Living Proof

The nine projects of the Helen Hamlyn Research Associates 2008 are showcased this year in Living Proof, an exhibition of evidence-based design projects from the Royal College of Art Helen Hamlyn Centre.

Show: 19-30 September 2008
Open every day 10am-6pm
Admission free
Lower Galleries, Royal College of Art

Symposium: 18 September 2008, starting at 4pm
Lecture Theatre 1, Royal College of Art

Living Proof is part of the Royal College of Art’s contribution to London Design Festival 2008

Exhibition curation: Rama Gheerawo
Exhibition design: Matthew Harrison and Catherine Greene
Textile design: Sarah Casey
Exhibition co-ordinator: Margaret Durkan
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Things that really matter

This year’s annual show and symposium of the Helen Hamlyn Research Associates takes place against the backdrop of a highly significant event in the life of the Royal College of Art. Following last year’s landmark decision to write the Helen Hamlyn Centre into the College’s ordinances in perpetuity, the Helen Hamlyn Trust has now generously agreed to fund the first endowed Chair in the history of the RCA.

The Helen Hamlyn Chair of Design will be primarily concerned with advancing design that ‘improves the quality of life’ and its first incumbent will be Jeremy Myerson, Director of the Helen Hamlyn Centre. This is a milestone for us in Kensington Gore and we are very grateful to the Helen Hamlyn Trust, and to Helen personally, for creating such a progressive platform at the RCA to shape change through design.

For design that seeks to improve the quality of people’s lives, we need look no further than this year’s Helen Hamlyn Research Associates – ten College graduates whose work in partnership with a range of industry and third-sector partners is addressing the things that really matter, from safer healthcare services to innovations that support failing eyesight and environments that improve working life.

The Research Associates specialise in user-centred and evidence-based design, rooting their work in practical and insightful investigations into how people really live and work. So it is entirely appropriate that their projects should form the centrepiece of a Helen Hamlyn Centre exhibition called Living Proof, which forms part of the RCA’s contribution to this September’s London Design Festival.

I am very grateful to all the research partners who have contributed to this year’s programme, to the three College design departments that have hosted projects, and to the design graduates for responding so creatively to the social challenges we face. I hope you enjoy this show and symposium.

A lot of the things around us don’t really matter. These do.
Message from Helen Hamlyn
An important role to play

The Helen Hamlyn Trust has a simple charitable objective: to support innovative projects that will effect lasting change in the medium term and improve quality of life. Our projects are wide-ranging – from medical, arts and culture, education and welfare to healthy ageing and international humanitarian affairs.

Within this mix, design has an important role to play. Good design enhances the quality of people’s lives – and bad design does the opposite. That is why I have always been so keen to support the idea of a design research unit at the Royal College of Art that pioneers creative thinking in key areas of social need in partnership with business and industry – from the time of DesignAge in the 1990s to the Helen Hamlyn Centre we know today.

When I was a student at the Royal College of Art in the 1950s, the world was a very different place and the pressing social challenges of that time had a different complexion. Today, despite all the advances in technology at our disposal, we still have many basic requirements – from homes that support us as we age to health services that are safe and efficient and centred around the needs of the patient.

Indeed many technology products and services are as difficult to use today as physical artefacts were 20 years ago. So it is vitally important that we continue to influence decision-makers in the commercial world with the message that good design is inclusive design. In this mission, of course, the Helen Hamlyn Research Associates have an important role to play. I wish the class of 2008 every success in this event and for their future careers.
It will come as no surprise to learn that the economic downturn this year has been accompanied by a massive upsurge of interest in people-centred design. As business organisations face a global credit crunch, their search for new ways to connect with customers and touch their lives in a more meaningful way has taken on a new urgency. In particular, expertise in co-design and co-creation with users has moved centre-stage and been covered extensively in the business press, whereas once it was considered a marginal activity by industry.

The design community has responded to these moves with a nervousness typical of the times, questioning whether the creative autonomy of the designer will be challenged by more cooperative design processes in which the user voice is a driving force. When our research partner the Audi Design Foundation organised a debate at the RSA on the subject in April this year, chaired by the RCA Rector Sir Christopher Frayling, there were heated arguments over the limits of co-design.

One camp argued that designers were being stripped of ‘authorship’, that they were on a slippery slope towards ‘design by committee’, or worse – a form of free consultancy masquerading as public consultation. Champions of greater user participation in design argued the opposite – that treating people not as test subjects but as equal contributors to the designed outcome is the future of design and an inspirational way to go.

**Seeking a balance**

Against this background of opportunity and threat, the Helen Hamlyn Research Associates of 2008 have worked this year within a tradition of inclusive design investigation that seeks a balance in the debate. Our belief is that the designer acts as an advocate on behalf of the user, listening carefully to their voice, observing their behaviour, and sifting the evidence of their daily lives, but always retaining the capacity to act and innovate autonomously.

