

Institution: University of Dundee		
Unit of Assessment: UoA 32 Art and Design: History, Practice and Theory		
Title of case study: Design meets disability: changing the relationship between disability and design in business, culture, practice and education		
Period when the underpinning research was undertaken: May 2004 – present		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Graham Pullin Andrew Cook	Professor PDRA; Lecturer	August 2005 – present February 2016 – present
Period when the claimed impact occurred: 2013 – 2020		
Is this case study continued from a case study submitted in 2014? N		

1. Summary of the impact

Design meets disability and related research projects are changing the way that designers, disabled people, business and society engage with issues of inclusion and with each other. This work has impacted on:

Design-led businesses, by changing the conceptual framing of disability, inspiring Canadian company Alleles to enable self-expression for thousands of individual prosthetics wearers and influencing the mind set of nearly 400 CEOs representing 12 million employees;

Culture, by changing the framing of disability and design, reflecting and affecting our participants' disability identity and introducing these nuances to over 100,000 disabled and non-disabled visitors to V&A Dundee;

Disability-related practice and education, by reframing the role of design, reaching 500,000 designers, users and/or future designers through Microsoft's inclusive design and education initiative.

2. Underpinning research

Prior to the underpinning research, **Graham Pullin** had been involved in two separate fields: assistive technology, developing robotic arms for disabled people (Bath Institute of Medical Engineering); and design, leading an interdisciplinary studio at the global design company IDEO. The resulting insights revealed that effective creative methods are often more exploratory or provocative than the direct problem-solving approach that still dominates assistive technology. Deep experience of both fields further afforded the insight that, even though both were involved in user-centred or human-centred design, the culture of each was contrasting and complementary.

The monograph *Design meets disability* [R1] was conceived as a bridge between the two cultures; to change the relationship of assistive technology to mainstream design, with the intent of influencing both: within disability-related design, to make the case for artschool design disciplines and designers to be invited into interdisciplinary teams; within design, to show that disability can be a catalyst for more creativity, not a cause of compromise that accessibility is often perceived as.

The book was structured around chapters that juxtaposed two differing priorities, for example 'fashion [from design] meets discretion [from prosthetics]'; identity meets ability; provocation meets sensitivity, and so on. Revealing these contrasting – often even

contradictory – approaches helped to explain what has kept these two fields apart. Yet the book also anticipated how, if combined, these very differences might be harnessed as positive, *creative* tensions.

The last chapter of the book, 'expression meets information', was the foundation for the research project *Six Speaking Chairs* that explored expressive tone of voice in augmentative and alternative communication (AAC). This demonstrated the value of critical design: using design to provoke discussion rather than directly solve problems. Embodied in designed objects, otherwise academic issues were made accessible to disabled participants, resulting in insights about the expressiveness that people using AAC want, resulting in peer-reviewed scientific papers [R2].

The insight that design research can mediate between specialist disciplines [R3] has defined our interdisciplinary practice ever since. Influenced by the humanities-based disability studies field (where *Design meets disability* is included in "the canon" by Rosemarie Garland-Thomson, editing *Manifestos for the future of critical disability studies*), our research has become more driven by the stances of disabled people, more radical and at the same time more nuanced.

This ethos is embodied by *Hands of X* (funded by EPSRC as 'Socio-technical materials for prosthetic hands' February 2016–July 2017) led by the Duncan of Jordanstone College of Art and Design at the University of Dundee with UCL. This work was guided by disabled participants who became our mentors and co-researchers, and this participation was balanced with fashion-led art direction [R4]. The hands we co-designed were obviously and unapologetically artificial – yet at the same time understated and unremarkable. We staged an experience prototype of an enriched limb fitting service within a fashion-led eyewear retailer, Cubitts, in King's Cross, London in June 2017. This very co-location implied and initiated a dialogue between two worlds and two cultures and was itself an output: a manifestation of what it might mean to move to a demedicalised future for rehabilitation services.

This combination of tangible and accessible outcomes with theoretical underpinnings was the basis of our substantive exhibition at V&A Dundee, 27 June–1 September 2019 [R5]. This engaged an estimated audience of 100,000 visitors, 7,500 of whom completed a participatory exercise. The exhibition included a manifesto 'Super normal design for extraordinary bodies' [R6] that lists signatories from fields as diverse as disability studies, commercial design, assistive technology, disability activism and cultural studies, not usually seen together.

