Smart Wearables:
clothing collection for young disabled people

DBA Inclusive Design Challenge 2002
Pearlfisher
i~design case studies
This is one of a series of inclusive design case studies published as part of the i~design research programme. These case studies document inclusive design collaborations between the Helen Hamlyn Centre (HHC) and industry and voluntary sector partners, under the Helen Hamlyn Research Associates programme. They also document the results of the ‘Inclusive Design Challenge’, a design competition co-ordinated by the Helen Hamlyn Centre and the Design Business Association (DBA).

i~design is a multi-centre collaborative research programme funded by the Engineering and Physical Sciences Research Council (EPSRC). The purpose is to foster the adoption of inclusive design by business decision makers and professional designers, in particular by presenting the business case, developing tools and techniques, and building a network of researchers around the projects.

i~design partners
• The Helen Hamlyn Centre at the Royal College of Art, London, is a centre for inclusive design, with extensive contacts in industry and design professions.
• The Engineering Design Centre at the University of Cambridge has a strong reputation in the improvement of design process and development of design methodologies to address specific issues.
• Applied Computing at the University of Dundee develops information technology systems to support older and disabled people.
• The HCI Group at the University of York has a long history of inter-disciplinary research in the area of user centred design arising from collaboration between the departments of Psychology and Computer Science.
• The Design Council inspires and enables the basic use of design by business, education and government to improve prosperity and well-being.
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Abstract:
The way we dress is a crucial means of self-expression and an assertion of our identity. A disabled person will add that the need for fashionable clothing increases in direct proportion to the severity of their disability and is a vital way to confront and overcome prejudice. Pearlfisher worked with a sharp and stylish young group of users who said what they wanted in no uncertain terms. The result is a clothing collection using a temperature-regulating fabric developed by NASA and with many accessible features that is seriously hot and seriously cool, and a boon in winter for people of all ages with circulatory difficulties.

Company: Pearlfisher

Keywords:
Embedded technology, technical textiles, ‘smart’ fabrics, fastenings, accessible features

The brief:
Design a mainstream product, service, environment, print, online or other communication which deliberately includes the needs and aspirations of currently excluded groups of people.

Design areas:
Packaging, communications, transport, retail environments and the new area of ‘smart wearables’ – the intersection between functional fashion, new textiles and embedded technology.

Year: 2002

Description
A clothing collection for young disabled people with mainstream styling and non-stigmatizing functionality, utilising a temperature-regulating micro-pile thermal fabric developed by NASA.

Background & Motivation
This project centered on the physical and emotional comfort of disabled teenagers. For any young person the way they dress is a crucial means of self-expression and an assertion of their identity. A disabled person will add that the need for fashionable clothing increases in direct proportion to the severity of disability and is a vital way to confront and overcome prejudice. Given the choice between a pair of stylish jeans whose thick seams can promote pressure sores and a pair of tracksuit bottoms that are comfortable but unstylish, it is likely that a wheelchair user will chose the former despite the risk. Tracksuit bottoms are seen to symbolize economic inactivity and lack of style.

As the design team found “What teenagers in this group desire is to have well designed clothing that works with rather than against their disability and in doing so it will allow them maximum comfort in a variety of situations. Secondly, like every other teenager world-wide, they care about fashion and image, yet current fashions discriminate unwittingly against disabled people, they make clothes that look great but they don’t work.”

Pearlfisher worked with a sharp and stylish young group of users who said what they wanted in no
Figure 1: Properties of Outlast™, the micro-thermal fabric used to line the garments in the collection
uncertain terms. The result is a clothing collection that is seriously hot and seriously cool – and a boon in winter for people of all ages with circulatory difficulties. Smart Wearables is a line of smart clothes for young people incorporating state of the art temperature-regulating materials, textiles, crease resistant weaves, innovative and flexible fashion detailing for maximum accessibility and ease of wear, that combine the smart aesthetic with smart materials and major design details and benefits.

