

Functional Clothing designs for individuals with Special Needs



Introduction

All types of clothing are known to fulfil various functions, from aesthetics to basic protection from elements. **Functional clothing is classified as any type of clothing that is specifically designed to deliver the performance and functionality requirement of the user, over its normal functions.** It is special clothing that is primarily engineered for people who are physically and mentally disabled (Gupta, 2011).

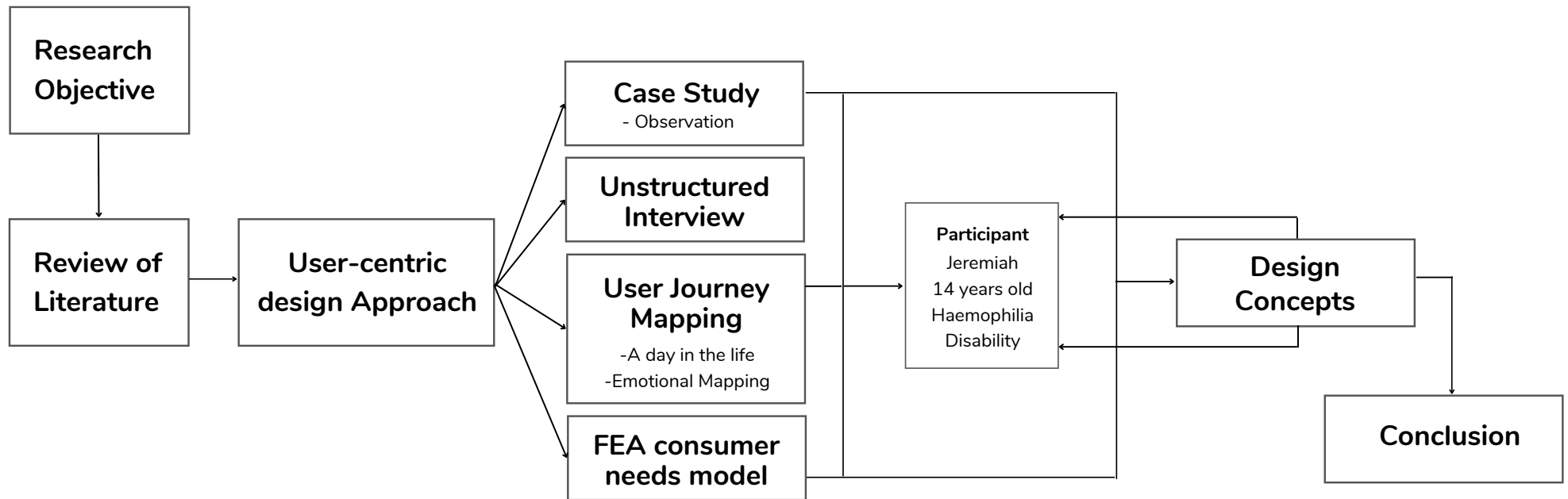
Objective

To understand the perception of the differently-abled on functional clothing and to develop design concepts

CASE STUDY

A case study was conducted on a 14-year-old boy Jeremiah, who suffers from severe Haemophilia 'A' inhibitors. He has a movement disability on his left hand and leg which is swollen at the joints due to the internal bleeding into the joints which had happened since birth and is in most days a lot of discomforts which limits everything he does.

Methodology



Observation

- His condition has recently become more severe and is currently on the Novoseven (Factor VII) treatment to aid his disorder.
- He has a movement disability on his left hand and leg which is swollen at the joints due to the internal bleeding into the joints which had happened since birth
- The joints are an area where two bones come together, in his case the bleed fills the joint space after an injury or sometimes without obvious cause. Participant observation was done on the 20th of March 2021.



Image 4. Swollen elbow joint



Image 5. Swollen knee joint

An informal interview was conducted where the participant listed a list of minor and major problems related to clothing. The following tables show the problems faced by him, his issues with clothing and the designs suggested to deliver the performance and functionality required.