3. References to the research

[R1] Pullin, G. (2009) *Design meets disability*. MA.: The MIT Press. Over 5,000 copies sold, including in high street bookshops and museums. Reviewed in non-academic and academic press. Translated for publication in Japan by O'Reilly in 2021.

[R2] Pullin, G. and Hennig, S. (2015) '17 ways to say yes: toward nuanced tone of voice in AAC and speech technology'. *Augmentative and Alternative Communication* 31 (5) pp.170–180. DOI: [10.3109/07434618.2015.1037930](https://doi.org/10.3109/07434618.2015.1037930) Peer reviewed.

[R3] Pullin, G. (2015) 'Mapping interdisciplinary design research as flow around a medidisciplinary sea' in *The Routledge companion to design research* Rodgers, P. and Yee, J. (eds.) London: Routledge, pp. 60–71.

[R4] Cook, A., and Pullin G. (2020) 'Fashion and participation in Hands of X' in *Crafting anatomies* Townsend, K. Solomon, R. and Briggs-Goode, A. (eds.) London: Bloomsbury.

[R5] *Hands of X: design meets disability*. (2019) [Exhibition] Michelin Design Gallery, V&A, Dundee. 27 June–1 September 2019. Pullin, G., Cook A., More, M., Bassam, L. and Clark, B. (Curators).

[R6] Pullin, G. (2018) 'Super normal design for extra ordinary bodies' in *Manifestos for the future of critical disability studies* Kent, M., Ellis, K., Roberson, R. and Garland-Thomson, R. (eds.) Abingdon: Routledge.

4. Details of the impact

Changing the framing of disability in design-led businesses

The impact of our research is embodied in two very different businesses:

Alleles has afforded **self-expression to thousands of individual disabled customers** worldwide. Founded in 2013, **Alleles** designs and manufactures 'fashion-led' covers for prosthetic legs and arms [www.alleles.ca]. Founder McCauley Wanner questions "if any of this would have happened if it wasn't for finding Graham's book in the campus library":

When I came across Graham's book, it literally changed my life... and became my 'research bible'... [E1]

Alleles embodies the opening chapter of *Design meets disability* [R1], 'fashion meets discretion', identifying as "a team of fashion junkies. We are trying to solve a style problem. Not a limb one. In an industry with limited options we aim to provide choice for self-expression." Alleles has shipped thousands of covers around the world, affording their wearers the ability to shape their own identity: "6 years since founding Alleles... making these products a reality for our clients has now created a movement for inclusivity" [E1].

In contrast, **The Valuable 500** is a global business movement that seeks to address inclusion at board level. Launched at the World Economic Forum in January 2019, "where it made history by putting disability on the main stage for the first time ever", it has grown to influence the CEOs of nearly 400 companies, with \$4.5 Trillion in revenue and 12 million employees, leading them to commit to "putting disability inclusion on their leadership agenda" [E2]. The Director of Inclusive Brands at The Valuable 500 and founder of Think Designable challenges the 'trickle-down effect' whereby disabled people benefit from technologies from elsewhere, arguing that disability can conversely revolutionise mainstream markets; she states that Pullin's research "has influenced the mind set" of nearly 400 global organisations including Unilever, Microsoft, Barclays, Accenture, Bloomberg and Fujitsu and has "personally worked with the CMO of Prada to help them understand the innovation benefits of design meeting disability" [E2].

Changing the framing of disability and design in culture

The research has created cultural impact, from the **individual experiences of disabled people** as our research participants and mentors, to an exhibition that around 100,000 disabled and nondisabled visitors engaged with and other **exhibits and articles with international reach**, through curators and journalists:

Hands of X [R4] was exhibited at the Cooper Hewitt Smithsonian Museum of Design, New York as part of *Access+Ability*, curated by Cara McCarty (15 December 2017–3 September 2018). The New York Times [E4] reported our focus "on people in the middle who don't want to hide their disability, but also don't want to become poster children for some futuristic, superhuman narrative."

At **V&A Dundee**, our own exhibition *Hands of X: design meets disability* (27 June–1 September 2019) explored prosthetics in the context of disability studies [E5]. Public events included conversations between an amputee, a prosthetics student and eyewear designers [E6]. The V&A estimate that a majority of 140,000 visitors saw the exhibition and their own

evaluation report found that the show helped people engage with a complex topic in a way that made them feel confident and comfortable. One visitor "was talking about how this kind of research was of interest because the prosthetic choices she has are uncomfortable and don't feel in any way part of her" [E7].

