of past testing</p> <p>39. Feeling the need to justify purchases. Guilt? <i>"but it was reduced, it was in the sale"</i></p> <p>61. "Always on the lookout" for something that might help relieve RS</p> <p>93. Re-treating to public toilets to re-arrange layers</p>
<p><b>Reliance</b></p> <p>42. Finding herself having to ask for help with fastenings on clothes and handling keys</p> <p>62. Going from feeling good and independent before the cold sets in, to being dependent on others once your hands get cold</p>
<p><b>Diagnosis</b></p> <p>73. Shocking to hear a policy which states that the NHS only get involved once ulcers develop.</p> <p>75. Worrying due to development of tissue damage and lack of interest from the GP as there is nothing they can do about it.</p> <p>76. Self-diagnosis. No medical procedure for diagnosis of RS.</p> <p>77. Appalled at discovering from GP the destructive nature of RS long term.</p>

<b>Empowerment</b>
67. Amused (delighted) being compared to “ <i>an urban warrior</i> ” when all wrapped up
<b>Control</b>
43. Impact of RS not being officially recognised, leaves her no choice but to carry out tasks which causes her discomfort or damage in the workplace
50. Taking control and being direct in asking people if her nose has gone blue to avoid awkwardness

## Appendix 9: Table of intangible and tangible design features

Table 1: Summary of data to inform sock design		
Tangible, Design Elements	Constructive	Destructive
Fit of the garment	Diabetic socks have no binding around the hem, making it a loose fit around the ankles.	Compression socks are too restrictive. Ribbing around hem of sock causes discomfort due to its tight fit. Seam along toes causes irritation.
Fibres & Components	Cotton, wool and mixed fibres (natural and synthetic) are preferred fibres. Electrical heated elements provide independent heat source for warmth.	Thermal socks are too thick to wear with 'normal' smart shoes. Layering of socks causes restriction to flex and move toes. Issue with durability of electric components. Battery is bulky to wear.
Performance	Handmade extra cup panel to cover toes for extra warmth.	Although two layers of socks are worn, the wearer's feet remain cold in winter months.
Intangible, Design Elements	Desirable	Undesirable
Aesthetic	Socks are outdoor and sports like (functional) in appearance, the aim is to design a smarter sock.	Warm, thermal socks are thicker, and restrict wearer on choice of footwear, such as smart footwear for work.
Sensorial	Soft and fluffy provides comfort and a sense of freshness.	Ribbed effect causes an imprint on the skin.
Experience	Electrical heated socks enable freedom to leave the house.	Thickness of layering of socks requires bigger shoes, causing embarrassment.

Table 2: Summary of data to inform jumper design

Table 2: Summary of data to inform jumper design		
Tangible, Design Elements	Constructive	Destructive
Fit of the garment	Loose fitting so the garment is not restricting movement.	Length of sleeves are too short and the hems need to be longer.
Fibres & Components	Wool, cotton, bamboo and cashmere. Including synthetics such as HEATGEN containing acrylic and viscose.	One of the women is allergic to wool. Another, sweats in her husband's bamboo top.
Performance	Keeping the core warm is essential. Having tops with holes helps with keeping wrists warm. Having a hood helps with neck exposure.	The women add scarves to keep their neck warm.
Intangible, Design Elements	Desirable	Undesirable
Aesthetic	Fashion statements. Sophisticated Arran knit style.	Whilst fleece is a God send, it is boring and not smart.
Sensorial	Super soft and comfortable to wear.	Due to layering, the women sweat and feel uncomfortable.
Experience	Acceptable aesthetics such as nautical theme helps women to 'fit it' and not draw attention to their impairment.	Layering of garments makes the women feel bulky like the Michelin Man.

Table 3: Summary of data to inform cardigan design

Table 3: Summary of data to inform cardigan design		
Tangible, Design Elements	Constructive	Destructive
Fit of the garment	Casual fit to allow room for layering. High neck lines are preferred for extra coverage for the neck. And longer sleeves to cover the wrists.	Fitted sleeves means one cannot wear a shirt or long top underneath. Exposing the back of the neck and wrists causes discomfort in hands.
Fibres & Components	Fleece fabric is warming. Velcro and magnetic components are wonderful to help with issues of dexterity.	The women struggle to use zips and buttons when their hands are cold.
Performance	The women layer garments. Having an opening in a cardigan can help air flow and cool the body down.	Layering at times overheats the women, but taking a layer off can lead to regret.
Intangible, Design Elements	Desirable	Undesirable
Aesthetic	Fabrics which are sparkly and shiny, bright and interesting with precision craftsmanship.	Wearing sports clothing can affect how people perceive them. That is, they are sporty. Not feeling smart in fleeces.
Sensorial	Soft and comfortable.	Avoid feeling hot and sweaty and embarrassed.
Experience	The opening of cardigans can show off a stylish shirt worn underneath.	At times the women feel embarrassed from feeling sweaty.

Table 4: Summary of data to inform legging design

Tangible, Design Elements		
	Constructive	Destructive
Fit of the garment	Leggings and tights are flexible to wear.	The seam runs across the very bottom of the panel. This creates an uncomfortable feeling along the toe area. The seam along the top can often be too tight around the waist.
Fibres & Components	Quite often synthetic made from polyester and some from cotton.	Leggings without a foot section, the hem can be quite tight around the ankle.
Performance	Keeping legs warm helps.	Two would be worn if they are not thick enough.
Intangible, Design Elements		
	Desirable	Undesirable
Aesthetic	Tights and leggings worn by participants are always dark and one tone colours.	Smart trousers are not warm enough and trendy jeans are not very comfortable.
Sensorial	Elasticated and thickness provides a sense of warming comfort.	Leg seams causes imprint on the skin.
Experience	Avoid wearing two leggings. Being able to wear tights or leggings means dresses and skirts can be worn.	Feeling like the Michelin man.

Table 5: Summary of data to inform Glove Design		
Tangible, Design Elements	Constructive	Destructive
Fit of the garment	Flexible knitted gloves are more comfortable than leather gloves.	Bulky gloves such as ski-gloves reduce flexibility and dexterity. Ribbing cuts off circulation.
Fibres & Components	Touch screen features allows for use of mobile phones.	Seams are irritable and leave unpleasant marks on the skin.
Performance	Longer gloves help with keeping the wrist warm.	Gloves with silver particles are not always effective and two are worn as a result. Gloves with ceramic qualities are not always effective as they require sunlight to perform.
Intangible, Design Elements	Desirable	Undesirable
Aesthetic	Leather gloves look dressier and more attractive.	Potentially bright colours which draw attention.
Sensorial	Soft and fluffy interior provides warmth and emotional comfort.	Avoiding gloves with no soft liners or feelings of ribbing or tightness.
Experience	Gloves are essential even in summertime. So, finer gloves are preferred to discreetly carry around in pockets or handbags.	Velcro draws attention to the women's impairment due to the loud noise.

## Appendix 10: Sock sampling



## Sock Design Testing

08/11/2018 (all knitted on shima)

### Yarn quality test No. 1

Tension for lace and ankle with is 40 because of the lace detail, otherwise it just breaks.

Changed tension to 35 for the rest of foot as the tighter you can knit the Plush the better. But you cannot have it too tight as it will affect the transfer of the loops.

Plating; leading yarn: Silk 2/60

Trailing yarn: 16% Linen, 24% cotton, 40% outlast, 20% Nylon

Plush yarn; 20% Linen, 80% Cotton, 50% Outlast

Analysis: the plush yarn is not ideal as it breaks when loops are cast off.



### Yarn quality test No. 2

Plating: Leading yarn: 48% Coolmax (Polyester) 32% viscose, 20% nylon, 2/48Nm

Trailing yarn: Silk 2/60

Plush: Acrylic 2/30 (Uppingham yarns)

Analysis: the plush is too thick and stiff and the plating is skipping.



### Yarn quality test No.3

Plating; Leading yarn: Silk 2/60 nm

Trail yarn: 16% Linen, 24% Cotton, 40% outlast (acrylic), 20% nylon, 2/60 nm

Plush yarn: Lineapu Italia 22000 Nm

Analysis: Plating is skipping



Yarn quality test No. 4

Plating; Leading yarn; 48% Coolmax (polyester), 32% Viscose, 20% nylon, 2/60nm

Trail yarn: Silk 2/60

Plush yarn: Lineapu Italia 22000nm

Analysis: plating is skipping



Yarn quality text No. 5

Plating; Leading yarn: 48% Coolmax (polyester), 32% Viscose, 20% Nylon, 2/48 nm

Trail yarn: 20% Linen, 30% cotton, 50% Outlast (acrylic), 2/48 nm

Plush: Lineapu Italia 22000 nm



Yarn quality test No.6

Plating; Leading yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon

Trail yarn: 16% Linen, 24% cotton, 40% Outlast 9acrylic), 20% nylon, 2/48 nm

Plush yarn; Lineapu Italia



Yarn quality test No. 7

Plating; Leading yarn: 22 Dtx Lycra, 78/34 Crimp nylon (Wykes suppliers)

Trail yarn: 48% Coolmax (Polyester), 32% viscose, 20% nylon, 2/48nm

Plush; Lineapu Italia



Yarn quality test No. 8 and re-size

Plating; Lead yarn: 60% organic cotton, 40% acrylic (zinc), 2/60nm

Trail yarn: 48% Coolmax (Polyester), 32% viscose, 20% nylon, 2/48nm

Plush; Lineapu Italia



Yarn quality test No. 9

Plating; Leading yarn: Silk 2/60 nm

Trail yarn: 16% Linen, 24% cotton, 40% Outlast 9acrylic0, 20% nylon, 2/60nm

Plush yarn: Secret Melange 2/48nm



Yarn quality test No. 10

Plating; Leading yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon

Trail: 60% organic cotton, 40% acrylic, 2/60 nm

Plush; 48% Coolmax (polyester), 32% viscose, 20% nylon



Shape test No. 11

Plating; Leading yarn: 60% organic cotton, 40% acrylic (zinc), 2/60nm

Trail yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon

Plush: Lineapu Italia 22000 nm

Analysis: the partial knit is not very effective, and there is still excess fabric on the foot side panel.



**02/11/2018 (all knitted on shima)**

Shape test No.1

Plating: Lead yarn; 60% Cotton, 40% Acrylic (copper) 2/60nm

Trail yarn; same as above

Plush: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

Analysis: too short and

Shape test No.2

Plating: Lead yarn; 60% Cotton, 40% Acrylic (copper) 2/60nm

Trail yarn; same as above

Plush: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

Analysis: Fit is fine. Next shape the toe area and add extra panel to cater for opening, plus magnets

Shape test No.3

Plating: Lead yarn; 60% Cotton, 40% Acrylic (copper) 2/60nm

Trail yarn; same as above

Plush: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

Analysis: fit is fine. Addition of tubular at start allows an opening for the magnets. And then it is closed off to a point. When magnets are placed inside, I will need to hand sew between them. The opening when placed on the foot pulls over to one side as it is stocking stitch

#### Shape test No.4

Plating: Lead yarn; 60% Cotton, 40% Acrylic (copper) 2/60nm

Trail yarn; same as above

Plush: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

#### Shape test No. 5

Plating: Lead yarn; 60% Cotton, 40% Acrylic (copper) 2/60nm

Trail yarn; same as above

Plush: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

Analysis: knitted the opening panel with a pearl stitch to see if that gives it more stiffness to lay over the opening.

**08/11/2018**

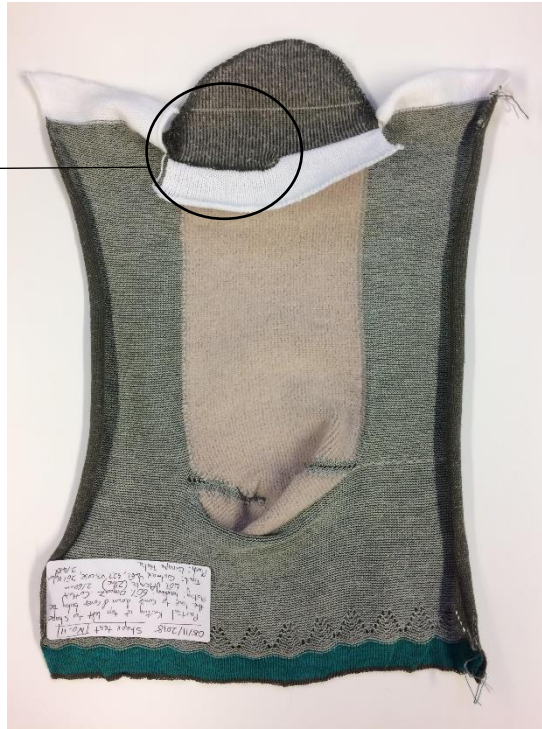
#### Shape Test No. 11

Plating yarn: Leading yarn 60% organic cotton, 40% acrylic (zinc) 2/60nm

Trail yarn coolmax (poly) 48%, 32% viscose, 20% nylon, 2/48nm

Plush yarn: Lineapu

Partial knitting  
to try and  
bring the  
seam down  
below the  
little toe



Shape to remove  
excess fabric



09/11/2018

### Shaping with Lycra

**Note:** the first attempt we tried was with a 2/60nm yarn for the trail plating yarn and it is too brittle, it doesn't knit well. We think this is because the Lycra is too thin as it is and it needs a thicker yarn with it. The 2/60nm works well.