Increasingly our work as a research centre has begun to revolve around the idea of evidence-based design. In each project, the research associates are encouraged to use a variety of methods to gather an evidence base for design decision-making, primarily through the participation of users at different stages of the design process. However the decision-making itself, whilst informed and validated by the user, remains the responsibility of the designer.

We’ve chosen to explore this evidence-based design proposition through an exhibition, *Living Proof*, which shows the work of the Helen Hamlyn Research Associates alongside other projects created or catalysed by the centre.

The exhibition is a signal of our belief that the litmus test for design that is inclusive and fit for purpose is how well it responds to the evidence of people’s lives. And its timing as part of this year’s London Design Festival marks our very own intervention in the broader debate about how designing with people has the potential to significantly reshape the parameters of design practice.
Innovative thinkers apply here
A people-inspired approach

Designers get inspiration from a number of sources. A new material or technology, a shape or form that triggers a creative reflex, a strong sense of aesthetic or even a visionary personal approach can all play a part in the process of innovation. However one of the most powerful sources can be the people for whom products, services, systems and spaces are designed. A people-centred approach is at the heart of all the projects on the Helen Hamlyn Research Associates programme.

In setting up this year’s partnerships with industry, I aimed to express this philosophy through the three main research themes of the Helen Hamlyn Centre: design for patient safety, workplace design and inclusive design. The nine projects have developed design propositions that benefit people in these three specific areas and propose new insights that advance thinking.

Patient safety this year has not just looked at the patient experience – it has also focused on another type of user, the medical personnel involved in delivering healthcare, by assessing their needs and designing to support them in improving standards of healthcare and reducing medical error. Projects have looked at the ‘behind the scenes’ systems involved in transporting and sterilising surgical instruments as well as the design of the infusion devices that play a critical role in keeping patients alive on the ward.

**Complex relationships**
Our workplace design theme has proposed a new way of thinking about work-life balance. It has articulated this as a work-life blend, perhaps a more accurate description of the complex interactions between living and working. The scale of the projects moves from specific interior solutions that bring elements of nature into the office, through mobile technologies that permeate the boundaries of workplace and home, to the urban scale where alternative ways of measuring city density respond directly to more fluid living and working patterns.

The inclusive design theme deals with the traditional problems of designing physical space and artefacts that account for the ageing process. In one study, the bathroom is redefined as a luxurious living space for the older person; in another, domestic lighting concepts are developed for people with low vision. However the Research Associates programme is also working to extend the inclusive design domain to address technological exclusion. The new barriers to social inclusion are digital, so work here includes internet-based services that allow older people to manage late-life transitions and wayfinding solutions that enable visually impaired people to navigate public buildings.

This programme is not just about innovative design, but also about innovative thinking. This is a direct result of a people-inspired approach and is something that our industry partners have come to value. This publication, the ninth in the series, marks the completion of the 100th research associate study, a milestone achieved in collaboration with 66 research partners from around the world. We hope you enjoy this latest crop of projects and the thinking enshrined in them.
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<td><strong>3D Reid</strong></td>
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<td>3D Reid employs a philosophy of knowledge-led architecture in which research provides a major contribution to what is a highly creative international architecture and design practice. The practice boasts its own Research and Development Unit that informs all the projects it undertakes. Its previous research has covered mixed-use within the context of community, real issues that hamper successful urban design and the inclusive design of urban space.</td>
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<td><strong>ARUP</strong></td>
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<td>Arup is a global firm of designers, engineers, planners and business consultants providing a diverse range of professional services to clients around the world. With this fully integrated approach Arup is a creative force behind many of the world’s most innovative and sustainable designs for the built environment, including most recently the ‘Eco-City’ of Dongtan, China. This leading practice has established 60 years of research and has its own Foresight + Innovation + Incubation group.</td>
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<td><a href="http://www.arup.com">www.arup.com</a></td>
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<td><strong>Audi Design Foundation</strong></td>
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<td>Audi Design Foundation (ADF) is an independent charity, set up by Audi UK in 1997, with the mission to use design to make a positive impact on people’s lives. It does this through a number of initiatives, including offering bursaries to postgraduate students from developing nations; funding inclusive research; running community design (co-design) partnerships both in the UK and developing nations; and grant making.</td>
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<td><a href="http://www.audidesignfoundation.org">www.audidesignfoundation.org</a></td>
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<td><strong>British Council for Offices</strong></td>
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<td>The British Council for Offices (BCO) has a mission to research, develop and communicate best practice, and stimulate new thinking on the design, development and occupation of offices across the UK. The development of the BCO research programme has been marked by the adoption of a thematic approach which focuses on all aspects of the workplace, sustainability and urban regeneration. It delivers this by providing a forum for the discussion and debate of relevant issues.</td>
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<td><a href="http://www.bco.org.uk">www.bco.org.uk</a></td>
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<td><strong>Child Graddon Lewis</strong></td>
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<td>Formed in 1992, architects and designers Child Graddon Lewis (CGL) today has more than 50 staff in its Spitalfields offices in London. CGL has an excellent track record in commercial, retail and residential architecture as well as mixed-use projects requiring master planning and urban design expertise. CGL is currently working with Transport for London, Genesis Housing Group, Brompton Estates, Royal Borough of Kensington and Chelsea, HSBC and Boots.</td>
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<td><strong>DePuy</strong></td>
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<td>DePuy International is an operating company of Johnson &amp; Johnson. With an annual turnover in excess of $50 billion, Johnson &amp; Johnson is the world’s most broadly-based manufacturer of healthcare products, servicing in excess of 150 countries in pharmaceutical, consumer, medical device and diagnostic markets. DePuy has already established itself as a global leader in the design, development and manufacture of orthopaedic systems.</td>
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## Research Partners