Table 1 : General challenges

Observation	Issue related to clothing	Design Decisions
Cannot wear heavy clothing	Heavy clothing pressures the body	Different types of light-weight fabrics can be used
Cannot wear Cotton clothing	Cotton clothing holds perspiration which irritates his body	Clothing with cooling capacity in summer and warm capacity in winter can be used

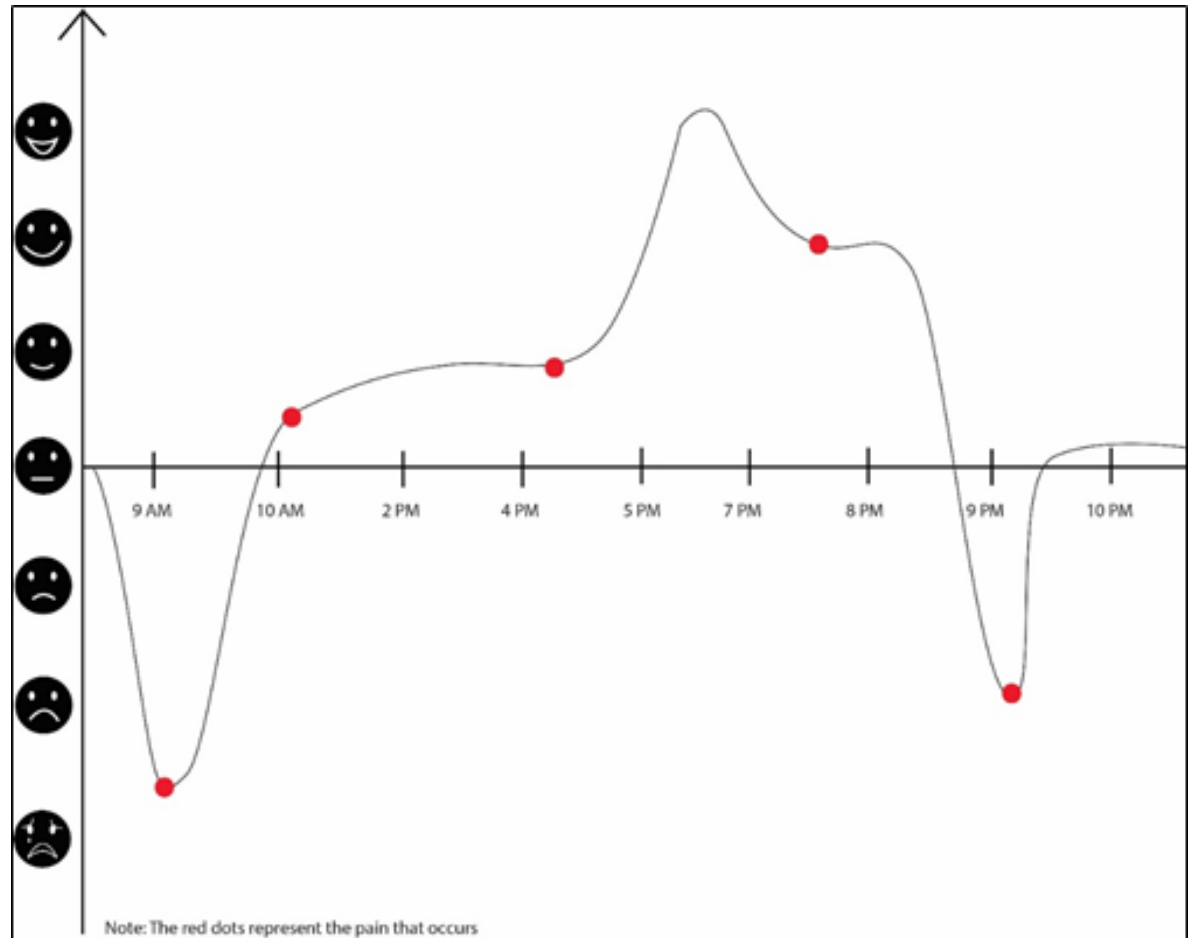
Table 1 : Upper body challenges

Observation	Issue related to clothing	Design Decisions
<p>Difficulty in wearing and taking off clothes which requires elbow to bend due to the internal bleed</p> <p>Cannot wear or change clothes quickly especially school uniform</p> <p>When pain in the elbow occurs, the hand constantly gets tired.</p> <p>When the hand is in pain, it cannot be lifted which makes it difficult to wear upper clothing</p>	<p>Clothes have only one opening to wear & take off</p> <p>Shirts have many buttons, wearing pants, pullovers & socks takes time</p> <p>Wearing an arm sling takes two people and time consuming & even irritates shoulder</p> <p>A shawl does not function enough to cover the body in keeping warmth nor is it stable</p>	<p>Detachable openings using fasteners</p> <p>Magnet button attachment at the opening of the shirt</p> <p>Horizontal pocket in the T-shirt mid-chest area for the hand to rest</p> <p>A stable poncho with slit sleeve openings and a strap to hold it in place</p>

Table 1 : Lower body challenges

Observation	Issue related to clothing	Design Decisions
<p>Limited in-trend clothing, like skinny & slim fit pants</p> <p>Could never wear denim jeans</p> <p>Difficulty in wearing and taking off clothes which requires knee to bend since the knee is swollen due to the blood that has filled the joint cavity</p>	<p>Tight clothing pressures the swollen joints</p> <p>Denim has a hard texture and it is difficult for him to take off</p> <p>Bottom wear have only one opening to wear & take off</p>	<p>Such designs can be given Functional ease for the user</p> <p>Detachable openings from the seams ,soft thin knee pad in the denim.</p> <p>Detachable openings at the seams using fasteners</p>

A Day in The Life and an emotional journey map has been reported. The red dot in the above map indicates the pain which occurs in that particular moment of time, the first and last red is when Jeremiah changes his daily clothes, for every night he has to slip in his thermals which are easy to wear and take off but because of his current condition due to the fall, he suffers in wearing and taking off clothing.

