

innovate 6

>why getting it
right for people
with disabilities
means getting
it right for all

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Innovate is the research and development journal for small firms in the care and disability sector. It is published twice a year by the Small Business Programme of the Helen Hamlyn Research Centre at the Royal College of Art, London

The Royal College of Art is the world's only wholly postgraduate university of art and design

The Helen Hamlyn Research Centre is dedicated to the study and practice of socially inclusive design

The Small Business Programme of the Helen Hamlyn Research Centre works with small firms, primarily in London and the south-east, to identify and exploit innovation opportunities in response to social and demographic change. Its key focus is new product and service development in the care and disability sectors. It is funded by HEFCE's Higher Education Reach-Out to Business and the Community Fund (HEROBC)

>editorial

Welcome to the latest issue of innovate which describes the six new design prototypes generated by the DBA Design Challenge 2003, a joint initiative between the Design Business Association and the Helen Hamlyn Research Centre at the Royal College of Art.

Now in its fourth year, the DBA Design Challenge has become one of the most eagerly awaited events in the design calendar and an important catalyst for inclusive design. More design firms than ever before lined up to take part and the shortlisted projects proved beyond doubt that working closely with key user groups can unlock hidden innovation potential in new products and services.

Designing inclusively for the mainstream while including the needs of disabled people is tough. Why do the designers take up the challenge? One can think of the Disability Discrimination Act, due to become law in October 2004. This will have huge implications for thousands of small firms both in the way they treat their staff and in the services they provide to their many disabled customers. There is also growing pressure from investors and the public for a greater focus on corporate social responsibility whatever the size of the company.

But Rory Cellan-Jones, Business Correspondent of BBC News, expressed it best in his keynote speech at the event: 'It is not just about blue sky thinking by a few design geniuses who closet themselves away for a few months before emerging to delight their customers with irresistible new products that they never knew they really needed. It is about putting designers and users together in a co-operative process knowing that, if we get it right for disabled people, then we get it right for most people.'

Getting it right for most people drives the six dynamic projects described in the following pages. Read on...

>DBA Design Challenge 2003

When six British design consultancies – all members of the Design Business Association – took up the challenge of inclusive design, their shared objective was to design for the mainstream market while including as many people as possible, especially those with disabilities.

Inspired by design briefs set by the Helen Hamlyn Research Centre, their proposals were shortlisted from a record total of 14 entries submitted. After a rapid three-month development period last autumn, their projects were unveiled to a capacity audience drawn from the worlds of design, disability, government and business at the Royal College of Art on 9 December 2003.

The DBA Design Challenge – Innovation through Inclusive Design – is a collaboration between the Design Business Association, a leading professional organisation of design firms in the UK, and the Helen Hamlyn Research Centre at the Royal College of Art, which explores inclusive design through practical research and projects with industry.

A key objective of this initiative is to demonstrate how a deeper understanding of the needs and aspirations of users can be a powerful driver of innovation. Groups of disabled people work in partnership with the participating design teams, pooling their mutual ‘out of the box’ thinking to develop innovative prototypes for new products and services.

The fourth DBA Design Challenge saw the development of projects spanning product design, visual communications and interaction design.

Judging criteria

The high quality of each project made selection of an outright winner exceptionally difficult and intense discussion took place among the panel of judges. In coming to a decision, they weighed each entry against four key criteria:

- > how well social inclusion was promoted
- > the depth of insight shown into the needs and aspirations of excluded groups of people
- > the creative use of user input
- > how well the key ideas were communicated.

The prototypes

For the first time, the DBA Design Challenge Inclusive Design Award was shared by two product design consultancies: Factory Design for Factory Wares, a reinvention of the saucepan; and Seymourpowell for Ello, an inclusive mobile phone.

The judges were impressed by Factory Design’s courage in taking an everyday, unromantic object and, in the short time frame of the project, transforming it into one that would enhance independence and quality of life for those with reduced grip and strength.