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<th><strong>Fletcher Priest Trust</strong></th>
<th><strong>Ideal Standard</strong></th>
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<td>Fletcher Priest Architects have established a Trust, which is a separate registered charity, in order to support architecture and architectural education in the UK. Its work can take a variety of forms, including the sponsorship of events, exhibitions, publications, research and bursaries. Projects currently supported by the Trust include an international lecture series, financial bursaries for students to undertake their diploma studies and the part-funding of postgraduate research. <a href="http://www.fletcherpriest.com">www.fletcherpriest.com</a></td>
<td>Ideal Standard serves the UK market with sister companies Armitage Shanks and Trevi Showers. The company is unusual in that it produces the complete bathroom: sanitaryware, baths, complete showers, brass fittings and storage furniture. It is also very keen to use quality designers and to apply design in its mid-market as well as its top-end ranges. <a href="http://www.ideal-standard.co.uk">www.ideal-standard.co.uk</a></td>
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<th><strong>National Patient Safety Agency</strong></th>
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<td>The NPSA was created to co-ordinate the efforts of those involved in delivering healthcare to learn from patient safety incidents occurring in the NHS. The NPSA’s work encompasses: safety aspects of hospital design, cleanliness and food; and ensuring research is carried out safely, through the Central Office for Research Ethics Committees. It also addresses concerns about the performance of doctors and dentists, through the National Clinical Assessment Service. <a href="http://www.npsa.nhs.uk">www.npsa.nhs.uk</a></td>
<td>Nokia are the world leader in mobility, focused on driving the transformation and growth of the converging internet and communications industries, whilst striving to enhance communication and explore new ways to exchange information. Nokia’s vision is a world where everyone can be connected. <a href="http://www.nokia.com">www.nokia.com</a></td>
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<th><strong>Research In Motion</strong></th>
<th><strong>Thomas Pocklington Trust</strong></th>
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<td>Research In Motion is a leading designer, manufacturer and marketer of innovative wireless solutions for the worldwide mobile communications market. RIM’s portfolio of award-winning products, services and embedded technologies include the BlackBerry® wireless platform, the BlackBerry® smartphone product line, software development tools, radio-modems and software/hardware licensing agreements. <a href="http://www.rim.com">www.rim.com</a></td>
<td>Thomas Pocklington Trust is the leading provider of housing, care and support services for people with sight loss in the UK. Each year it commits around £700,000 to fund social and public health research and development projects. Pocklington’s research and development programme aims to identify ways to improve the lives of people with sight loss, by improving social inclusion, independence and quality of life, developing service outcomes as well as focusing on public health issues. <a href="http://www.pocklington-trust.org.uk">www.pocklington-trust.org.uk</a></td>
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Programme Partners

UrbanBuzz

A government funded, two year programme, UrbanBuzz is led by University College London. It brings together academics and practitioners in the built environment sector to convert research results into new practical tools and processes to help build sustainable communities.

www.urbanbuzz.org

Designing for the 21st Century Initiative

The Designing for the 21st Century Initiative is a vehicle for supporting interdisciplinary design research over a five-year period from 2005-2009. It aims to support the development of design practice and it is funded by two UK Research Councils, the Engineering & Physical Sciences Research Council (EPSRC) and the Arts & Humanities Research Council (AHRC). Both have remits that include design. Professor Tom Inns of the University of Dundee is Director of the Initiative, which is supporting more than 40 design research projects across the UK, including Welcoming Workplace in the RCA Helen Hamlyn Centre.

www.design21.dundee.ac.uk

RCA Partners

Architecture

The Department of Architecture aims to combine experiment with plausibility. With inspiration drawn from the city, it attempts to tune in to urban desire and anticipate the next major architectural moves. It is not interested in designing spaces that simply evolve the norms of style but works in a dynamic way with what happens in them. Its medium is not so much bricks and mortar but space itself. It considers the work of the architect as spanning between the hard materiality of building and the reprogramming of existing space.

Head of Department: Professor Nigel Coates

Design Products

The Department of Design Products does not embrace any one design ideology or favour a specific style, nor does it train towards any one of the design trades. Its aim is to create a design culture engaged equally in ongoing debate on all aspects of design, including the social, ecological and technological. It seeks to generate a culture that thrives on new ideas, new ways of doing things and new areas of exploration. It encourages experimentation and risk-taking.