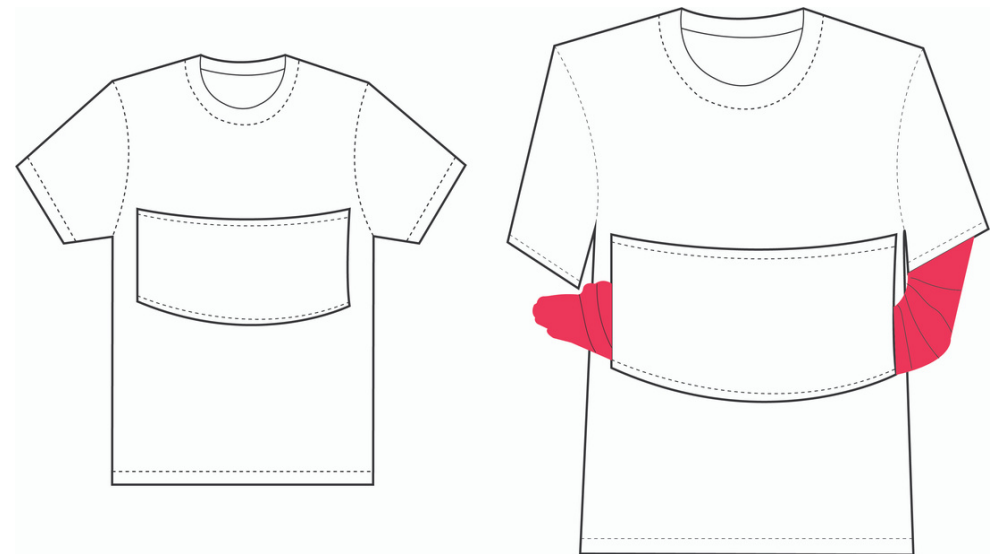


Concepts

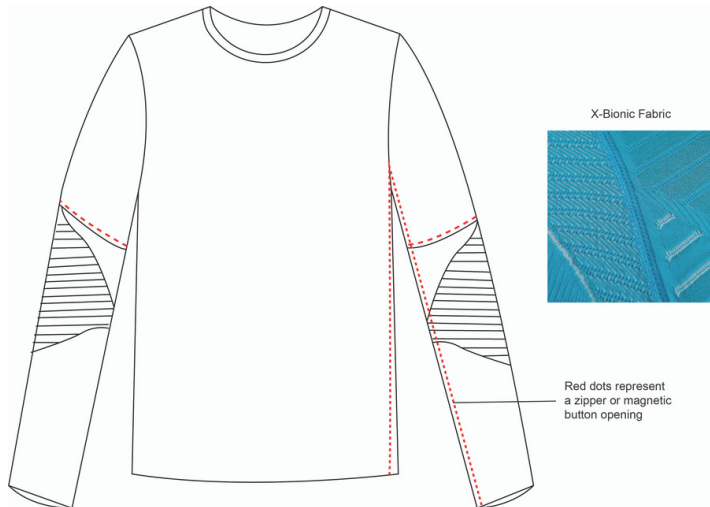
- Inside magnetic opening in a shirt
 - Easy and a fast way to button up, when his finger joints hurt
 - Normal buttons in the front and sleeves
 - Mesh armpit: maximum ventilation



- Padding Pocket at the chest
 - Can rest his hands at any time
 - No need of an arm-sling which he does not approve much of it
 - The Pocket can be decorative
- Co-design with the user



- Opening T-shirt