The panel felt that the design team ‘set the standard’ for the Design Challenge in a rigorous process that resolved the hierarchy and complexity of the issues identified in the user groups, translating them seamlessly into a high-quality mainstream prototype.

As for Seymourpowell’s Ello, the judges found it wonderfully refreshing, to hear the powerful message of ‘less is more’ in regard to mobile phone technology from two young designers.

They were impressed by the designers’ willingness to strip the mobile phone down to its essentials, eliminate those elements that wouldn’t fit, and craft a beautiful, sensual object that worked at the aesthetic and functional levels. The judges liked the phone’s tactile buttons, its intuitive features and felt it could have as much impact on the marketplace as BT’s Big Button telephone.

Lewis Moberly, an independent brand identity consultancy with offices in London, Paris and Geneva, developed Eye Speak – a communication device to transmit a visual language. Its aim is to facilitate non-verbal communication in noisy environments where conventional means are ineffective or where hearing impairments can lead to social exclusion.

The judges felt that the design team had identified a neglected area that disables everyone, not just the hard of hearing. They were impressed by their willingness to go back to first principles, look at non-verbal signing systems and extract those elements that were crucial to the aspirational and functional needs of the users with whom they had worked. The result: an elegant language of symbols, with great mainstream potential, backed by a simple device that assists communication in the most positive, non-stigmatising way.

Leading transport graphic designers Roundel partnered Dalton Maag, recognised experts in font design, in the DBA Design Challenge. Together they developed the first much-needed set of protocols for electronicfont displays in a project entitled Digital Wayfinding.

The panel felt they displayed a mastery of the key sensory, visual, cognitive and environmental issues facing the new and as-yet unregulated area of digital signage, which impacts so negatively on the travelling public. Within the limited time frame available for the project, they devised an invaluable set of guidelines for designers, entering an area where engineering has long held sway. The judges felt that the guidelines could set new standards for the way that the design profession will work in this area in the future.

Creative consultancy Seachange proposed Life Circle, a communication system coded for chronic conditions which encourages compliance in taking prescribed medicines. The project aims to reduce medical emergencies stemming from human error.

The panel was very impressed by the design team's willingness to take on an increasingly complex subject, identify the separate needs of the stakeholders at each level of the system, and translate these into concepts that were brilliant, yet simple and effective. The judges felt that Life Circle, if adopted by the industry, could holistically – and dramatically – resolve some of the psychological, systemic and financial issues that lead to non-compliance.

Last but not least of the six projects was Buddy, proposed by brand communication consultancy The Team. Buddy is a wearable mobile device with vibration alerts that warn the hearing impaired user when alarms go off in the vicinity, helps distinguish between them and allows informed decisions and action to be taken.

The judges felt that Buddy directly addressed the user's emotional and physical needs by simultaneously reducing their vulnerability and enabling new levels of independence and peace of mind. Of all the projects, this was one that tackled an emotive subject extremely well.

The panel felt that the idea, with its use of simple, usable technology, had great potential as a mainstream product, going way beyond the hearing impaired community it was perhaps intended to serve.

The speakers

Julia Cassim of the Helen Hamlyn Research Centre welcomed the capacity audience and introduced the event. She paid tribute to the energy, creativity and commitment of the design teams who had worked on a voluntary basis to develop the projects. Equally important, she said, were the dedicated and growing network of disabled users, many of whom had travelled considerable distances to take part in the focus groups that are an important part of the whole process.

Rory Cellan-Jones, Business Correspondent of BBC News, chaired the event and made the keynote speech. He described the event as 'a combination of the Oscars and Olympics of the inclusive design world' and went on to contrast the performance of companies who had taken up the inclusive design message and found their markets expand with those who had ignored it.