Head of Department: Professor Ron Arad

Industrial Design Engineering

The Department of Industrial Design Engineering has the 'philosophy of the enlightenment': creativity, design and science in harmony. It is a unique 'hub' discipline, from which creative multidisciplinary projects are inspired, led or joined and then executed. A joint course with Imperial College, it believes in the benefits to society of design and promotes its graduates to work at the centre of complex, demanding projects, juggling creatively in teams, to achieve great ideas, designs and successful products.

Head of Department: Professor Tom Barker
Define / Develop / Deliver

The Helen Hamlyn Research Associates year is structured in three distinct phases that fit a calendar year at the Royal College of Art.

Define
October-January
The first phase begins with an induction period for new research associates in areas such as project management, presentation, user research, writing and film-making. For all projects, this is a period for wide exploration. The context of the project is investigated, market analysis conducted, desk research completed and preliminary user studies carried out. By the end of this phase a direction is defined.

Develop
February-May
The second phase of the programme develops the design directions chosen with the research partner. Research associates work with selected users and construct research methods around them. Initial scenarios and prototypes are created and relevant processes and technologies are investigated. Ideas are validated with experts and in user trials. Final project outputs are determined in preparation for the final phase.

Deliver
June-September
The third and final phase of the programme focuses on completing the project. The results are captured in a form that is most practical and applicable to the research partner. This can include new designs, prototypes, films, guidelines or publications. A final report with full design documentation is written up so that ideas and recommendations can be acted upon by the research partner.

Show and Symposium
Public dissemination is a key part of the Helen Hamlyn Research Associates programme. All the projects are displayed in an autumn exhibition and symposium at the Royal College of Art, presenting and displaying those aspects of the work that are not confidential to the industry partner. This event typically takes place in late September, as part of the RCA’s contribution to the London Design Festival.
Most wayfinding solutions are geared to the needs of people with good eyesight. Where systems have been designed for low vision users, they are generally limited to audio loops that can be expensive to install or Braille, which only a small percentage of people can read. However, the rapid development of technology and the high uptake of personal electronic devices mean that there is an opportunity for change.

This project set out to look at how emerging technologies could be harnessed to enable new forms of navigation that rely less on sight and more on the other senses. The aim was to realise the inclusive potential of ‘sensory substitution’ through practical design.

Wayfinding was defined from the start as comprising four essential components: orientation, route decision, route monitoring and destination recognition. A key objective was to develop concepts that would enable these tasks to be carried out effectively.

A user perspective

In order to understand the difficulties of wayfinding first-hand, field research was conducted at the Vassall Centre in Bristol, a building which houses a number of different disability organisations but has no reception and relies on visual signage for direction. It is a location with many navigation problems – and as visitors represent a range of age and ability, it provided an ideal test-site for the project.

People were filmed as they struggled to find their destination and then informally interviewed to gain further insight. Experts such as Dr John Gill from the Royal National Institute for the Blind were consulted to supplement the user research and provide further perspective on the project. Emerging technologies were painstakingly researched and evaluated.

Three solutions

The project proposes three different solutions. All aim to limit the amount of information involved, convey only the most important information first, and allow the user to access more detail should they wish. The first design concept develops a tactile map that combines a physical object with voice information to describe a building using hearing and touch. The materials that distinguish different sections of the model are used in the real building so users can run their fingers along a material strip in the corridor to their destination.

The next two ideas use different technologies to run a similar system. They build on the fact that most people have electronic devices such as camera-equipped mobile phones or mp3 players and the majority of these will soon have easy access to the internet. A building can therefore upload navigation information on the internet that can be accessed in ‘real time’ as a person walks through that space, giving ‘blow by blow’ directions.

People can post their own directions and comments on a particular space to aid other users and the recipients can adjust the amount of information they want to hear. One system uses QR codes, a two-dimensional barcode that can be read by a mobile phone camera and interpreted into directions. The other utilises RFID technology to allow a seamless interchange between a building and a personal device.

The three solutions were prototyped and tested in situ in the Vassall Centre. This gave the study a practical application and a platform for testing, whilst adding to the sum of knowledge on using new technology to aid wayfinding. The solutions have application for both the low vision user and the fully sighted.
Top: QR codes can be read by a mobile phone camera. Above: a multi-sensory approach includes visually impaired people.
Prevalence of sight loss increases with age. It has been estimated that one in eight people aged over 75 years and one in three people over 90 years have serious (registerable) sight loss. This equates to some 600,000 people over 75 years old. But around two million individuals in the UK have sight loss that affects their everyday lives. This is a sizeable market that is set to grow as a result of a rapidly ageing population whose sight will deteriorate as part of the natural ageing process. This study in partnership with a leading sight loss charity set out to improve home lighting for older people and those with low vision – but the benefits of an inclusive approach are also relevant to the wider market.

The first year of the project examined the critical role of good lighting in enabling individuals with low vision to live more independently, complete daily tasks and light their homes in a more attractive way. The work uncovered limitations in the standard lighting fixtures currently available and developed three new concepts that each responded to an area of critical concern for the user group consulted. Tack addressed navigation around the house, Frame increased the overall illumination in a room and Candle was portable task lighting that could be carried wherever needed.