### Size Test No. 1

Plating; Leading yarn: 22 Dtx Lycra, 78/34 Crimp nylon (Wykes suppliers)

Trail yarn: 48% Coolmax (Polyester), 32% viscose, 20% nylon, 2/48nm

Plush yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

Analysis: there is too much excess fabric at edge of baby toe. I cut where it needs to be taken out off. Next step is to figure out how to knit it to that shape.

### Size test No.2

Plating; Leading yarn: 22 Dtx Lycra, 78/34 Crimp nylon (Wykes suppliers)

Trail yarn: 48% Coolmax (Polyester), 32% viscose, 20% nylon, 2/48nm

Plush yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

Analysis: taken 1.5cm .. 18r out of left hand side. There seems to be too much fabric from the overlap toe bit now though. Take 12st out for next step.

### Size test No. 3

Plating; Leading yarn: 22 Dtx Lycra, 78/34 Crimp nylon (Wykes suppliers)

Trail yarn: 48% Coolmax (Polyester), 32% viscose, 20% nylon, 2/48nm

Plush yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

Analysis: take an extra 18r, but add 12r to the top overlap. Partial knit it from the point of the right hand side where the big toe is. Add lycra to the inside of the tub at top of sock.

### Shaping test No. 4

Plating; Leading yarn: 22 Dtx Lycra, 78/34 Crimp nylon (Wykes suppliers)

Trail yarn: 48% Coolmax (Polyester), 32% viscose, 20% nylon, 2/48nm

Plush yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

Analysis: when the overlap of toe panel meets the other line it leaves a gap on seam. Take two rows out.

### Shaping test No. 5

Plating; Leading yarn: 22 Dtx Lycra, 78/34 Crimp nylon (Wykes suppliers)

Trail yarn: 48% Coolmax (Polyester), 32% viscose, 20% nylon, 2/48nm

Plush yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

Analysis: the seam connecting the overlap toe panel to the foot panel is sitting better having taken out two rows to decrease excess fabric. One more needs to be knitted as it needs a slack row.

Shaping test No. 5 Plush Sock LR Final No.6

Plating; Leading yarn: 22 Dtx Lycra, 78/34 Crimp nylon (Wykes suppliers)

Trail yarn: 48% Coolmax (Polyester), 32% viscose, 20% nylon, 2/48nm

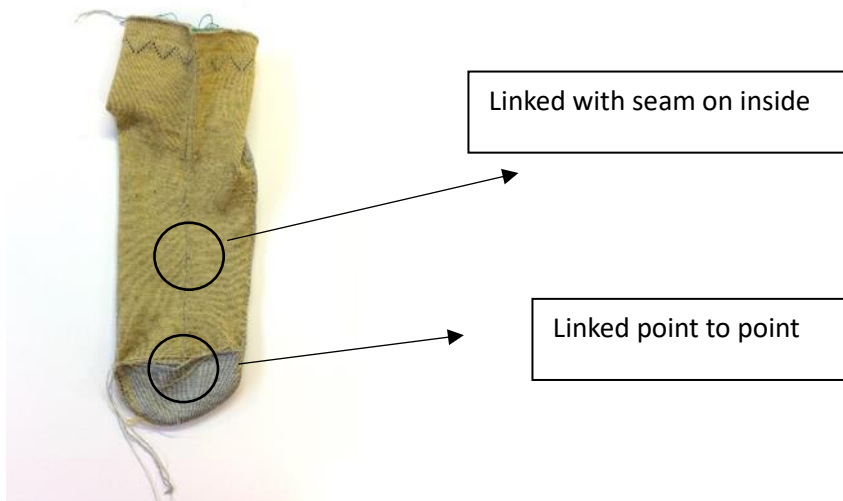
Plush yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

Linked on 14 gauge linker

Analysis:



The tube is rolling outwards,  
solution is to knit 2Ros with just  
Lycra.



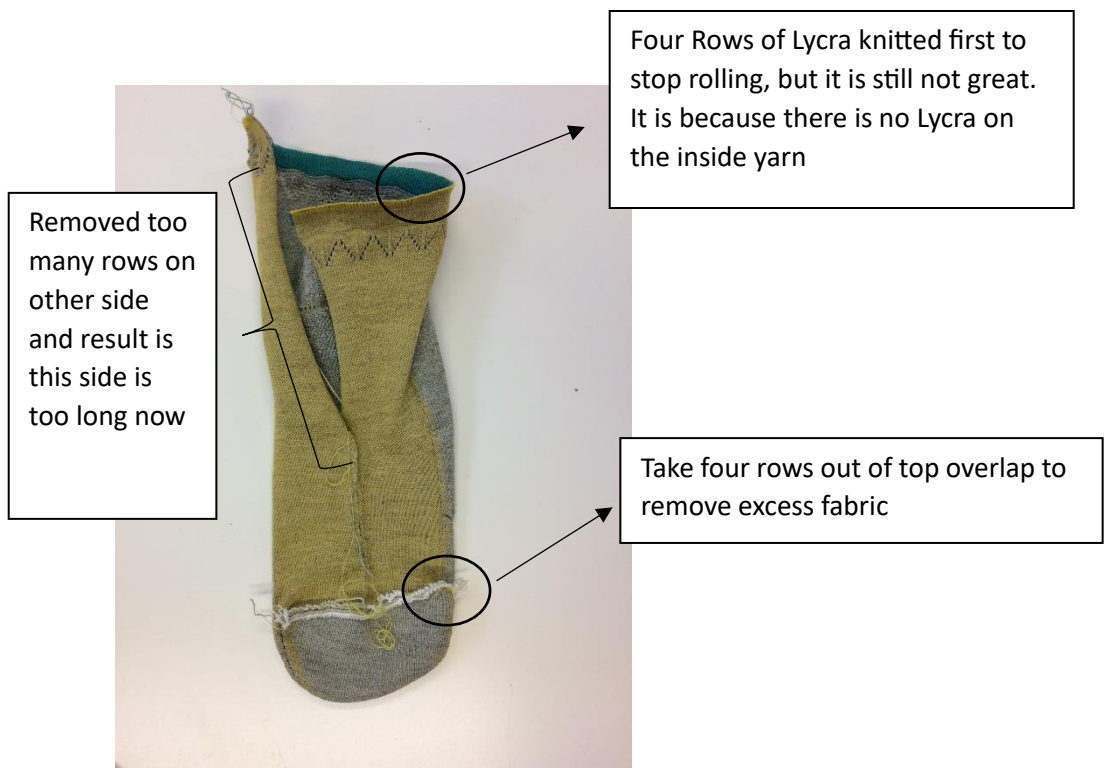
**13/11/2018 (all knitted on Shima) Plus Sock LR Final No.1**

Shaping test No. 1

Plating; Leading yarn: 22 Dtx Lycra, 78/34 Crimp nylon (Wykes suppliers)

Trail yarn: 48% Coolmax (Polyester), 32% viscose, 20% nylon, 2/48nm

Plush yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48

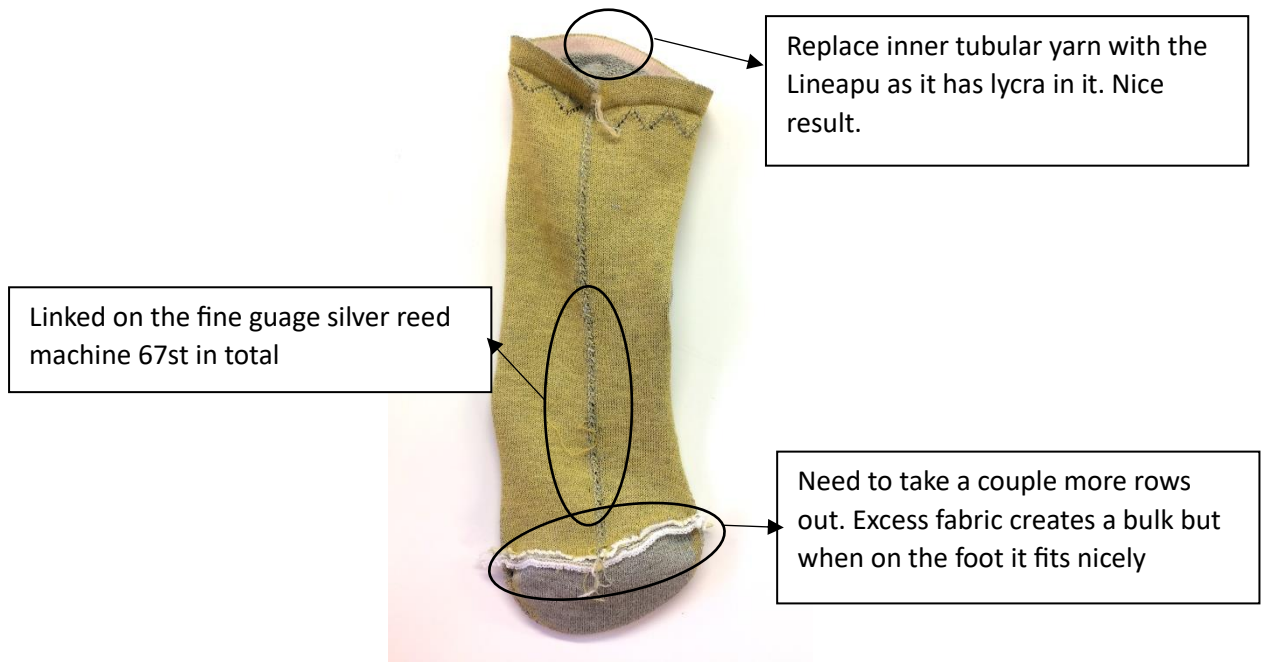


Shaping test No. 2

Plating; Leading yarn: 22 Dtx Lycra, 78/34 Crimp nylon (Wykes suppliers)

Trail yarn: 48% Coolmax (Polyester), 32% viscose, 20% nylon, 2/48nm

Plush yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon, 2/48



## 06/12/2018

### Casandra (Plush Sock without Lycra)

#### Tension and shape test No. 1

Carrier 5 Contrasting tubular: 60% cotton, 40% acrylic (copper) 2/60nm

Carrier 3 Plating leading yarn: 60% organic cotton, 40% acrylic (zinc) 2/60nm

Carrier 6 Plating trailing yarn: 485 coolmax (polyester), 32% viscose, 20% nylon 2/48nm

Carrier 1 Plush: Lineapiu

Analysis: tension is too tight as the yarn is breaking on the right hand side of the sock whilst looking at it on the machine.

Plating is not 100% in the plush area., however it is giving a lovely stripe effect in the plush area

#### Tension and shape test No. 2

Carrier 5 Contrasting tubular: 60% cotton, 40% acrylic (copper) 2/60nm

Carrier 3 Plating leading yarn: 60% organic cotton, 40% acrylic (zinc) 2/60nm

Carrier 6 Plating trailing yarn: 485 coolmax (polyester), 32% viscose, 20% nylon 2/48nm

Carrier 1 Plush: Lineapiu

Analysis: after losing the tension the yarn is a little better, but it still needs losing of tension.

### Tension and shape test No. 3

Carrier 5 Contrasting tubular: 60% cotton, 40% acrylic (copper) 2/60nm

Carrier 3 Plating leading yarn: 60% organic cotton, 40% acrylic (zinc) 2/60nm

Carrier 6 Plating trailing yarn: 485 coolmax (polyester), 32% viscose, 20% nylon 2/48nm

Carrier 1 Plush: Lineapiu

Analysis: tension is fine. The shape of seam joining foot panel to toe panel has too much excess fabric.