Michelle Rivers of Wandsworth Council's Sensory Disabilities Team and a veteran of the DBA Design Challenge's user forums, responded to the presentations. She stressed that the experience of working with disabled people as part of an inclusive design approach would help designers in tackling the future needs of an ageing population, as disabilities were inherent to ageing.

John Mathers, President of the Design Business Association, presented the awards, designed by former Helen Hamlyn Research Associate Mary Wagstaff. He thanked the

teams for all the ‘time, sweat and consideration that had gone into each and every project.’

‘Anything which involves getting a greater understanding of how customers use business services has to be good for the bottom line.’

Rory Cellan-Jones, Business Correspondent, BBC News

‘I just feel quite privileged to be part of what you are trying to do, not just for ourselves but for the next generation of disabled people to come.’

Michelle Rivers, Sensory Disabilities Team, Wandsworth Council

‘At a personal level this award programme feeds the soul and taps into the passion designers have to solve problems. On another, it creates viable new business opportunities... all of the stories act as inspirational case studies to encourage design consultancies and businesses to reassess their thinking and processes to embrace a more diverse customer base.’

Deborah Dawton, Chief Executive, Design Business Association

>project one: Factory Wares by Factory Design

A project that returns to first principles to design an inclusive, commercially sensitive and delicious-looking saucepan.

The users with severe arthritis who advised Factory Design all loved cooking but their moment of truth came once the dish was ready and had to be lifted from the heat. It was then that the weight and design of the saucepan increased the pain of their condition and led to accidents.

Nine million people of all ages in the UK are affected by arthritis and every one of them needs to eat. Factory Design's challenge was to create a saucepan that would transform the pain of their cooking experience to one where pleasure is uppermost.

User input

Users with severe arthritis.

User issues

- > A multipurpose pan with built-in colander desired
- > Many saucepans have a painful split in the handle
- > Radius at bottom of pan too tight, making it difficult to clean
- > Weight, handling, balance and draining are common problems.

How does it work?

- > Universal pan size to accommodate different cooking methods
- > Traditional round shape but with conical sides for easy pouring and a large radius to facilitate cleaning
- > Aluminium body for lightness, non-stick interior and copper bottom to enhance cooking and cleaning
- > Integrated aluminium colander for drainage
- > Two-part lid in transparent lightweight polycarbonate and aluminium with hooped handle that is easy to lift. The lid upends to make stacking easy
- > Ergonomic two-part long handle with a fuller cross-section to assist gripping and angled downward for intuitive use.
- > Oval comfort platform at the end shifts the weight of the pan to the arm from a single point at the wrist, ensuring greater balance, safety and less pain
- > The handles main structural shroud made of lightweight heat-resistant material overlaid with tactile foam-filled polyurethane to enhance gripping
- > Secondary hooped handle on the opposite side for two-handed use.

‘When we first started, we had an open mind. We didn’t go in with any preconceptions; we purposefully kicked off the project taking on board the feedback from the user groups. We were looking at two-handed operation initially and realised that, to be truly inclusive, we had to make it as effective with one hand and then identify secondary use with two hands.’

Gavin Thomson, Factory Design

>project two:

Eye Speak

by Lewis Moberly

A project that develops a visual language to facilitate non-verbal communication in noisy environments, using a hand-held communications device.

Clubs are places of fun and social liberation where the environment is enhanced by the music and the atmosphere – but the key pleasurable ingredient of communication can be hampered by the very elements that make such leisure venues enjoyable. Noise can drown out speech and crowded spaces can leave body language open to misinterpretation.

Lewis Moberly looked at how universal pictograms could be developed into a visual language to facilitate non-verbal communication in noisy environments, using a communications device to transmit the symbols.

User input

Hearing-impaired and wheelchair users.

User issues

‘When I approach a ticket counter and they have a glass panel, I can’t understand what they are saying. Sometimes the loop system is not working.’

Caroline Appleby, Hearing Concern

‘Whatever you come up with needs to be very cool and very slick.’