Developing the designs
The second year of work began to develop these three designs and bring them closer to market. The concepts aimed to harness the potential of emerging LED technologies and achieve more seamless interaction between the lighting objects and the users. The research targeted two groups – sight professionals who gave expert insight and advice, and the low vision users themselves.

Four homes were selected and the three prototypes were delivered to residents to test them and give feedback. An accompanying probe kit containing a variety of prompts and recording equipment encouraged participants to articulate their thoughts in a more expressive manner. There was an even spread of age ranges and a variety of eye conditions amongst the users. A teenager and her family were added to the user group to widen the age range and place the prototypes within a family setting.

Lighting up industry
The feedback from this research resulted in multiple suggestions and these were ranked according to user preference. A competitor analysis coupled with a market feasibility study conducted by the Tanaka Business School at Imperial College London helped to further define direction. As a result, Spin Light was designed. Informed by the research, it develops upon the functional appeal of Candle. It provides good illumination to create ambience or atmosphere but can be carried and positioned by the user to provide strong, focused task lighting where needed. The design is easy to handle, is stable when positioned on a flat surface and ‘docks’ to recharge like a mobile phone. A special hinge allows the light source to spin around and remain in position with no need for any locking mechanism.

Alongside this, a lightweight, portable kit of existing lighting products similar to Tack, Frame and Candle was developed for occupational therapists and rehabilitation officers to take on home visits. This tackles the immediate need to improve lighting for people with low vision as the Spin Light starts on the long and challenging route to market in discussion with potential manufacturers.
Left and below left: development sketches and computer renderings of the Spin Light. Below right: initial prototypes for Candle, Frame and Tack
A common misconception about old age is that life transitions are generally smooth and well-planned in contrast to the more disruptive changes of the teenage years. This project in partnership with the Design for All team at Nokia set out to explore the communications needs around key points of transition in the lives of older people. In doing so, the study discovered that disruption, displacement and dependency – more typically associated with younger people – are also features of later life, requiring new service design models to address the emotional and psychological needs of older people.

The Transitions study began with a broader look at the nature of communication and at how past mobile communication projects have addressed the physical demands of ageing. Research into the ‘situational’ aspects of ageing identified three common transitions in later life: moving house, retirement and sudden dependency through ill health. Research was undertaken with 13 older people, aged 62 to 83, from varied backgrounds in the Greater London area. Interviews, observations and responses to a research probe – an activity pack to stimulate discussion in a group setting – built up a picture of communication practice as older people travel, learn, socialise and manage their health.

Independence prized
The study revealed just how much older people prize their independence and mobility – and how that can be hindered by disconnects in communication. When people downsize from a family house to a smaller dwelling, retire from fulltime work or become dependant following a stroke or fall, these are the ‘tipping points’ that require exceptional communication support, whether such events are planned or unforeseen. An opportunity was identified for Nokia to respond to such needs through a set of internet services branded Nokia Transitions.

Six design scenarios were created to explore new service ideas. The three key transition events were examined from both an expected and a sudden user perspective. At the heart of the proposed system is an online contacts database. This enables individuals to input personal contacts and subscribe to relevant services. The interface is organised as a series of support circles stretching from family and friends to work, neighbourhood/community and citywide contacts.

Creating new ties
For those moving house, communication services called Post and Postcode enable people to keep in touch with old friends and contacts as well as create ties in their new community. For retirees, Family Vault is an online ‘scrapbook’ allowing the richness of family memorabilia to be shared across the generations while Link facilitates pairing of the newly retired with entrepreneurs in need. For people experiencing sudden dependency through ill health, Reach is a one-touch alert service for family and friends to be in contact with each other during times of need, and Corner Shop gives access to local services – from florists to taxis – in order to maintain independence and dignity while in this state of transition.

Collectively, these design proposals respond to the growth of ageing populations as well as Nokia’s future strategy of concentrating on internet services. Nokia Transitions demonstrates how a Design for All focus can be a catalyst for innovation, challenging stereotypes on how people manage the later stages of life.
Left: activity research probe filled in by participant. Below: Postcode scenario presents internet-based services for when older people move home.
Bathrooms have historically focused on safety and cleanliness but they are now being transformed into coveted living spaces in the home, offering a contemplative place where we get ready to face the outside world and an intimate environment where we can work on our appearance. But despite the rejuvenating aspect of the bathroom setting, most bathroom furniture does little to address our aspirations or support an idea of luxury or indulgence.

As we age and the desire to pamper and groom and keep up appearances becomes more important, a bathroom that does more than function as a place of hygiene becomes more important too. This project with Ideal Standard set out to look at 'beauty pampering' in the bathroom and create new design concepts that take account of those consumers over 50 who are a burgeoning market for bathroom manufacturers.