### Sofie Tension and shape test No. 4

Carrier 5 Contrasting tubular: 60% cotton, 40% acrylic (copper) 2/60nm

Carrier 3 Plating leading yarn: 60% organic cotton, 40% acrylic (zinc) 2/60nm

Carrier 6 Plating trailing yarn: 485 coolmax (polyester), 32% viscose, 20% nylon 2/48nm

Carrier 1 Plush: Lineapiu

## Appendix 11: Sample development for the jumper, cardigan and leggings

### Jumper

22/11/2018

#### Test NO.1 (stitch swatch)

Stoll

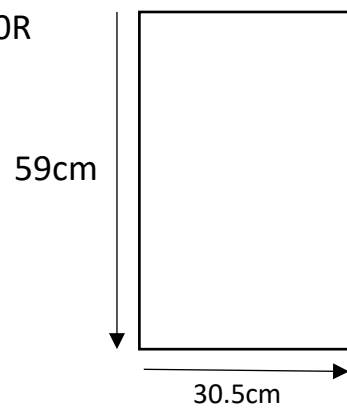
Carrier 7 Plush; 60% organic cotton, 40% acrylic (Zinc) 2/60Nm

Carrier 8 Leading Plating; Viscose 20nm

Carrier 9 Trailing Plating; Woodland 2/48Nm, 60% WV, 40% PA

Note: 60% Cotton, 40% Acrylic Copper, 2/60Nm

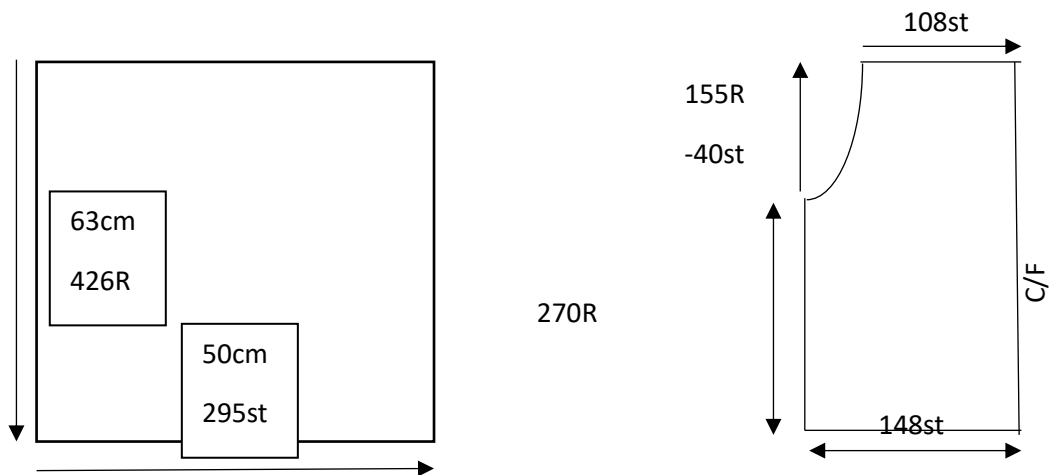
18St x400R



$$400/59=6.77R$$

$$180/30.5=5.90St$$

#### Joanna Jumper NO.2 (front swatch)



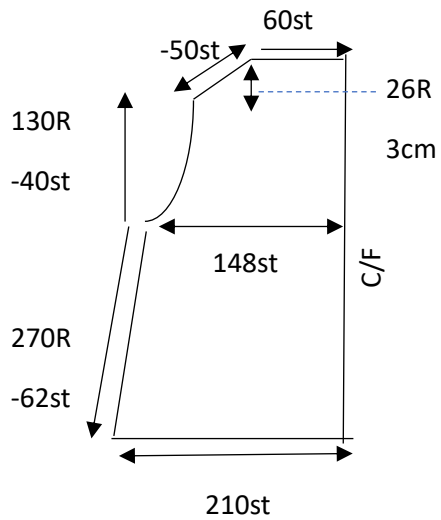
328

Joanna Jumper Front 1 NO.3 (Front Panel size test)

Carrier 7 Plush; 60% organic cotton, 40% acrylic (Zinc) 2/60Nm

Carrier 8 Leading Plating; Viscose 20nm

Carrier 9 Trailing Plating; Woodland 2/48Nm, 60% WV, 40% PA



Note: the shoulder seam needs to be an even amount of needles for the bind off to work.



Carrier 7 Plush; 60% organic cotton, 40% acrylic (Zinc) 2/60Nm

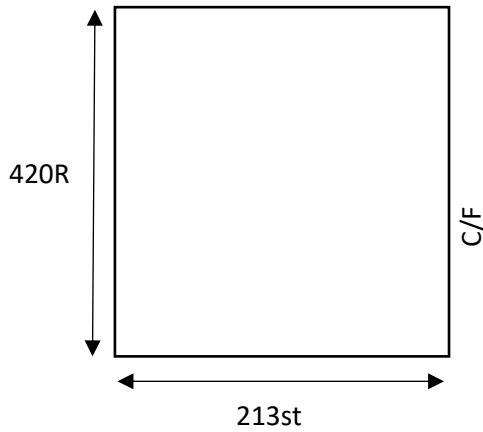
Carrier 8 Leading Plating; Viscose 20nm

Carrier 9 Trailing Plating; Woodland 2/48Nm, 60% WV, 40% PA

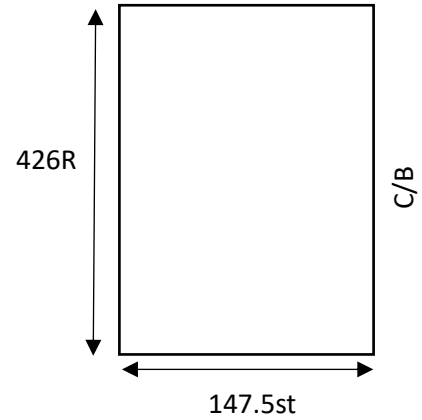
29/11/2018

Joanna Jumper Boat Neck

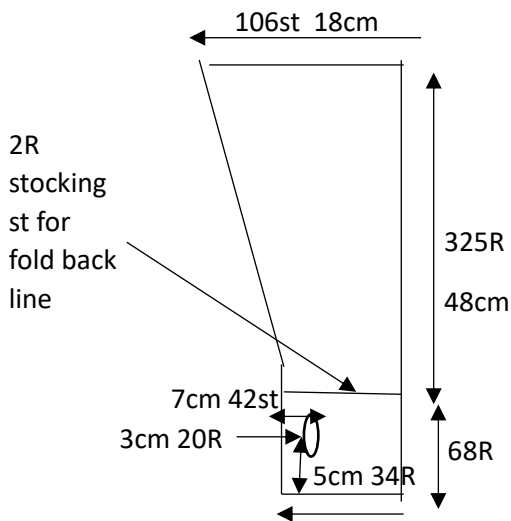
Front Panel



Back Panel



Joanna Boat Neck Sleeve



Carrier 7 Plush; 60% organic cotton, 40% acrylic (Zinc) 2/60Nm

Carrier 8 Leading Plating; Viscose 20nm

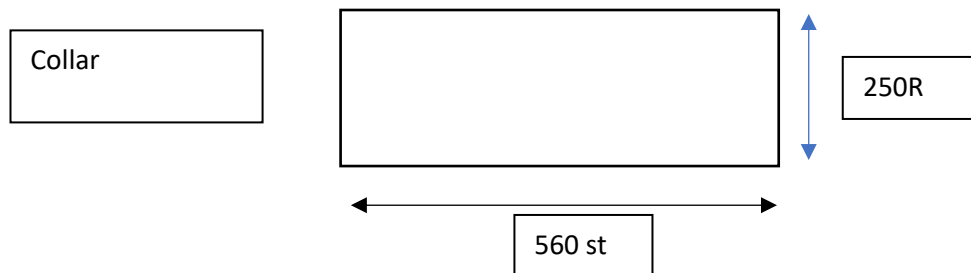
Carrier 9 Trailing Plating; Woodland 2/48Nm, 60% WV, 40% PA

Carrier set up on left side of machine for intarsia

Carrier 103 Plush; 60% organic cotton, 40% acrylic (Zinc) 2/60Nm

Carrier 105 Leading Plating; Viscose 20nm

Carrier 106 Trailing Plating; Woodland 2/48Nm, 60% WV, 40% PA





Joanna Plush Plating Sample

Carrier 7: Plush; 60% cotton, 40% Acrylic (copper), 2/60

Carrier 8: Plating leading yarn; 20% Linen, 30% Cotton, 50% outlast (acrylic), 2/48nm

Carrier 9: Plating trailing yarn; 48% coolmax (poly), 32% viscose, 20% nylon, 2/48nm

Note: plush yarn keeps breaking!

Joanna Front Interlock Edges test No.2

Carrier 7: Plush; 40% coolmax (poly), 32% viscose, 20% nylon 2/48nm

Carrier 8: Plating leading yarn; 20% Linen, 30% Cotton, 50% outlast (acrylic), 2/48nm

Carrier 9: Plating trailing yarn; 48% coolmax (poly), 32% viscose, 20% nylon, 2/48nm

**06/12/2018**

Michelle Cardigan SW Test No.1

Main body

Carrier 3 Plush; 40% coolmax (poly), 32% viscose, 20% nylon 2/48nm

Carrier 8 Lead Plating; Plating leading yarn; 20% Linen, 30% Cotton, 50% outlast (acrylic), 2/48nm

Carrier 9 Trail Plating; Plating trailing yarn; 48% coolmax (poly), 32% viscose, 20% nylon, 2/48nm

Plating Under Arm Panels

Right Hand side of garment

Left Hand side of garment

Carrier 7 Plating lead yarn:

Carrier 6 Plating leading yarn

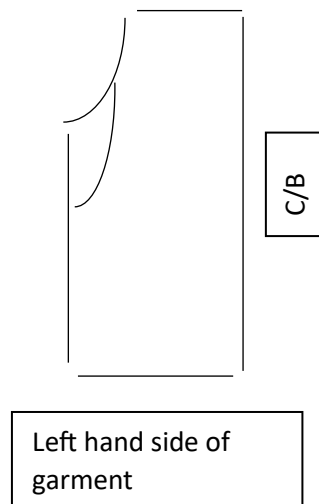
IGEA/ATHENA 20NM

IGEA/ATHENA 20NM

Carrier 10 Plating trail yarn

Carrier 11 Plating trail yarn

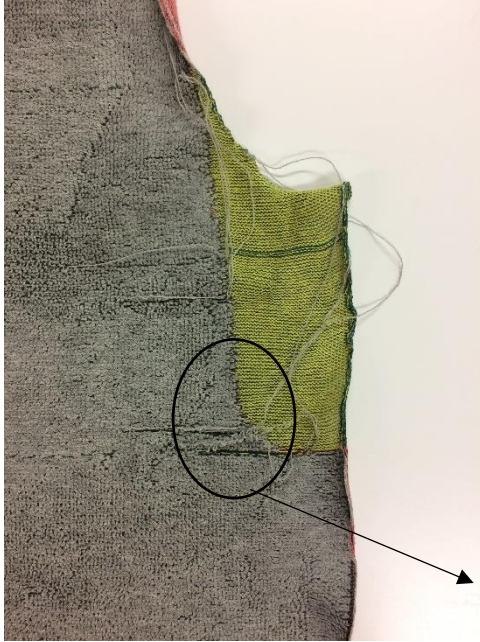
20% Linen, 30% cotton, 50% outlast (acrylic) 2/48nm



Analysis: Bind off on armhole is too tight and missing plating.

## Michelle Cardigan SW Test No.2

Carriers and yarns as above in test No.1



Plush yarn (grey) is not being cast off and is holding on to needle creating a large floating thread.

Plating is still not 100%

Tension on bind off change from 14 to 15

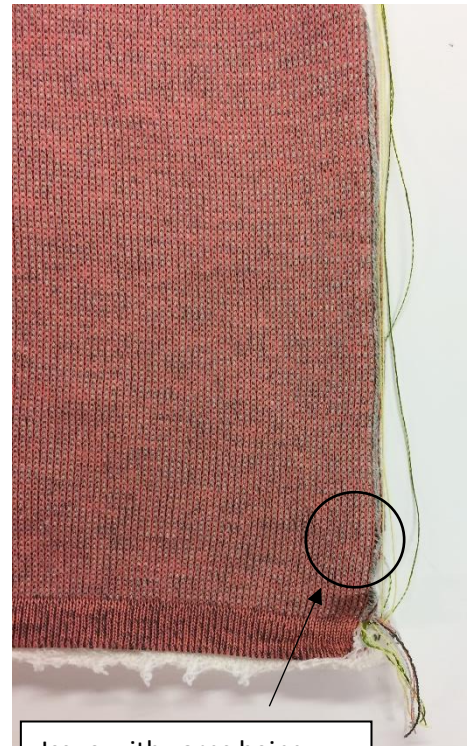
## Michelle Cardigan SW Test No.3

Yarns and carriers same as above with the exception of changing plating yarns in under arm panels to help improve plating Matt viscose 3/60nm





Issue with floating thread remains. Result of carrier placement. Plush loop is holding on.



Issue with yarns being caught at start.

Plating is better but the yarn combo is too thick to bind off.  
Tension was changed from 15 to 14 but no improvement.  
Change plaiting trail yarn from a 2/48nm to a 2/60nm.

Note; Bind off on armholes are still not working. Will need to bring in another carrier to bind off with.