 - Zipper or magnetic button opening from the side seam
 - Zipper opening at the sleeve
- Fabric- X-Bionic so as it keeps the body cool when sweat and warm when cold



- Warm lightweight jacket
 - Polyurethane padding at the elbows for protection
 - Extra panel at the elbow for easy movement
 - High loft fabric for lightweight
- Warm lightweight jacket

Other ways:

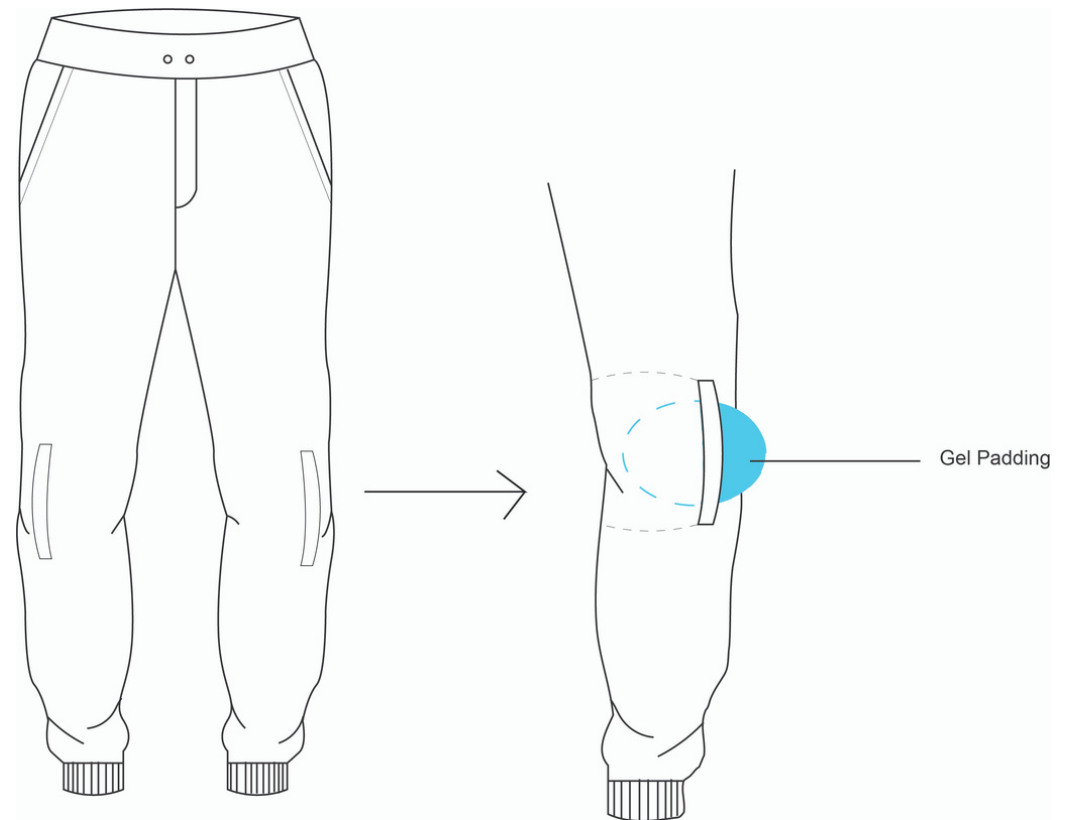
- Cotton from soft toys can be used as padding for the elbows