Matt Brown

‘There are a lot of deaf people out there who want to speak to hearing people but they are too shy.’

Troi Lee, organiser Deaf Raves

How does it work?

Lewis Moberly developed an inclusive language of symbols to enhance the ability of those, whether hearing impaired or not, to get about or get together in environments where ambient noise or broadcast sound makes communication difficult. The product concept is for a small electronic device that fits into the palm of the hand or slips into a pocket. Signs, symbols and pictograms can be accessed from a database of categories via the touch screen and arranged in syntax to form sentences.

The design team drew on existing pictogram-based vocabularies ranging from Makaton (www.makaton.org) used by those without speech to universally recognised signage in

general use. They added abbreviations, numerals and some new visual concepts. To aid legibility, the onscreen characters are in black and white.

‘The main purpose of Eye Speak and the visual language is to embrace as many people as possible. The language of symbols has existed from cave paintings, thousands of years ago ... Our technology was inspired by the i-pod, which has a lot of symbols. All we tried to do was to simplify the process of finding the icons, so that you could make your messages very quickly, and to make it fun.’

Paul Cilia La Corte, Lewis Moberly

>project three:

Digital Wayfinding

by Roundel/Dalton Maag

A project to develop design protocols for electronic font displays.

In the mistaken belief that more information means better communication, a wide variety of electronic media have replaced traditional signage in public places. Dot matrix displays, CRT screens, digital projection systems, LCD and plasma displays are installed with little thought given to consistency, readability or perceived authority.

New display technology offers the potential to do whatever you want but it also creates more opportunity for things to go wrong. The problem is particularly acute in large transport terminals where confusing or illegible signage impacts negatively on our ability to understand where to go next. Design cannot resolve the myriad problems of public transport in the UK but it can do something to improve the typographic quality of digital signs.

Roundel and Dalton Maag, both recognised experts in the field, collaborated to develop long overdue design protocols for electronic signage that will help designers, commuters and computer users, and which should set the standard industry-wide.

User input

Regular travellers with vision and mobility impairments.

User issues

- > Information confusing or contradictory
- > Screen positioning problematic
- > Level of illumination for display too low since it is intended for home or office use
- > Screen glare and reflections render signs illegible
- > Technology not designed to display type
- > Resolution on plasma screen/CRT is poor
- > Scrolling confusing and disliked.

Recommendations

- > Maximum angle for reading overhead signs should be 30° from the horizontal
- > Screens should be angled downwards to reduce glare with reflections from floors and walls taken into consideration
- > Non-reflective glass to be used and angle of adjustment variable for each screen
- > Sign should be positioned to avoid direct light from windows, glazed roofs and overhead lighting
- > Consistency in graphic presentation, language and physical presentation
- > Humanist sans serif typeface preferable to Grotesque

- > Spacing of words kept loose to compensate for larger viewing distances
- > DMR (Dalton Maag Roundel) typeface developed as example of best practice
- > Few but consistent colour changes with test pages converted to greyscale to check for contrast and tested in actual environment
- > Scrolling should be vertical not horizontal, with transitional fade in/fade out preferred.

‘When we started we thought we were just going to design a typeface that would display really well on digital screens and improve the decipherability of information for everybody. When we looked into it, we found out that the problem was much, much bigger than we thought, but the user group convinced us that it really was worth looking at.’

Tony Howard, Roundel

>project four: Life Circle by Seachange

A visual coding and communication system for use in both traditional and electronic media that will encourage compliance by those with chronic conditions in taking their prescribed medicines.

Each year there are 125,000 deaths worldwide among those who fail to take their prescribed drugs correctly. The overall cost of non-compliance is estimated at £60 billion. The problem is particularly acute among those who must follow complex, timed regimes for such chronic conditions as diabetes, asthma or arthritis.