Ideas and insights
The first year of the project focused on building up a picture of user need and aspiration in relation to the washbasin and mirror, focal point for grooming. Eleven people representing a mix of age, gender, ethnicity, personal circumstance and family structure were selected as core users to inform and inspire the design approach. They were filmed and interviewed in their own space or home, and their insights and ideas informed a new design concept incorporating a sculptural basin, three mirrors, lighting, seating and storage. The study returned to the older members of this user group to look at bathroom furniture for showering and toileting in the second year of the project.

General issues to emerge from the user research included future-proofing the bathroom so it could be used well into old age and the need to make it easy to clean. Specific issues with the toilet were around hygiene and access. Showering uncovered a range of concerns including text that was difficult to read, a lack of grab rails and the difficulties caused by having just a single overhead source of water, which left some parts of the body such as feet unwashed due to reduced dexterity and mobility problems.

A total concept
New shower and toilet concepts resulted from the study. The toilet moves beyond the ceramic technology that has dominated the last century to reflect advances in 'solid surface' materials, and has a widened seating area to improve stability. It is wall-hung to allow it to be placed at any height and lifted off the floor for easier cleaning. The bowl is designed to feel more capacious and dispose of waste and water more easily. The shower has a large surface area for graphics and handles that work better for ageing hands. An important addition is the inclusion of a secondary showerhead that uses a suction cup to be positioned anywhere around the bathroom. The shower rail also acts as a grab rail offering strong support without the need for a new fixing.

These new showering and toileting concepts sit alongside the washbasin and mirror combination of the first year as part of an integrated bathroom range. They acknowledge the trend towards seeing the bathroom as a living space, but are firmly fixed within the space limitations of the average European bathroom and budget limitations of the average household income. All the ideas have resulted in full-sized prototypes that will be unveiled by Ideal Standard this autumn.
Concepts for integrated bathroom range showing basin, mirror, shower and toilet elements
Giving drugs safely
Creating design guidelines for infusion devices

Infusion devices that pump fluids, medication or nutrients into a patient’s circulatory system are essential in hospitals, but difficult to operate. This study has created design guidelines to help reduce medical errors in their use.

Every year the Medicines and Healthcare Regulatory Agency (MHRA) receives more than 700 reports of unsafe incidents involving infusion devices. At least one quarter of all reported incidents are directly attributed to user error. In the majority of incidents involving fatalities, no fault was found with the devices, implying user error as the leading immediate cause and poor design as the likely root cause.

The term ‘infusion device’ covers a number of different types, each of which has its own individual operating mode that must be learnt. The complexity of these devices, combined with the lack of standardisation, appears to be contributing to the large number of incidents – and unintuitive interfaces only compound the problem.

A lack of design
The project started with a literature review to learn from documented problems, previous recommendations, and existing expertise within health services. Little mention had been made of the design or interface of the devices, and most issues were focused around staff performance. Whilst personnel are trained in the use of infusion devices in areas where they are prevalent, such as intensive care units, anecdotal evidence suggests that training is less of a priority in other areas of the hospital.

Moreover, a huge problem with existing devices is that staff must undergo training for each model. Staff familiar with one device may not be able to navigate their way around one from another manufacturer. There is therefore a strong need to create some level of standardisation throughout infusion devices to enable a consistent way of navigating through the menu, of checking options and of confirming steps. This would then allow any member of staff who has undergone a generic training programme to be able to safely operate any device they come into contact with.

Involving medical staff
These aims were central to creating the design guidelines. In order to achieve this effectively, it was important to learn about existing devices and user experiences. Ward observations were conducted and interviews were held with users from a variety of backgrounds, including nurses, anaesthetists and procurement personnel.

Methods of communication were also explored with the development of an ‘ideal pump kit’. This provided users with the tools to create an image of their ideal infusion pump, allowing them to change parameters and highlight the functions and information they felt to be most important. Contact was made with key manufacturers in the field, to better understand industry issues and experiences in developing the products. Involving manufacturers in this way helps to ensure future buy-in from industry into the guidelines.

Key findings were collated into a number of design recommendations. These ranged from addressing the physical characteristics of a pump and providing handles to aid transport, to creating an order of information entry to help standardise key software parameters. Each of the recommendations has been illustrated in a double page spread of a publication. A draft copy of the guidelines was sent out for stakeholder review to over 100 international professionals in the field, whose comments and feedback will be incorporated into the final edition, which is set for publication for Easter 2009 subject to UK Department of Health approval.
1.7a Device controls - numeric keypads

**Issues**
- Infusion pumps use different layouts for numerical keypads, causing confusion among users.
- The keypad layout may be rearranged, placing the ‘0’ and ‘.’ in unexpected places.

**Recommendations**
- Tests found that staff are more familiar with the telephone layout, where the number ‘1’ is in the top left corner. This layout should be used on all devices.
- The numerical layout should not be altered. The ‘0’ and ‘.’ should always be positioned below the rest of the numbers.