13/12/2018

Michelle Cardigan SW V2 Test No.1

Carrier 3 Plush; 48% coolmax (poly), 32% viscose, 20% nylon 2/48nm

Carrier 8 Lead Plating; Plating leading yarn; 20% Linen, 30% Cotton, 50% outlast (acrylic), 2/48nm

Carrier 9 Trail Plating; Plating trailing yarn; 48% coolmax (poly), 32% viscose, 20% nylon, 2/48nm

Plating Under Arm Panels

Right Hand side of garment

Left Hand side of garment

Carrier 7 Plating lead yarn:

Carrier 6 Plating leading yarn

Silk 2/60

Silk 2/60

Carrier 10 Plating trail yarn

Carrier 11 Plating trail yarn

Woodland 2/48nm 60% WV, 40% VA



Change yarns to a softer quality to allow binding off without breaking and it is successful.

Hold carrier for plating under arm panels until the end so the yarns are not knitted across the body

Intarsia section is causing holding of threads as the carrier is being moved about ten stitches. Alter shape of curve so the carrier is only moving about 2stitches at a time.



## Michelle Cardigan SW V2 Test No.2

Carriers and yarns same as in Test No. 1.



Inserting a two needle jersey to allow a relief between the plush and intarsia and plating techniques. It is successful as there is no loops.

## Michelle Cardigan SW V2 Test No.2

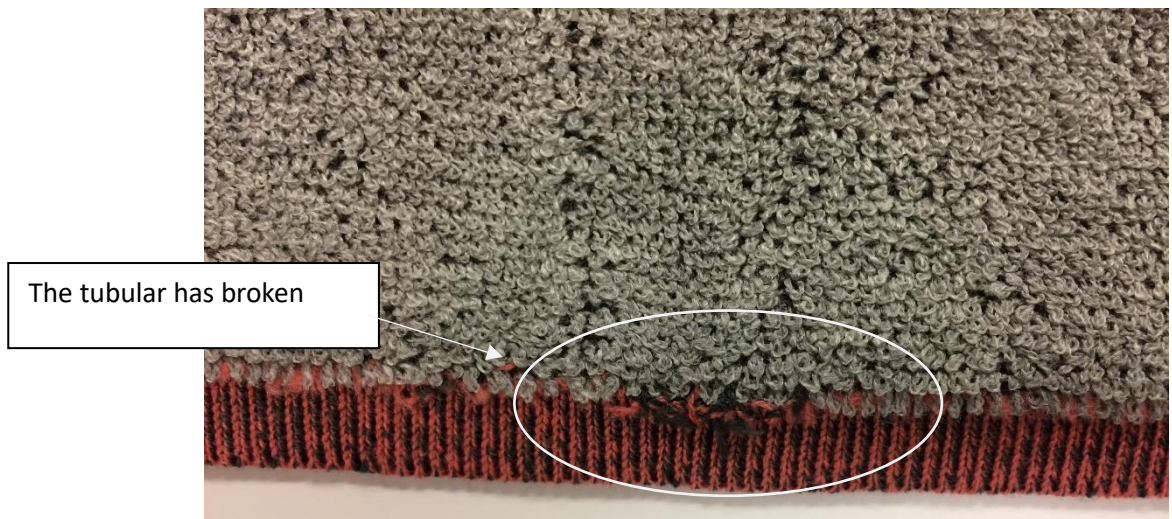
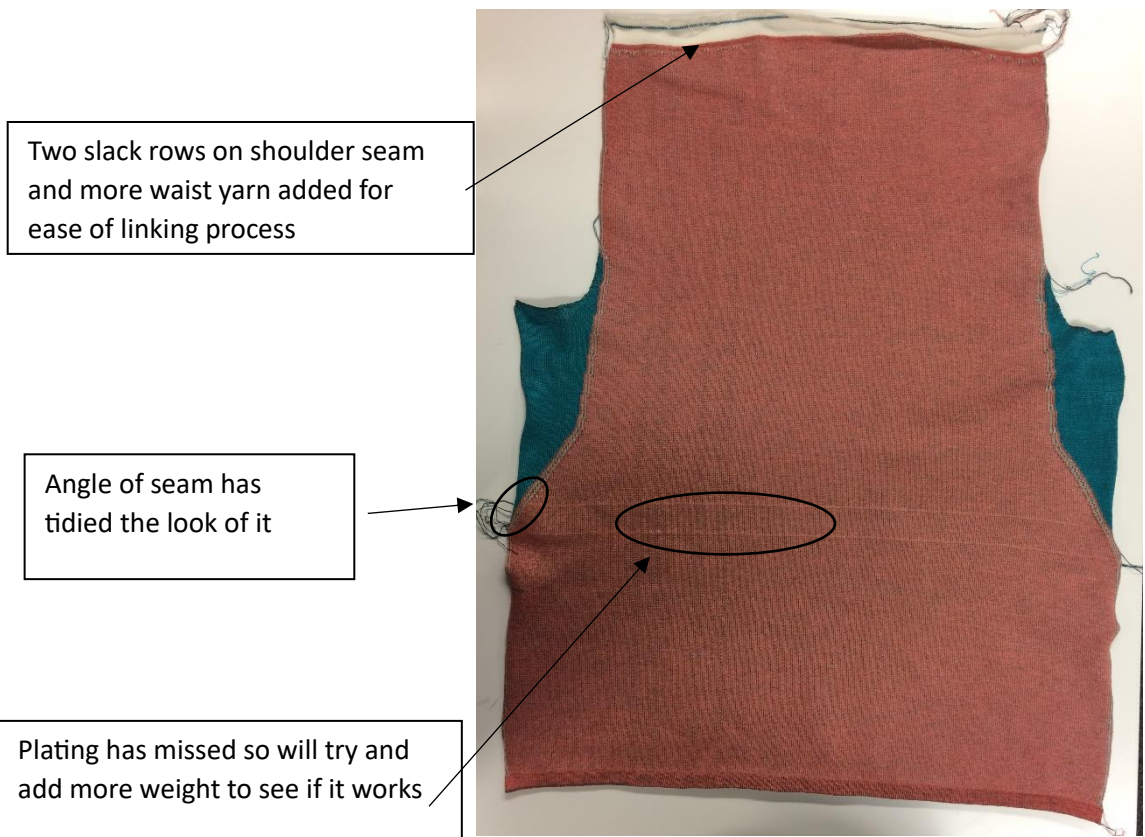
Shape test. Using partial knitting to shape the shoulder seam.

The right side isn't as neat due to position of the racking of bed, so, change shape of line so it's not so steep. Try two, two two...





Michelle Cardigan Back Test No.1



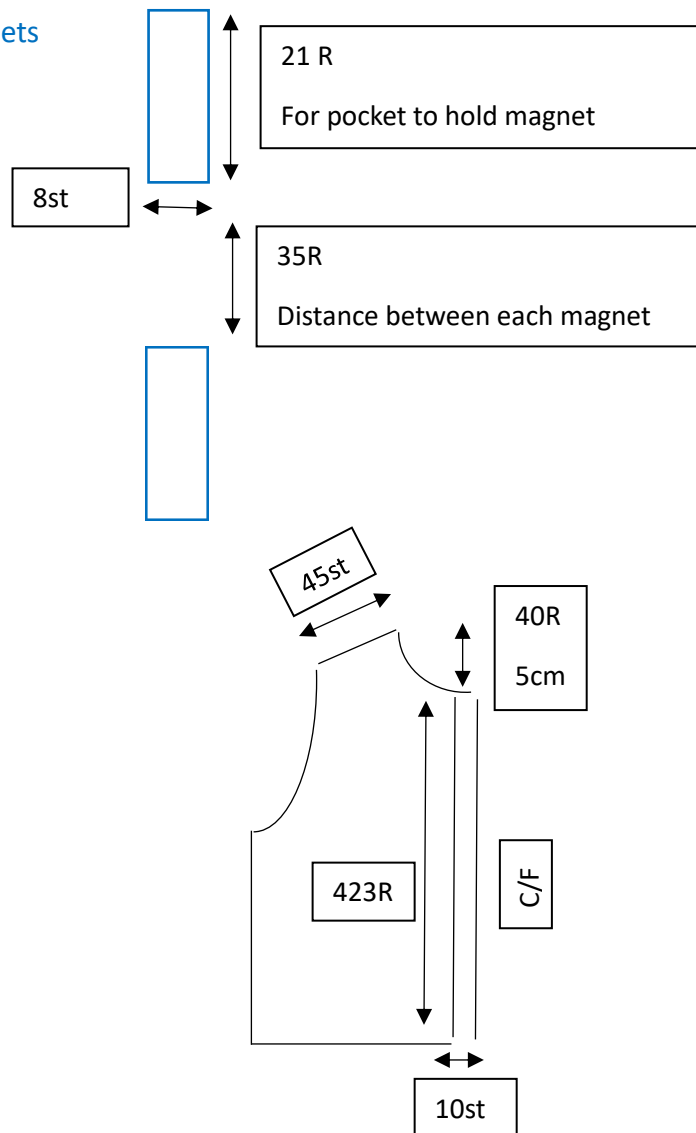
## Michelle Cardigan Back Test No.2

Note: The plating yarn is skipping when fashioning technique begins.  
Need to loosen the tubular rib at the hem.

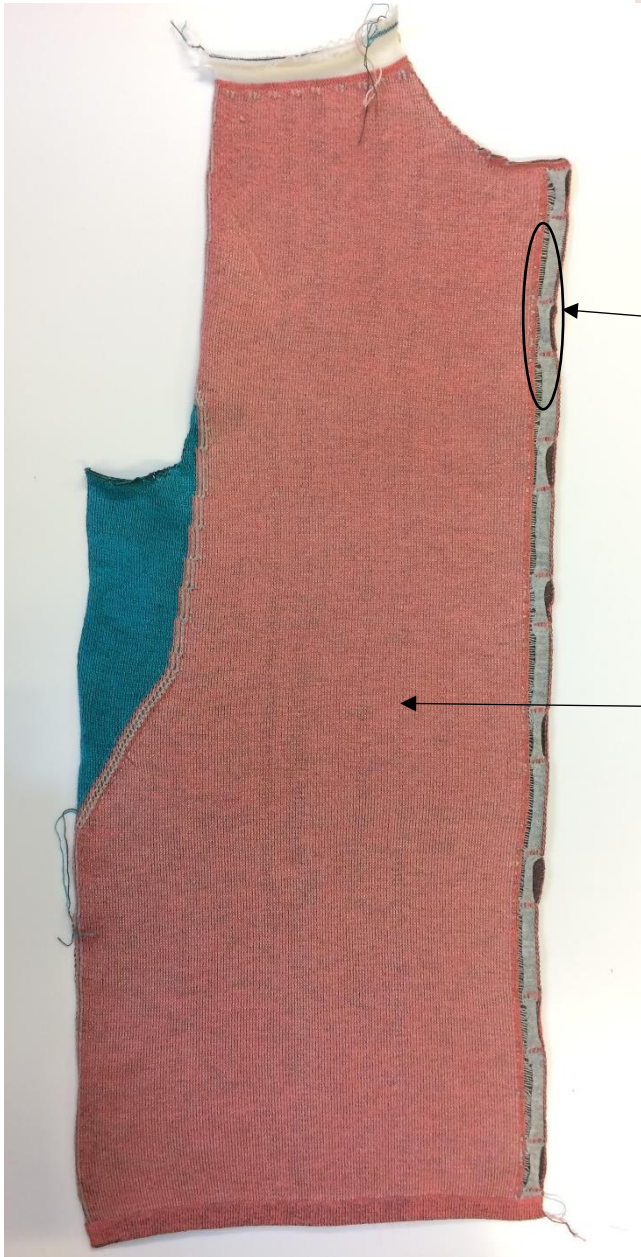
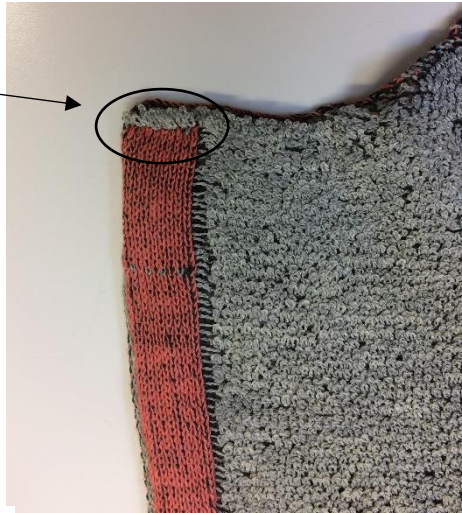
**14/12/2018**

## Michelle Cardigan Front Test No. 1

8 Magnets



The plush continues to the edge of panel, need to stop it just at the start of the trim.



Floating threads

Insert some lines along centre front for aesthetic reasons, similar to around the under arm panels.