Forgetfulness, insufficient instructions by the doctor, packaging that is difficult to open and mystifying small print instructions all play a part in this daily drama. Seachange responded holistically to the life-and-death nature of the issue by developing an interlinked communication and visual coding system to be used by all the stakeholders involved in taking prescribed medicines. The solution aims to encourage compliance and reduce medical emergencies resulting from human or systemic error.

User input

Users of different ages with such chronic conditions as arthritis, multiple sclerosis and asthma.

User issues

- > Delays in prescription reissue can be catastrophic
- > Current system relies on the patient's ability to collect the prescription in person and then self-administer
- > Timing of complex drug regimes for chronic conditions reliant on fallible human memory
- > Information divided between different stakeholders but not necessarily shared
- > No visual code to indicate generic types to user or prescriber alike.

How does it work?

Seachange envisages the following five-step visual coding and alert system:

- > Step 1 – The patient and GP personalise the information and any necessary updates. This information is stored electronically on a central server to allow access by the GP, pharmacist or emergency services. The details are downloaded to a chip and held in smart card or other format of the patient's choice
- > Step 2 – An alert message is sent automatically to the pharmacy when a prescription issue or renewal is due

- > Step 3 – A coded alert message is sent from the pharmacy to the patient’s chosen device to signal that the prescription is ready for collection. The hierarchical icon system indicates the nature of the alert – whether it is for information, confirmation or an emergency
- > Step 4 – Relevant information about the drug and its regime is transferred to the label with icons for quick identification.
- > Step 5 – The patient collects the prescription from the pharmacy using the smart card for identification.

‘We issued some questionnaires to GPs and pharmacists, alongside holding the user forum. The answers came back saying this is needed. The precise format and manner is something that we will probably take some time to find out. But the response so far has surprised me. There is a need to get a communication line that overcomes the disparate aspects of the health service. Among the drug companies, there is interest and I think there is opportunity.’

Sally Costen, Seachange

>project five:

Ello - Inability not Disability

by Seymourpowell

An inclusive mobile phone designed to address the needs of the widest possible audience, irrespective of age or ability. Mobile communication devices have transformed our lives. The mobile phone in particular is vital to the ability of disabled people to remain independent yet stay in touch. However, with each new model the features multiply while the product shrinks in size in the mistaken belief that this is what all consumers want.

Seymourpowell stripped the mobile phone down to its essentials. Its design focus was to create a device that would be commercially viable and intuitive to use and capable of instilling confidence in the user.

User input

Mobile phone users and non-users with arthritis and visual or mobility impairments.

User issues

- > Technophobia
- > Inability to access even simple functions
- > Operation not intuitive
- > Buttons too small, hampering quick and accurate operation
- > Interface too complex.

How does it work?

- > Compact folding device with easy-to-open 'book edges' for one-handed use
- > Ready to use when opened
- > Keypad rises when opened for increased tactile feedback
- > Prominent five key is convex and the rest concave for easy navigation
- > Border of key lights up to indicate number has registered
- > Clear contrasting graphics
- > Dedicated memory keys
- > Audio and visual feedback when operation is successful
- > One memory key flashes when caller is known
- > Three keys light up and the phone vibrates when caller unknown
- > One button direct link to voice mail
- > Button pops up to indicate new message
- > Slider adjusts ringer volume by covering or exposing speaker
- > Larger speaker gives better sound quality and improves performance when there is ambient noise
- > Gauge on front shows proportional level of battery power
- > Cradle recharger eliminates need to plug in each time

> Increased battery life through elimination of screen.

‘We tried to create a package that would enable people to do the simple things well and easily and we tried to make the interface more intuitive, more accessible.’

James Samperi Seymourpowell

‘All the functions and aspects of the phone we wanted to incorporate would be things people would understand automatically, and not include systems that would require explanation or learning.’

Paul Backett, Seymourpowell

>project 6:

Buddy, the 'Active' Companion by The Team

A mobile alert system for people with and without hearing impairments, consisting of a wearable device with a smart switching system that warns the user when alarms go off in the vicinity.