Hardware design

Identification

Screen clutter

Setup

Line loading

Above: sample spread from guidance publication. Below: areas of operation for improvement
Working with people

The Research Associates 2008 worked with people around the world to gain insights and inspire new thinking. The projects employed a diverse range of design research methodologies to identify and include the needs and requirements of people – from questionnaires, expert consultation, user diaries and interviews to observation in situ, testing with prototypes and research kits. The result is an evidence base of knowledge that has influenced and supported the design ideas.
Surgical instruments are transferred into the operating theatre in containers referred to as ‘delivery systems’ or ‘trays’. They hold the instruments during the sterilisation process and protect them during transport and storage. The trays are handled by a range of hospital and medical personnel and need to meet different performance criteria. They play an important role – if these containers do not keep the instruments clean or secure, operations could be cancelled and surgery delayed with resulting financial costs to the hospital and health implications for the patient.

The primary aim of this project in partnership with orthopaedic systems company DePuy was to assess the current delivery systems for primary knee replacement instruments in order to pinpoint the main problems and identify opportunities for design intervention. Concepts were developed with the objectives of reducing turn-around time, improving durability and ease of use, and lowering cost.

**Two systems developed**

From the many design concepts generated to address these issues, two were chosen for further development. The first consists of generic clips arranged within a lightweight aluminium base fixing all the instruments inside the tray. The shape of the clip allows for the secure capture of instruments of varying shapes and sizes. Images of instruments are provided to aid placement. The lightweight external cover includes handles that enable the trays to be carried easily when wrapped and allows for labelling or branding.

The second concept uses a metal sheet stamped into the shape of the instruments, placed directly into a simple wire basket with silicone handles for heat insulation. This allows for easier location of the instruments which can be washed in-situ. The concept is durable and quick to dry. A lid keeps the instruments in place. Both systems have been presented to medical staff for intensive assessment. As a result of positive feedback, elements will be taken forward into the next generation of containers, adding value to operating procedures, reducing risk of delays or errors and improving overall patient safety.
Above: existing solution for delivering surgical instruments within the hospital environment. Below: new concepts based on a clip system and a stamped metal sheet.
Conventional measures of urban density such as ‘dwellings per hectare’ or ‘bed-spaces per hectare’ are one-dimensional and prescriptive means of ‘measuring-up’ the cities we live in. None succeed in truly representing the characteristics of high-density living or adequately describing the increasingly varied ways in which we live and work.

For those involved in the planning process, this can mean that new urban developments do not meet the needs of city dwellers and are not designed to support the powerful social, demographic and cultural changes around us. This two-year architectural study, supported by a consortium of architectural research partners, investigated alternative ways of measuring urban density and explored how such measures affect the way new urban developments around transport hubs are designed and occupied.

**A user-driven framework**

A hypothesis that a more user-driven measure of density can generate a more dynamic urban environment better suited to modern living and working was reinforced by a programme of research. Interviews with experts gave an overview on policy and looked at planning on a global, national and local scale. Horizon-scanning and trend research identified technological, social and cultural influences that could impact in the future. User consultations in London and Tokyo gave the research an individual scale.

This led to the creation of four new principles that were presented at the end of the first year of the project and developed further this year: Intensity — the measure of an area’s socio-economic requirements; Amenity — the measure of social demographic needs; Autonomy — the political ability of residents to influence local planning; and Frequency — the technology measure of an area’s flow of information and people within wireless networks.

The second year of the study used these four principles to drive four hypothetical design scenarios, looking at how one site could change in character when different density measures are applied. The chosen site was Ebbsfleet in Kent, relatively remote from established central city services, but with good national and international transport connections.

**Four new scenarios**

Disconnected Suburb, the first scenario, uses the existing metric of ‘dwellings per hectare’ and is a low-density, low-rise dormitory town dominated by commuters who desert it by day and return to it by night. Timeshare Towers is a high-density, high-rise settlement with a dominant work focus – the main residents are workers employed by the companies who dominate the site and the architecture has been designed to support rapid turnaround. Incorporated Cluster combines living and working and constitutes a mixed-use, medium density settlement that alternates between low and high-rise development. Open Source City is a user-led and resident-managed estate that allows social networking to evolve its form on a high-density site.

The scenarios sketch out four alternative and provocative views of the future, tested via multidisciplinary and participatory knowledge-transfer events as part of the UrbanBuzz initiative. What emerges from the study is that narrow measures of urban density restrict the open-mindedness of the city. New density measures are required for developments to be planned in a more animated and holistic way, especially those around transport hubs.
Four hypothetical design scenarios for Ebbsfleet site based on different measures of urban density
Seamless mobility
Technology enabling work-life blend

New communication technology has the potential to blend work and life rather than balance it. This study with the maker of the BlackBerry® presents seven new service applications that change our relationship with the world around us.

Information and communication technologies continue to change our lives, creating new freedoms and new dependencies. As they expand their capabilities, they start to impact in new ways. This project, in partnership with Research In Motion (RIM), maker of the BlackBerry® device, takes a people-centred look at how technology might enable our patterns of living and working to be more seamless, improving communication with those around us.