**17/12/2018**

**Michelle Cardigan Sleeve Test No. 1**

Carrier 3: Plush yarn; 48% coolmax (poly), 32% viscose, 20% nylon 2/48nm

Carrier 11: Tying in yarn; Plating leading yarn; 20% Linen, 30% Cotton, 50% outlast (acrylic), 2/48nm

Carrier 5: Extra yarn for plush; Wykes, DTX LYCRA 22, 78/34 Crimp Nylon

Right Side;

Carrier 7: Plating lead yarn; Silk 1005 2/60

Carrier 10: Trail yarn; Woodland 2/48nm 60% WV, 40% VA

Left Side:

Carrier 108: Plating lead yarn; Silk 1005 2/60

Carrier 109: Plating Trail yarn; Woodland 2/48nm 60% WV, 40% VA

**Note: Knitted at tension 11**

**There is no plating trail yarn in main body.**



The fabric has a lovely feel to it without the trail plating yarn, however, it does not match the main body of the cardigan



Rib has only the main yarn, seems to work as it sits well

**Plating is skipping on under arm panel.**

**For next piece, include a trail plating yarn in main body and change the double plush panel yarn to one with Lycra incorporated in it to pull it in further making it fitted.**

## Michelle Cardigan Sleeve Test No. 2

Carrier 3: Plush yarn; 40% coolmax (poly), 32% viscose, 20% nylon 2/48nm

Carrier 8: Plating leading yarn; 20% Linen, 30% Cotton, 50% outlast (acrylic), 2/48nm

Carrier 9: 48% coolmax (poly), 32% viscose, 20% nylon, 2/48nm

Carrier 4: Double plush yarn: Lineapiu Fenix Nm 2200

Right Side;

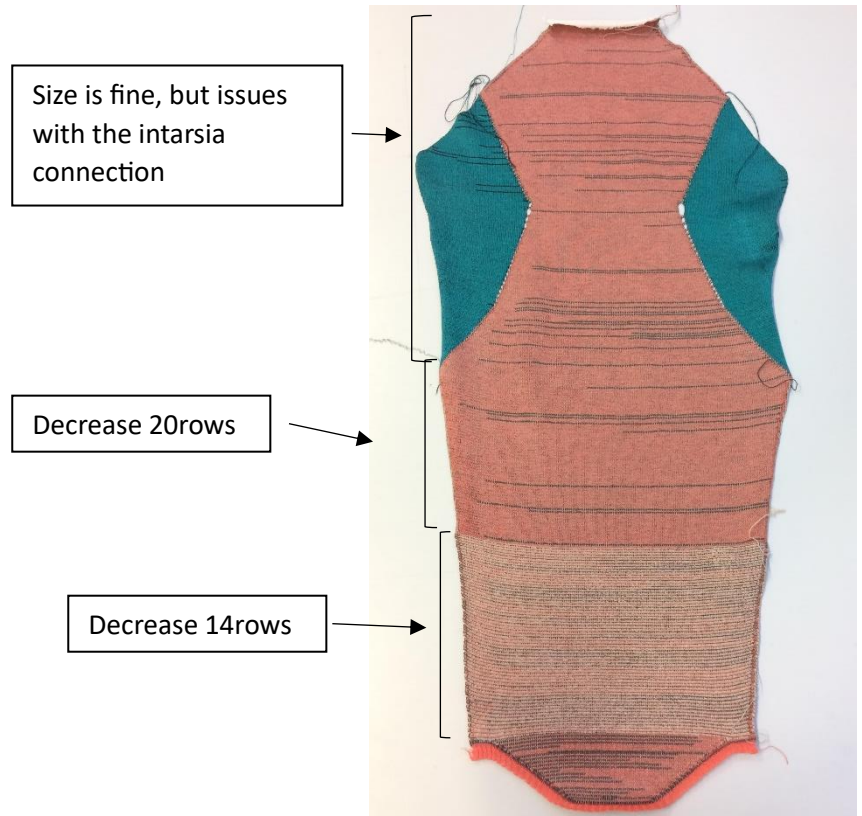
Carrier 7: Plating lead yarn; Silk 1005 2/60

Carrier 10: Trail yarn; Woodland 2/48nm 60% WV, 40% VA

Left Side:

Carrier 108: Plating lead yarn; Silk 1005 2/60

Carrier 109: Plating Trail yarn; Woodland 2/48nm 60% WV, 40% VA



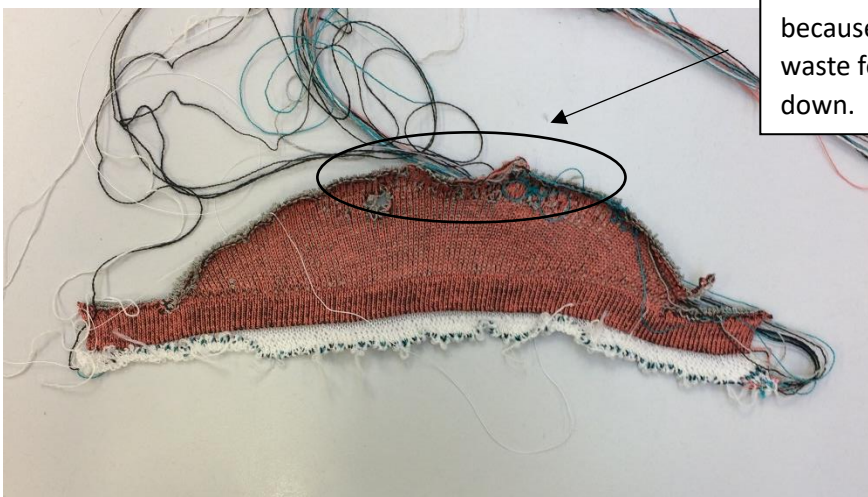
### Michelle Cardigan Sleeve Test No. 3

Yarn and carrier set up as before in test No.2

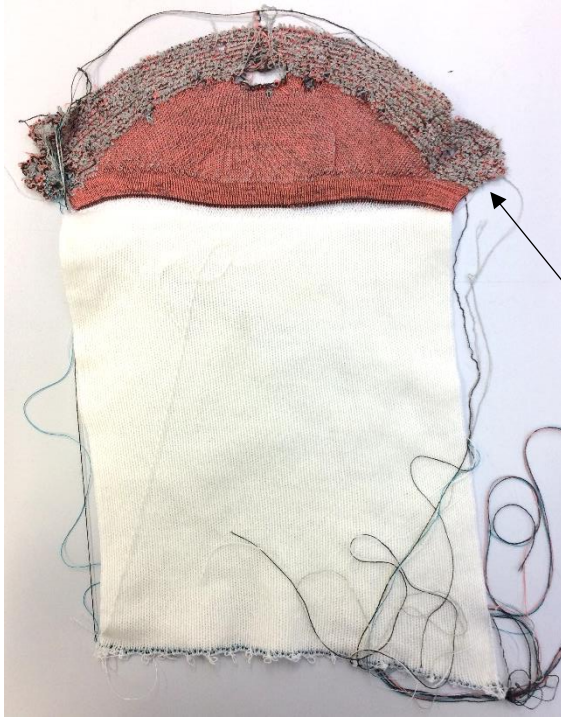
Note: Issues with plating



Include the trail plating yarn in to the rib to give more structure.



Issue with the partial knit because there is not enough waste for rollers to weigh it down.



Issue with the partial knit because it is transferring from one bed to the other. Change yarn for one that is elasticated to ease this process.

**18/12/2018**

**Michelle Cardigan Sleeve Test No. 1**

Carrier 3: Plush yarn; 48% coolmax (poly), 32% viscose, 20% nylon 2/48nm

Carrier 8: Plating leading yarn; 20% Linen, 30% Cotton, 50% outlast (acrylic), 2/48nm

Carrier 9: Plating trailing yarn; 48% coolmax (poly), 32% viscose, 20% nylon, 2/48nm

Carrier 4: Double plush yarn: Lineapiu Fenix Nm 2200

Right Side;

Carrier 7: Plating lead yarn; Silk 1005 2/60

Carrier 10: Trail yarn; Woodland 2/48nm 60% WV, 40% VA

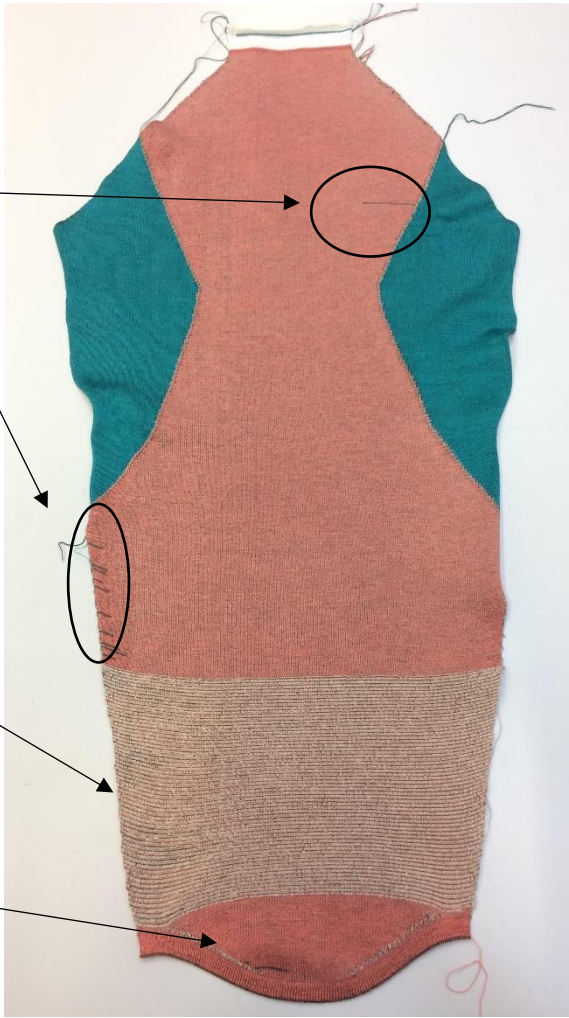
Left Side:

Carrier 108: Plating lead yarn; Silk 1005 2/60

Carrier 109: Plating Trail yarn; Woodland 2/48nm 60% WV, 40% VA



Small issue with plating, change tension of yarn on machine to compensate



Decrease's length of double plush panel by 18Rows.

Partial knitting has too big of eyelets where it is allowing for plush yarn to come through

**Reflection:** the double plush panel is too wide and needs to be more fitted to prevent draft, however, it will remain wide to allow another separate layer underneath. This ties in with the layering concept the women speak about.

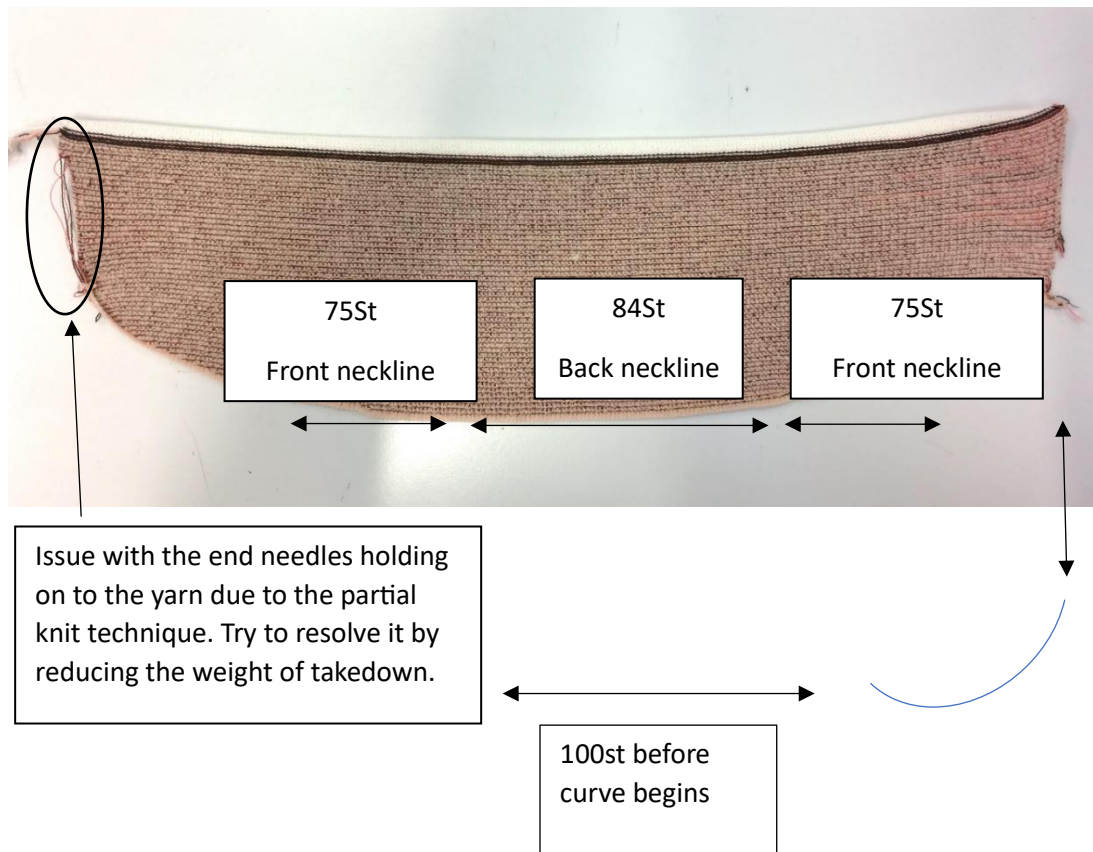
**Note:** Place jersey along edges of fabric and on interlocking areas as in the main body

## Michelle Collar Test No. 1

Carrier 8: Plating leading yarn; 20% Linen, 30% Cotton, 50% outlast (acrylic), 2/48nm

Carrier 9: 48% coolmax (poly), 32% viscose, 20% nylon, 2/48nm

Carrier 4: Double plush yarn: Lineapiu Fenix Nm 2200



## **Leggings design**

**15/07/2019**

### Circular Plush Test No.1 on Stoll Machine

Plating yarn: Elastomeric, 81% Nylon, 19% Lycra, 1350m

48% Coolmax (polyester), 32% viscose, 20% nylon 2/48nm

Plush yarn : 48% Coolmax (polyester), 32% viscose, 20% nylon 2/48nm



The knitting did not produce a tube. Both sides knitted together.