An estimated one in seven people in the UK has a hearing impairment and nearly 700,000 are profoundly deaf. As our population ages, these numbers will increase. Not all will wear hearing aids but all will need to be aware of and enabled to deal with life-threatening events. The Team designed a 'wearable' mobile device based on simple, readily available technology that will help people to distinguish between different types of audio alerts, allowing informed decisions and action to be taken.

User input

Users with hearing and visual impairments.

User issues

- > Inability to hear alarm or alert
- > No differentiation possible between them
- > Inability to understand direction or source of sound
- > Feelings of vulnerability through inability to sense danger.

How does it work?

- > Wearable paging device clips into holding structure of choice
- > Device can be worn on wrist or as pendant or badge
- > Device vibrates when alarm sounds
- > Symbols appear to differentiate type of alarm or alert
- > Possible inclusion of inaudible travel information from tannoy systems etc
- > Simple, existing, usable technology.

'We have had meetings with a leading mobile communication company who seems to think it is possible. It would just be a question of recognising a certain pitch and frequency and intensity and duration. So I think it is very critical.'

Tom Wilson, The Team

'There are examples that illustrate the product working ... of a noisy factory environment where people couldn't hear the tea bell alarm going and a vibrating pager would go off on their hip ... So the technology exists on local networks. Our challenge is to make it much broader.'

Roger Rundle, The Team

>looking ahead

Student awards

Visit the Royal College of Art's annual summer show from 25 June to 4 July 2004 to see how RCA students from all design disciplines have responded to working with users of all ages and abilities in the Helen Hamlyn Research Centre's Design for our Future Selves Awards. With a record 80 shortlisted entries, the class of 2004 promises a host of inclusive new products and services for the care and disability sector. The Awards will be presented at the RCA on Tuesday 29 June. To attend the awards ceremony, contact: hsrc@rca.ac.uk

Mobility Roadshow

Also not to be missed is the Helen Hamlyn Research Centre's exhibition at the two Mobility Roadshows to be held in 2004: 17-19 June at Donington Park, Derbyshire; and, for the first time, in Scotland – 9-10 July at the Royal Highland Centre, Ingliston, Edinburgh. It is a chance to get an overview of the work of the Centre and see some of the prototypes developed by RCA students and the design teams featured in this issue of *innovate*.

>web resources

Participating design consultancies and organisations:

www.bcab.org.uk

www.dba.org.uk

www.daltonmaag.com

www.factorydesign.co.uk

www.lewisoberly.com

www.roundel.com

www.seachangecreative.com

www.seymourpowell.com

www.theteam.co.uk

Design guidance/inclusive design:

Inclusive design special collection:

www.hhrc.rca.ac.uk/resources/special_collection/index.html

Inclusive design education resource:

www.designcouncil.info/inclusivedesign

The Centre for Universal Design:

www.design.ncsu.edu/cud

General:

www.disabilityaware.org

www.design-engine.com

www.access2go.co.uk

www.usabilityfirst.com

www.sonicrim.com

Typography:

www.readregular.com

www.tiresias.org

Interaction design:

www.stakes.fi

www.iarchitect.com

www.etsi.org

Hearing:

www.rnid.org.uk

www.hearingconcern.com

Vision:

www.rnib.org.uk
www.labs.bt.com/people/rigdence/colours
www.toledo-bend.com/colorblind/Ishihara.html

Product & Packaging:

www.ricability.org.uk
www.dti.gov.uk
www.pira.co.uk

Design guidance for considering older people's needs:

www.tbchad.com
www.ace.org.uk
www.ageing.org

The Helen Hamlyn Research Centre at the Royal College of Art is a centre for inclusive design. Funded by the Helen Hamlyn Foundation, it collaborates with RCA staff and students and a range of external partners to explore the development of socially inclusive products and services for future ways of living, working and communicating.

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