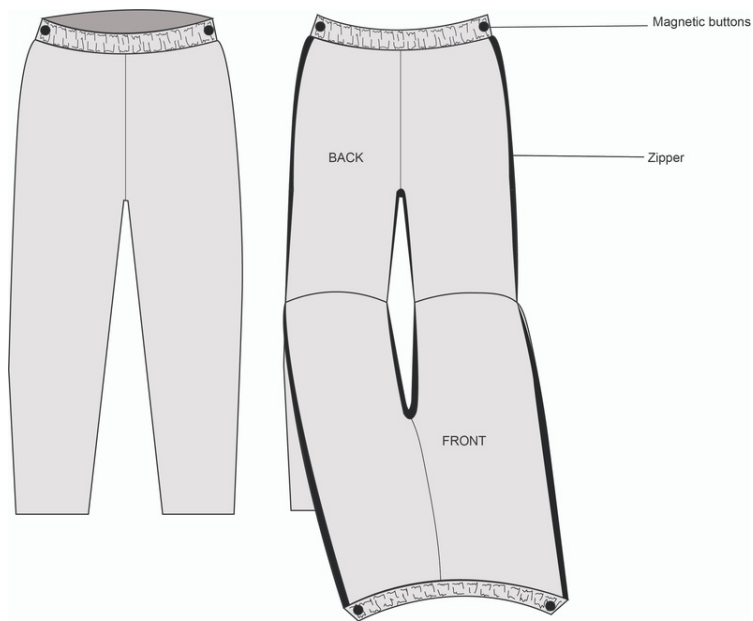
- Jogger
 - Velcro opening at the knee for inserting a gel pad
 - Gel pad-Synergy cold gel pack (<https://www.1mg.com>)
 - The fabric used is Polyester Polyamide Elastane Sweat-wicking fabric which is lightweight

Other ways:

- By using a sock filled with rice, which is refrigerated to make a cold compressing pack.



- Opening Pants
 - Zippers at the outer and inner seams
 - Magnetic buttons at the waist
 - Easy to slide in and out
 - Knitted fabric



- Tshirt with a print of his own creation Joker (his favourite character)



Conclusion

Disabilities lead to special functional requirements for clothing which enhances the functions of comfort. The purpose of this study was to offer ideas for the special needs clothing design which combines functional, expressive and aesthetics to provide the right design decisions to fulfil special requirements and to improve the emotional well-being of the wearer. In conclusion, the user was elevated and eager when shown the design intervention, for these clothing would satisfy the following standards which are, putting on and off clothing independently, the clothing variation is no distinct from others and providing a mental and physical comfort. The scope of this research is it can offer a direction not only to the individuals with special needs but also to designers interested in developing special needs clothing.