### Circular Plush Test No.2

Plating carrier: Elastomeric, 81% Nylon, 19% Lycra, 1350m

48% Coolmax (polyester), 32% viscoe, 20% nylon 2/48nm

Plush carrier 4: 48% Coolmax (polyester), 32% viscose, 20% nylon 2/48nm



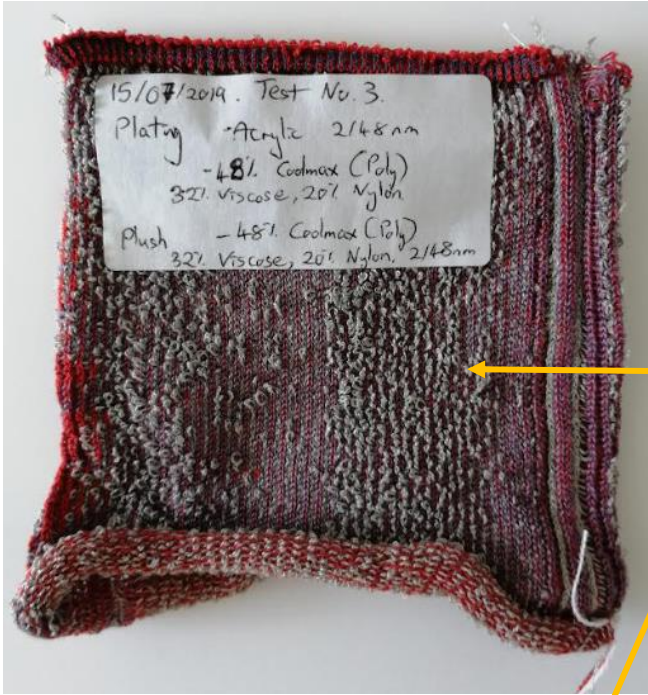
Issues with the plush yarn protruding

Circular Pluah Test No.3

Plating yarn: 100% Acrylic 2/48nm

48% Coolmax (polyester), 32% viscose, 20% nylon

Plush yarn: 48% Coolmax (polyester), 32% viscose, 20% nylon 2/48nm



The sample is a tube, but the plush yarn is protruding.



Alex Pre-test No.1: Circular floating tuck stitch

Floating tuck yarn Carrier 7: 48% Coolmax (polyester), 32% viscose, 20% nylon 2/48nm

Plating yarn Carrier 11: Lycra

48% Coolmax (polyester), 32% viscose, 20% nylon 2/48nm



Right side of sample



Wrong side of sample. Has a lovely soft, thickness to it



Side seam is lovely and flat causing no feel of raised edges when placed against skin

Alex Pre-test No.2

Floating tuck yarn Carrier 7:  
48% Coolmax (polyester),

32% viscose, 20% nylon

2/48nm

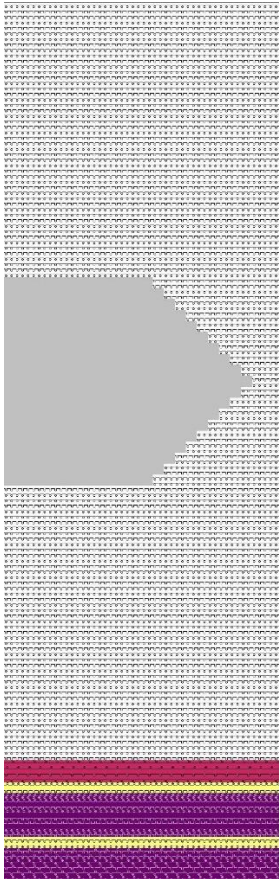
Plating yarn Carrier 11: Lycra name?

48% Coolmax (polyester), 32% viscose, 20% nylon 2/48nm

Testing out shaping of the heel using floating tuck stitch



Issue with the closing of the heel section



Alex Pre-test No.3

Floating tuck yarn Carrier 7: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm

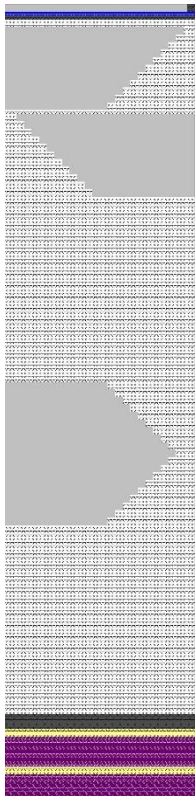
Plating yarn Carrier 11: Elastomeric





The floating tuck yarn is coming through

Building the toe section but we need to remove the pointed ends



Alex No.1

Floating tuck yarn Carrier 7: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm

Plating yarn Carrier 11: Lycra



The texture is much improved as the floating tuck yarn is not protruding

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24/09/2019

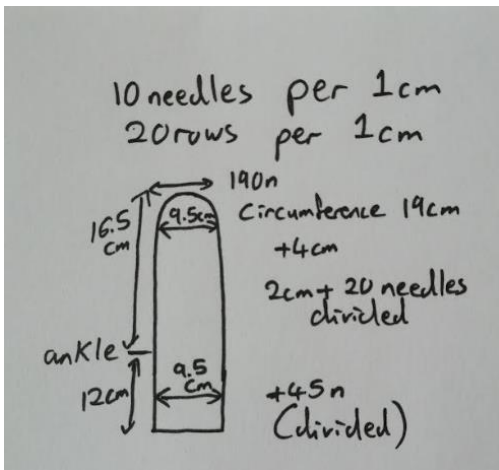
Alex Test No.2

Floating tuck yarn Carrier 7: 48% Coolmax (polyester), 32% viscose, 20% nylon

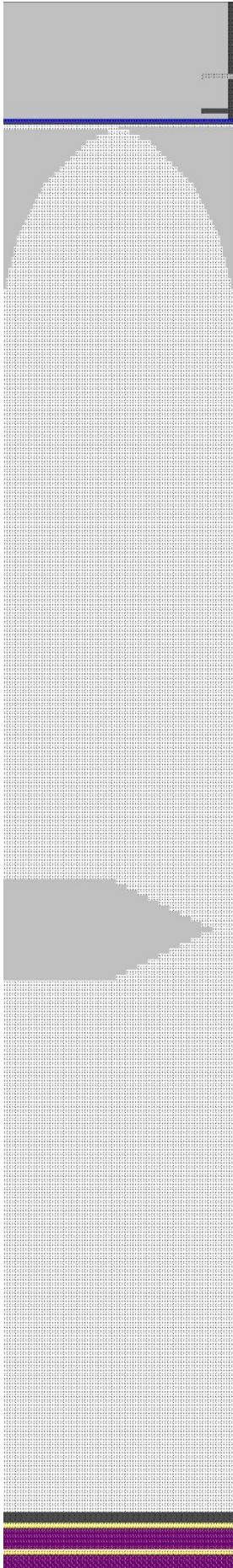
2/48nm

Plating yarn Carrier 11: SWISSELASTIC

Knitting heel on side using partial knitting to reduce the risk of fabric accumulating on the machine in the centre of the sock pattern



Binding around toe seam is too raised



Alex Test No.3

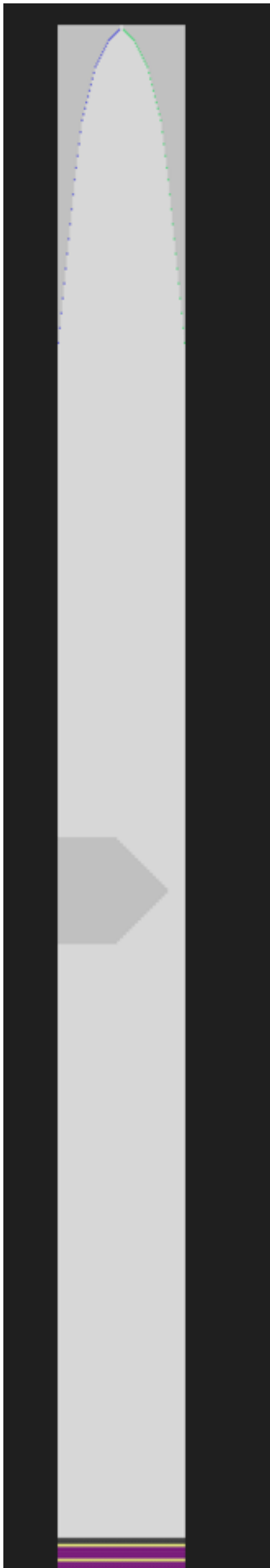
Floating tuck yarn Carrier 7: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm

Plating yarn Carrier 11: SWISSELASTIC



The heel feels lovely but the design makes the foot section feel to restrictive as the pointed end squashes the toes



Alex test No.4

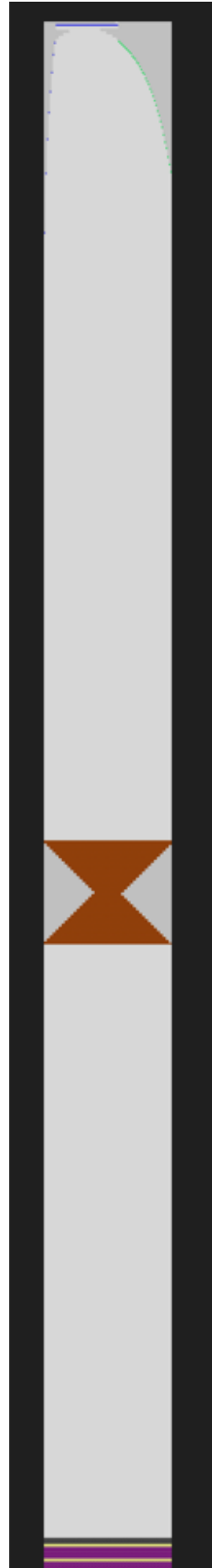
Floating tuck yarn Carrier 7: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm

Plating yarn Carrier 11: SWISSELASTIC





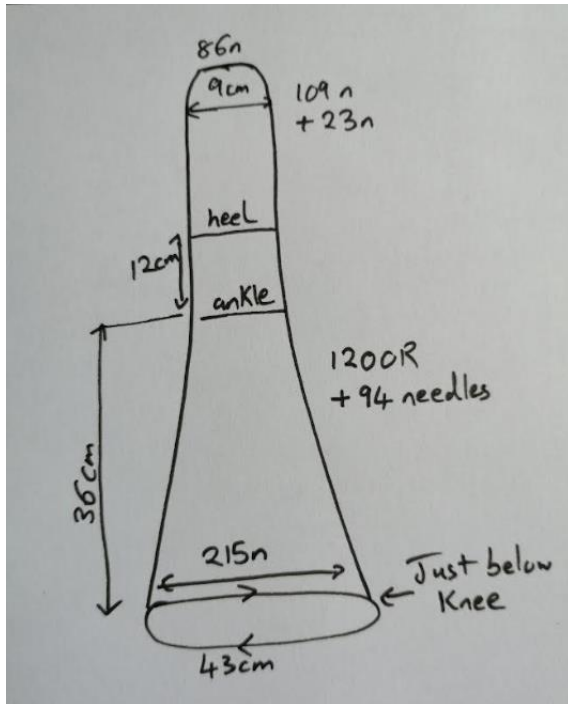


Alex test No.5

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm





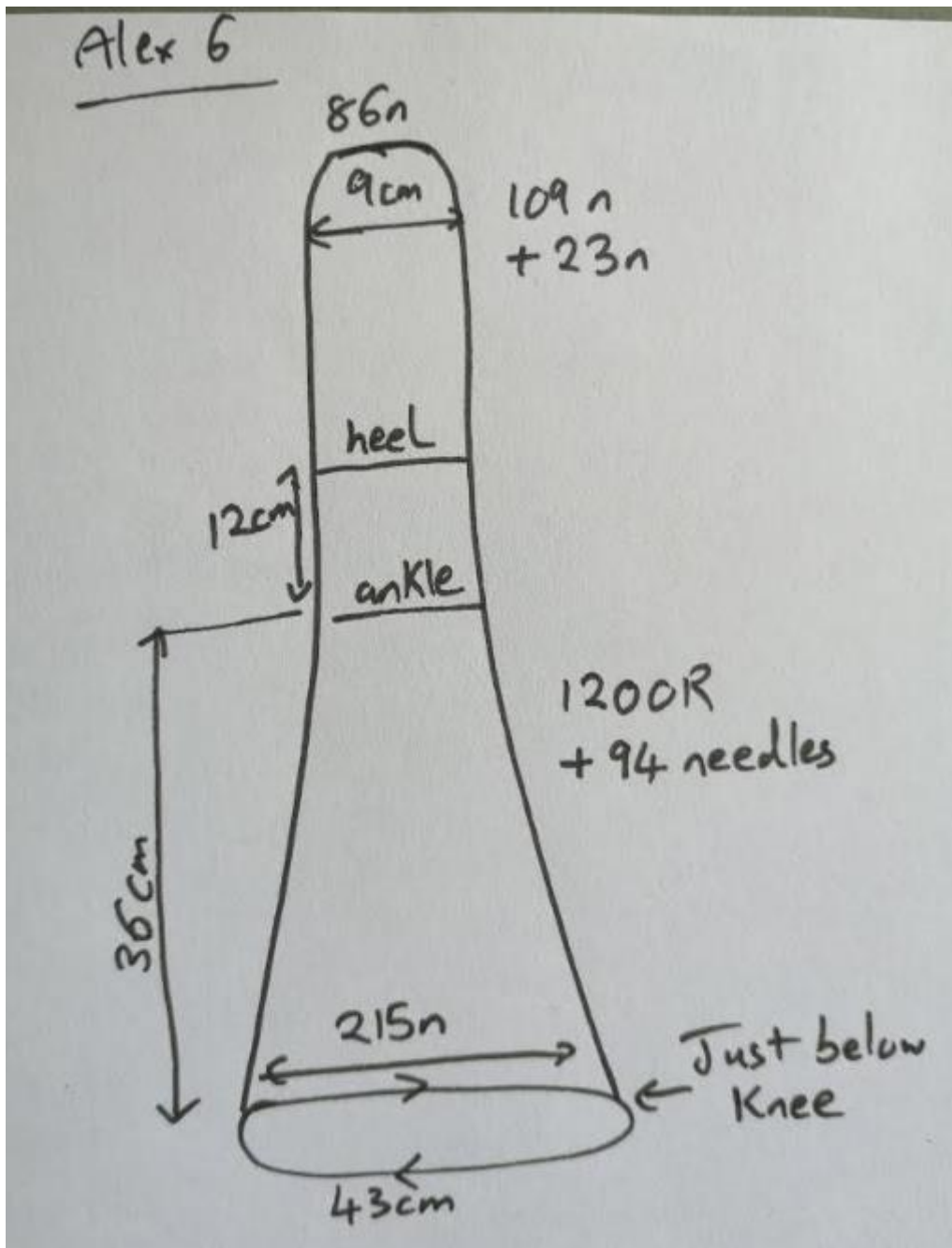
01/10/2019

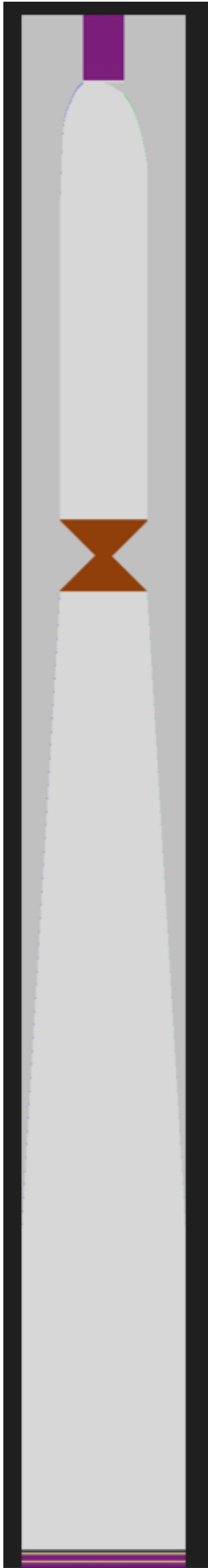
Alex Test No. 6

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm





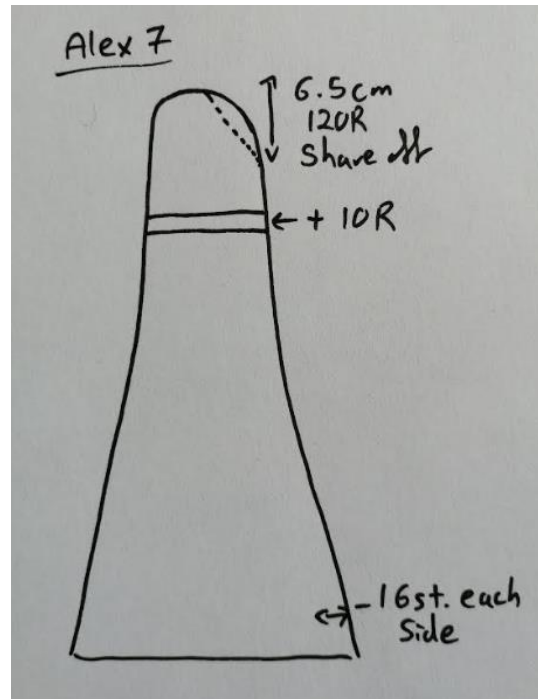


Alex Test No. 7

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm

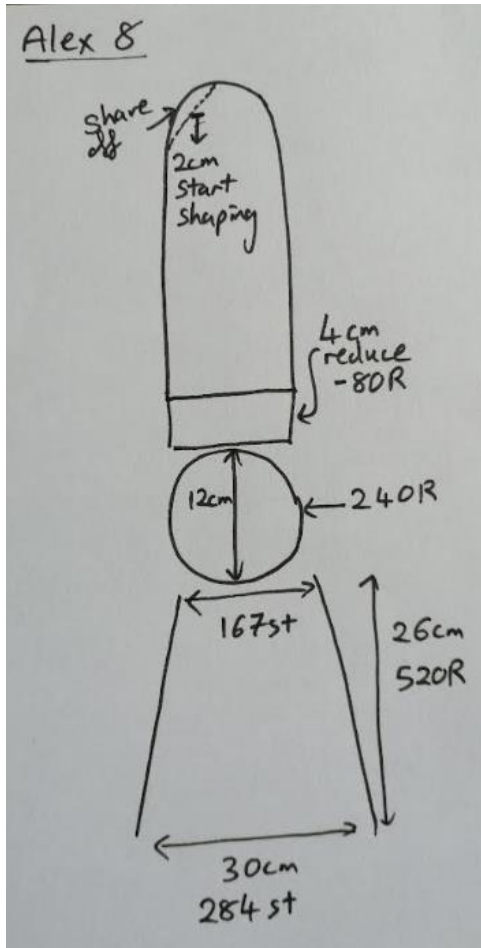


Alex Test No. 8

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm



No shaping of the knee as yet. Building on the thigh area and the back of the knee section





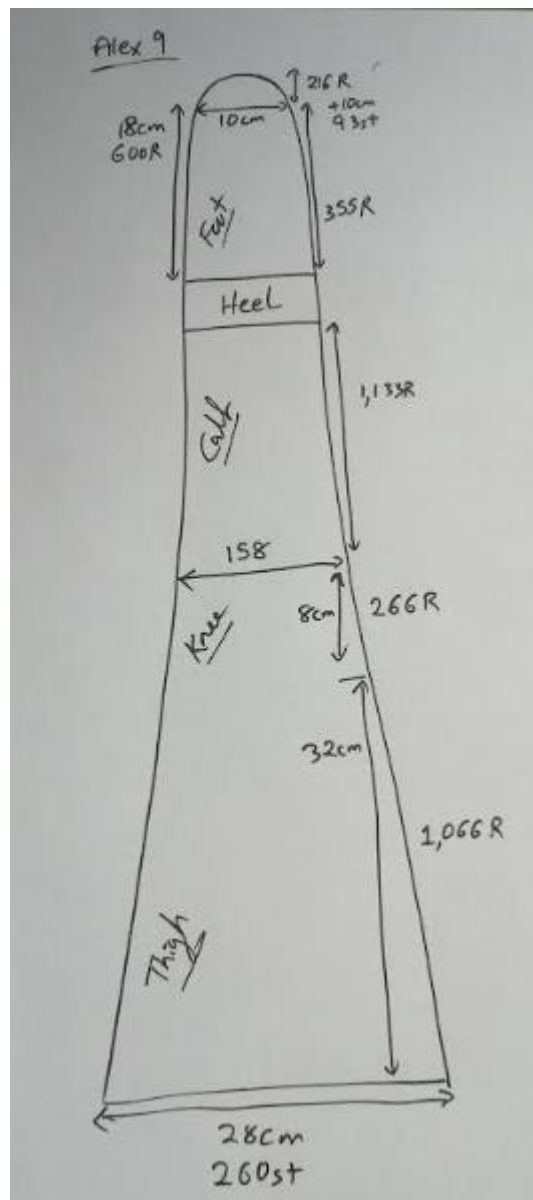
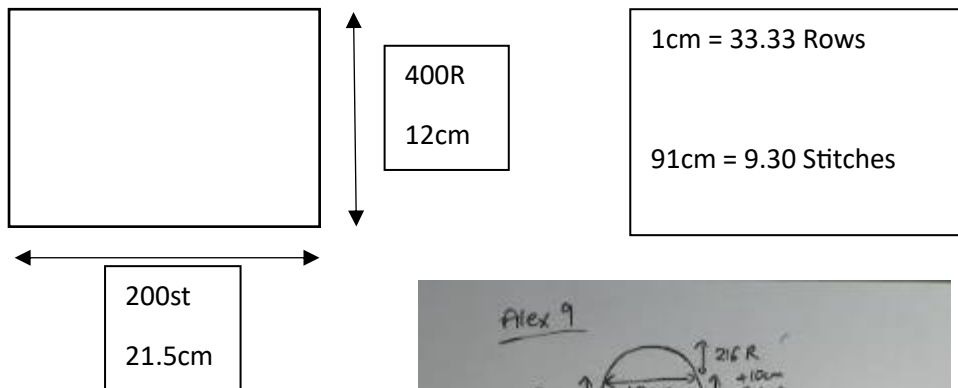
Alex No. 9 knitting time measurement testing