An artist and one of four mentors amongst many other disabled participants on *Hands of X*, acknowledges the power of the exhibition stating that it "unquestionably helped inform a personal process of acknowledging my own disability and challenging my internalised ableism." As an artist, he reflects that this has "helped me to align what had until recently been separate aspects of my life, art practice and disability", thereby also changing a broader cultural and artistic landscape:

Also, in a more literal way, these collaborations have emboldened me to talk about and prioritise aesthetics and comfort as part of the requirements and expectations of a prosthesis, in situations where experts often solely focus on function [E3].

Invitations from the **design press**, including *Icon*, *Dwell* (circulation 900,000 in print and online) and *Domus*, illustrate a growing awareness of our research and these issues within magazines that do not often feature disability. Introducing our article on robotic prosthetic hands, *Domus* editor Sir David Chipperfield acknowledged this:

While it is traditionally an area dominated by technologists and clinicians, there is clearly a role for designers in considering the profound significance of materiality and personal identity. [E8]

Changing the framing of design in disability-related practice and education

Our international impact on disability-related practice spans inclusive design and assistive technology. **Within Microsoft's Inclusive initiative alone** the work has influenced 50,000 employees and featured in 500,000 screenings.

The Principal Design Strategist (herself disabled) and co-founder of **Microsoft's Inclusive Design** writes that our research "helped us frame the inclusive design practice as a one-size-fits-one method" [E9]; she goes on to state that within Microsoft, "Our inclusive curricula is in part grounded in our learnings from Graham. It has now been taught to over 50K Microsoft employees and inspired dozens of new products and features." In their Inclusive Design Toolkit [E10], Pullin is one of three "key people" thanked for their "leadership in inclusive design" and interviewed in the film 'Inclusive' [E11], screened internationally and streamed over 500,000 times worldwide. At the time of writing, The Principal Design Strategist confirms that "to date 50 universities have used the Inclusive Design Toolkit in their course curricula and 70+ have leveraged the film"; she notes:

Graham's quote... "It is not about us and objects. It's about us and each other." is a standard on our presentations to external partners and has been shared with over 5,000 companies worldwide. [E9]

5. Sources to corroborate the impact

[E1] Letter of support from the founder of Alleles (PDF attached)

[E2] Letter of support from Director of Inclusive Brands, The Valuable 500 (PDF attached)

[E3] Personal statement by artist and Hands of X participant (PDF attached)

[E4] International newspaper article in *New York Times* 'How design for one turns into design for all', 24 January 2018.

<https://www.nytimes.com/2018/01/24/arts/design/cooper-hewitt-access-ability.html>

[E5] Local newspaper article 'New V&A Dundee exhibition explores factors in choosing a prosthetic hand', *Evening Telegraph*, 27 June 2019.

<https://www.eveningtelegraph.co.uk/fp/new-va-dundee-exhibition-explores-factors-in-choosing-a-prosthetic-hand/>

[E6] Public talk at V&A Dundee led by prosthetics wearer 'Material preference for prosthetics', 31 July 2019 (as part of Hands of X exhibition).

<https://www.vam.ac.uk/dundee/event/138/lunchtime-talk-material-preference-for-prosthetics-with-caitlin-mcmullan-and-euan-ogilvie>

[E7] Exhibition report by V&A Dundee (PDF attached)

Summative Project Evaluation Report 'Hands of X: design meets disability', October 2019. Includes evidence from Curators, Visitor Assistants and social media.

[E8] Article in international design magazine (PDF attached)

Foreword remarks from Editor (Sir David Chipperfield) and article Graham Pullin, 'Ottobock Bebionic hand' (pp50-55), *Domus*, May 2020.

[E9] Letter of support from Microsoft Principal Design Strategist (PDF attached)

[E10] Microsoft Inclusive Design Toolkit (PDF attached)

in which on Page 60, Pullin is one of three "key people" thanked for their "leadership in inclusive design". Toolkit available at: <https://www.microsoft.com/design/inclusive/>

[E11] Internationally-screened film 'Inclusive', 2015, Miao Wang (director). Streamed

500,000 times, available open access at: <https://www.microsoft.com/design/inclusive/>