**User input**

User input to the project came from young disabled people with visual and mobility impairments.

**Design solutions**

Two prototype ranges were designed - two outfits for men and women, one smart and one casual. All the materials used are crease-resistant performance ones which go back to their natural shape, crease free, after washing, so that ironing is unnecessary – an important factor for visually impaired people in particular.

OUTLAST™, a lightweight temperature-regulating micro-pile thermal fabric developed by NASA, was used as a lining and outer fabric for the whole collection. It works in the following way:

- The fabric absorbs excess heat generated by the body reducing overheating.
- Heat is distributed throughout the fabric, reducing hot and cold spots
- When necessary, stored heat is released back to the body so that the temperature is always just right.

The collection is easy to wear and crucially easy to put on and take off. Great attention has been paid to fastenings and openings – zips are strategically placed for carer-assisted dressing and maximum

Figure 2: Detailing on the clothing - the hem to waist zip (left). The magnetic buttons and knee-high pocket for mobile phones (right)
Figure 3: Three outfits from the modular collection
comfort for wheelchair users. They run the length of the trousers allowing them to be opened flat, are positioned to avoid contact with the wearer and exist also as a decorative feature. Discreet panels have been put into the clothes to accommodate sanitary pads.

In other trousers the zips run from hip to inside leg again for ease of dressing and as a design feature. The jackets have magnetic buttons and magnetic strips in the pocket features, on the jacket as well and the shirt for ease of use and dexterity. Velcro® simplifies fastening for visually impaired consumers, while LED and reflective strip features add excitement and increase safety when people are out walking in the dark. Pockets have been integrated to allow mobile phones to be stored yet always be within reach. “This modular collection includes both formal and informal wear for all seasons and allows the wearer to flexibly choose their look for the day and the occasion. The lead designer described them as clothes for anyone who wants to make light of life’s challenges, look good and feel great at the same time.”

Next steps
37 Degrees
Pearlfisher went on to design and market, 37 Degrees, an innovative, temperature-regulating range of infant clothing to help babies stay at the right temperature and help prevent SIDS or cot death. The 37 Degrees clothing absorbs and stores heat from the skin and releases it only when necessary to keep the baby’s body temperature at a comfortable 37 degrees Celsius. The clothing is beautifully designed and, therefore, has a competitive edge in terms of both functionality and desirability.

Judges’ evaluation
The panel liked the integrity of the project, its clever detail ideas and its core message that feeling comfortable is not incompatible with looking fashionable. The collection is strong, the fabric used has great potential and the fashion show clearly illustrated how much pleasure the target audience derived from wearing clothing that is exciting yet meets their functional and emotional needs. They were impressed too that the design team had chosen to explore a new design area for their company and feel that the project is the start of an exciting new direction in clothing.

Designer’s evaluation
“At Pearlfisher we don’t normally design clothes so this design challenge brought a fresh perspective. By looking at excluded groups of disabled people, we were able to see it in a way that maybe fashion designers don’t and I think it is a hugely viable commercial proposition.”
Karen Welman, Pearlfisher

![Figure 4: Casual outdoor wear with fluorescent zip detail for safety in the dark](image)
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The DBA Inclusive Design Challenge is an annual competition organised by the Helen Hamlyn Centre (HHC) and the Design Business Association (DBA). Mentored by the HHC, DBA member design firms work with expert users over four months to devise prototypes for a new generation of products and service with inbuilt functionality and mainstream styling. By providing beacon exemplars of inclusive design, the Challenge aims to highlight the potential for innovation and business opportunity in a growing but hitherto neglected field and underscore the key role design can play in improving quality of life for disabled and older people. The Challenge serves as a mechanism to provide designers with transferable inclusive design skills and methodologies.

Design Business Association
The Design Business Association (DBA) is the membership-based trade association for the UK design industry. It exists to promote professional excellence through productive partnerships between commerce and the design industry to champion effective design, which improves the quality of people’s lives.
www.dba.org.uk

Pearlfisher
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