Fast knee, heel shape test

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm





**02/10/2019**

Alex Knee and Heel Test No.0

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm



Need to add to take down comb on the machine

Alex Knee and Heel Test No. 1

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm



Alex Knee and Heel Test No. 2

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm



Alex Knee Test No. 3

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm



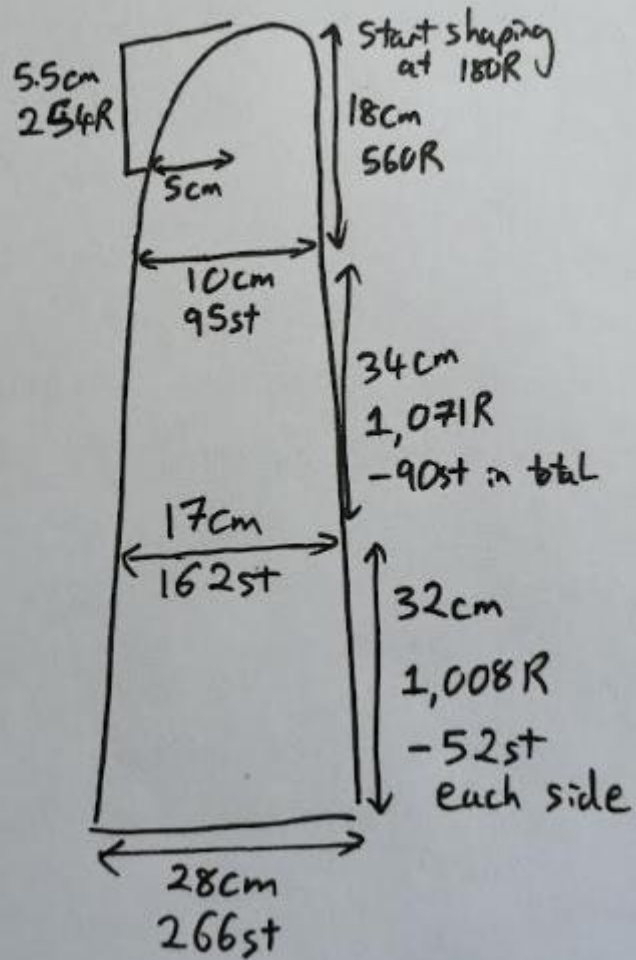
Alex No. 10

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm

# Alex 10







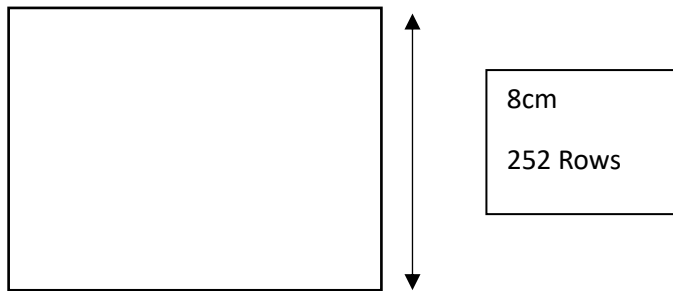
Alex Knee test 2

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm

Building section behind knee



Alex Knee Test 3

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm

Add 32 rows at the bottom of sample text 2

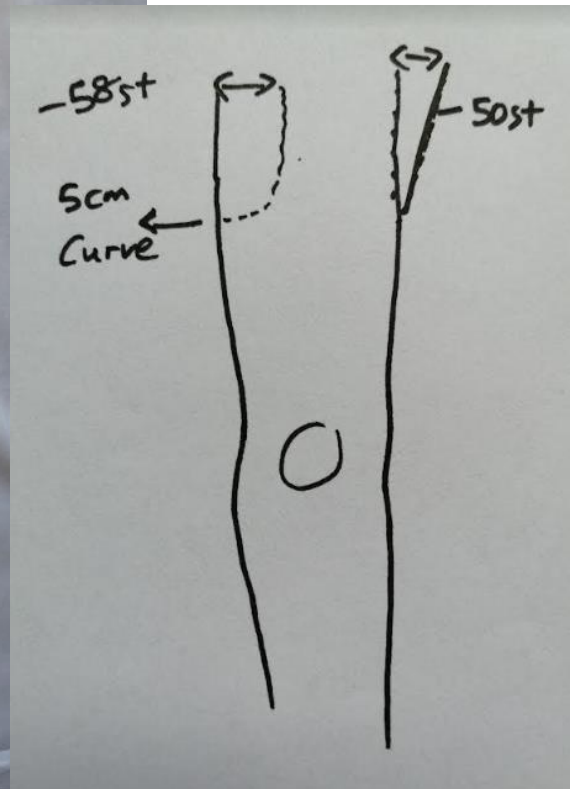
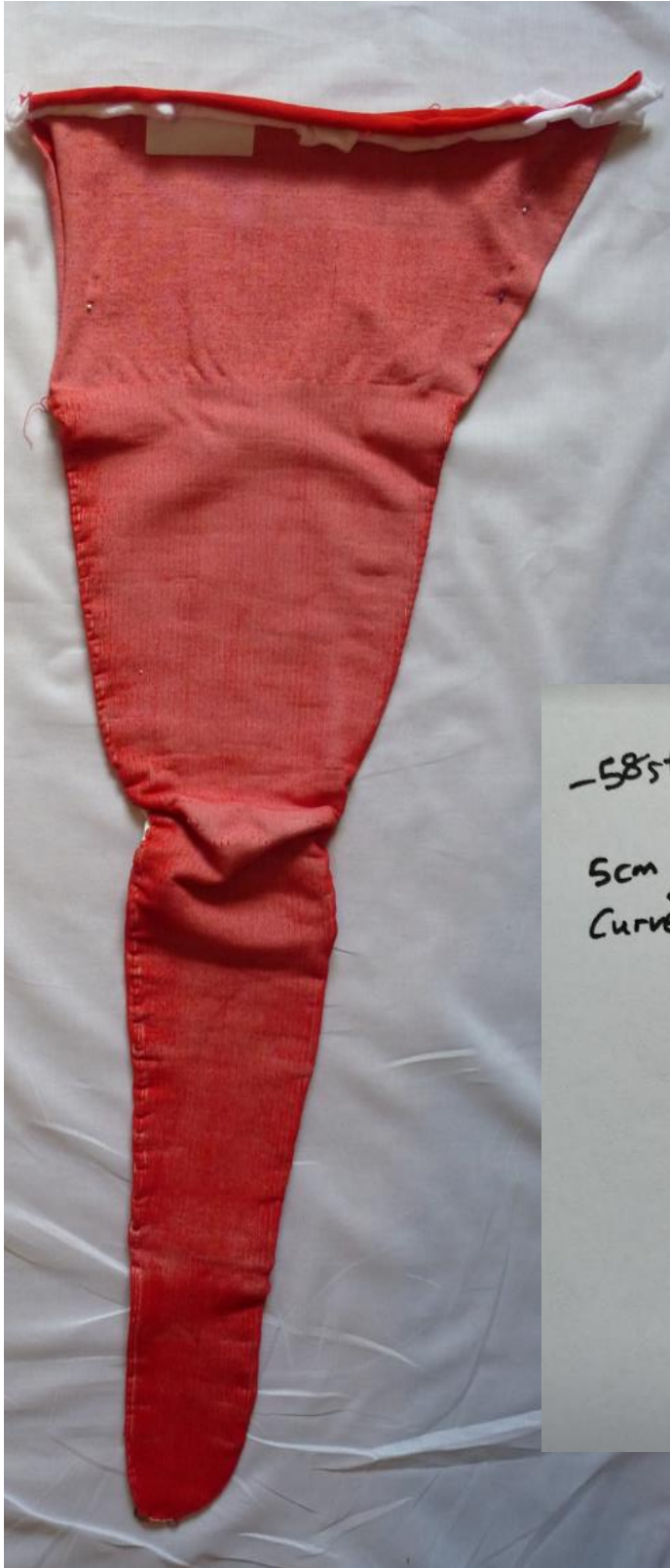


Alex No. 11

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm



Alex No. 12



Alex  
No.  
12 A

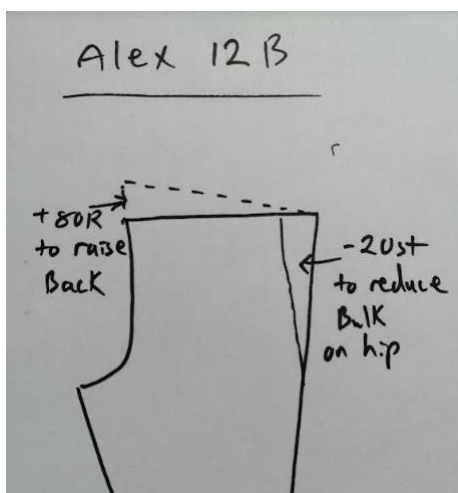


Alex  
No.  
12 B

Floating tuck yarn Carrier 7: SWISSELASTIC

Plating yarn Carrier 11: 48% Coolmax (polyester), 32% viscose, 20% nylon

2/48nm





## **Appendix 14: Protocol for feedback interviews on designs**

### **INSTRUCTIONS**

Thank you for agreeing to take part in the final stage of my PhD project '*Supporting Women Living with a Disability; specifically, Raynaud's Phenomenon, through knitted textile developments*'.

#### **There are two steps to this final stage of the research:**

- Step 1 involves looking through the items of clothing in your own time and answering some questions (further instructions are below).
- Step 2 is a follow up interview (online) whilst you still have the garments.

#### **Step 1:**

- Please read the information sheets and sign the consent form provided in the envelope.
- Each garment/accessory comes with a swing tag containing information about the item of clothing, and an A4 sheet with questions. Please have a read to familiarise yourself before exploring each piece.
- Look at each item of clothing individually, and feel free to try items on fully or partially. As you do this, you can record what you think about each item of clothing by using the voice recorder and/or writing notes on the sheet of paper provided.
- Please feel free to take photographs (e.g with your mobile phone in hi-res) wearing the garments, either separately, together, or showing how you would style or accessorize pieces with other items from your wardrobe. You can do this by wearing the 'outfit' or placing clothing items next to each other and photographing them.

**Please Note:**

- In line with COVID-19 safety guidelines, the clothing items are isolated for 48-hours and handled with sterile gloves pre and post-delivery.
- Please do contact me on 0737 809978 if you have any questions

**QUESTIONS ABOUT THE .....**

What was your initial reaction?

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What is your impression on how the item looks visually?

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How does it feel against your skin?

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How does it fit?

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How does it feel after wearing it?

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What would you change about it?

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How will it integrate with other items of clothing in your wardrobe?

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What is your overall feeling about the item? Any lasting impressions?

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Any other comments?

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The final stage of the empirical field work involved gathering qualitative data from participants on the prototypes developed. This was to take place in the form of a focus group at the end of April 2020, where garments would hang on a rail for the women to browse through, recreating the style of a shopping experience. This was to gather initial reactions of how the garments looked and felt, followed by a trying on session to test comfort in terms of fit, understand the overall sensory experience and effect of the garment style on the wearer. With the announcement of the Covid-19 pandemic and enforcement of a global lockdown in

March 2020, the focus group was cancelled. Furthermore, three out of the seven prototypes were NOT completed by March 2020. This created two quandaries; the first was how to gather the remaining qualitative research data, and the second was how to complete the garments. Through discussion with my supervisory team, an alternative strategy was devised to acquire the feedback by delivering the prototypes to participants homes for evaluation followed with an online interview. To complete the garments, I decided to use a domestic knitting machine already in my possession.

The prototypes were placed on hangers encased in garment bags to enhance the presentation aesthetic. To avoid loss or damage, the garment bags were delivered in person, and for this reason, six of the studies participants geographically close to me were selected. All but one participant was within 2-3 hours roundtrip car journey. With each garment, a questionnaire and tag were placed on its hanger. Alongside the garments was a clear box with instructions, participant information sheet, consent, and image release form. Following the UK's Covid-19 government health and safety guidelines, the garments were quarantined for 48 hours before each delivery. Upon collection, items such as questionnaires, tags and the folder were placed into isolation for 48 hours before handled for analysis and newly replaced for each interview. All garments were handled with sanitised gloves with a fresh mask worn during delivery. Participants were then given time to try the garments and complete the questionnaires. This varied between a day or two depending on their personal schedules. Afterwards, an online interview was carried out, and a collection time was organised. The table below contains participants profiles and date of interviews. The role of the questionnaire was to capture participants' initial thoughts whilst trying the garments and act as reminders during the interview. The garments were purposefully left with the women for the interview, to act as prompts and for interviewees to gesture towards a design feature. Further to this, no information about the garments was included such as fibre content and size. This was to avoid influencing participant's responses.

As I made the decision to move the project forward by using a domestic Silver Reed standard knitting machine, the final finishing's were not how I designed or envisioned them to be. For example, the fabric created on the original knitting machine (Stoll ADF) was a finer fabric to the domestic Silver Reed standard gauge machine. I needed to decide whether to disclose or withhold this information during the trail period, as I wondered how it would affect the process. It would require the inclusion of complex information on these garments, and therefore more information for participants to read, digest and remember. With this in

mind, the information regarding several features, which I considered were yet to be refined, was not included, as it was possible the women would approve the features. Furthermore, the process needed to be fun, relaxing, and uncomplicated. Below is an example as to what finishing's I am referring to. Image 1 is the turquoise undergarment. To complete the garment, it required hemming and straps. Image 2 is the completed version using the Silver Reed domestic machine. The hem crinkles rather than sitting flush, and the trimmings highlighted in image 3 rolls along the neckline.



Image 1



Image 2



Image 3

The interviews lasted between thirty-five minutes and one hour and seventeen minutes. During the interviews, participants were asked to discuss their responses for each garment following the questionnaire which included eight open ended questions about their initial reaction to the garment, its visually aesthetics, how it fitted and felt against the skin, affect after wearing it, what changes they would make, how the garment would integrate with their current wardrobe, any lasting impressions, and any additional comments? The written answers were quite short, however, as the questionnaires were intended to act as reminders and prompts for the participants, the women provided more in-depth answers about their trying experience in the interviews.

The interviews were translated verbatim, to allow a deeper understanding of what the data contained. The material was then analysed using thematic analysis. Firstly, a table for each garment was created with two columns. Within each table, the first column contained a theme, whilst the second listed the quote it originated from with participant's name and line number for referencing. To help with managing the data, within each table representing a garment, it was sectioned per participant, so participant's name followed with information on the garment. This information was then amalgamated into another table where similar themes across all participants about that garment were grouped together under a theme. The next step was to collate information across all tables into one table by grouping similar themes together under one overarching theme. This information was then transferred into another table where all similar overarching themes became sub-themes and grouped together under a master theme. Throughout analysis, colour coding was assigned to themes to help with managing the data.