The BlackBerry® is a ubiquitous business tool known for enabling work to happen outside the office and around the clock. This study looked at opportunities for technology to allow people to have better connections with their family, friends and life outside of work. A central hypothesis challenged the traditional view that we are all trying to create a work-life ‘balance’. For today’s city dwellers, this has become more of a work-life ‘blend’.

Work-life blend
In order to understand the drivers and tensions of this relationship, the project selected a number of users who exhibit different biases in ‘blending’ work and life. Four extreme work-life relationship types were identified: the Overlapper has work and life sharing the same space and the Separator keeps them apart; the Expander has work dominating life and the Reclaimer organises work around life. Seven participants were visited in their homes or at work, informally interviewed and given probe packs to allow them to capture a week-long snapshot of their lives.

The research was analysed and translated into design scenarios that depict possibilities five years in the future. The study identified two key user demands: first, to ‘experience the immediate’ and explore the unfamiliar safely; and second, to be able to ‘take their world with them’ wherever they went, allowing impersonal spaces to become familiar and giving them access to friends and family. These imperatives were used to generate seven new service applications.

Seven new services
Explorer logs all journeys and ‘greys’ out parts of the map you have not visited, encouraging you to discover new places. PeerSteer allows places on a virtual map to be bookmarked so friends can share personal knowledge of local areas and recommend shops or restaurants to each other. Traces allows pictures of those recommendations to be shared so you can see where your friends have been. Wildfire is a system that spreads information from person to person – mobile devices automatically communicate as people pass close by each other spreading messages around the city. BlackBox is a flight recorder for your life as well as a digital repository for personal media – it can reconfigure a hotel room to feel like your own living room. Footfall gives an ambient experience of another person’s movement even though they are at a remote location, allowing active participation in their daily routine. Quiet Time filters incoming communications, making it possible to create a quiet personal space away from constant digital interruption.

These concepts have been brought to life in three short films, showing how they can create a more seamless work-life blend for different users. Together they suggest new ways of building on the traditional stronghold that BlackBerry® technology has in the business arena, encouraging wider engagement with the consumer and lifestyle market.
Screenshots from animations describing the seven new services in the Seamless mobility study.
This project began as a Masters study in the Department of Design Products at the RCA, looking at ways to introduce more natural elements into office interiors. Most of us spend considerable amounts of time at work in environments that are sterile and exhausting. How would people feel if natural elements like rainwater could be channelled inside an office space to bring nature closer to the work environment?

Initial design concepts demonstrated how this could be achieved, and this line of enquiry was introduced to a Helen Hamlyn Centre research project ‘Welcoming Workplace’, looking at ways to improve the office environment for people facing extended working lives. An ageing workforce requires fresh stimulus to remain productive in the knowledge economy. Desk research revealed that closeness to nature and an awareness of the world outside were factors in combating the fatigue that the ageing body feels when faced with sitting for hours at a time in an artificial environment.

**Three knowledge industries**
Catherine Greene joined the Welcoming Workplace research team as a research associate, and incorporated her natural design study into the broader project, which is funded by the Designing for the 21st Century research initiative. The research methodology involved conducting in-depth interviews with corporate employees aged over 50 and working in three knowledge-based industries – pharmaceuticals, technology and financial services – in the UK, Japan and Australia. Managers responsible for their welfare from such disciplines as occupational health, human resources and facilities management were also interviewed. In all, 80 people worldwide participated in the study.

This global research was achieved through partnerships with the University of Kyushu in Japan and the University of Melbourne in Australia. Issues raised in the interviews were followed up with a series of design interventions prototyped by the research team with industry partners in selected office spaces in the UK and Japan. These interventions altered key aspects of the environment, including lighting, acoustics, furniture and technology. A natural intervention was also introduced – the Rain Curtain, a visual and acoustic space divider measuring 2m x 2m that uses water to create a very different atmosphere from that which we normally associate with an office.

**Contemplation space**
This design intervention was developed to test people’s interest in natural elements that help to create ‘contemplation space’ capable of aiding concentration and supporting recuperation at work. The Rain Curtain was viewed by many as making the environment less oppressive.

The Welcoming Workplace research is ongoing and the project team is working with furniture manufacturer Kinnarps to unveil further natural elements such as a Planted Partition as part of Designers Saturday on 26 September 2008, during the London Design Festival.

The full study findings will be discussed at the Worktech conference at the British Library on 17-18 November 2008. What is clear, however, is that a refreshing alternative to open plan office space is required to enable older knowledge workers to remain productive for longer. Those facing extended working lives want a ‘surrogate home’ away from the collaborative hum of the office to think and recuperate during the working day, in an environment that is natural and soothing and adaptive to their needs.

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**Inside it’s raining**
Natural elements to support the older worker

Many offices are sterile and exhausting places. This project addresses the use of natural interventions to create the effect of falling rainwater inside the workplace, as part of a larger study into the environmental needs of knowledge workers aged over 50.
Left and below: schematics for introducing water into office space. Centre: images from user trials in London and Yokohama, Japan.
Research Associate profiles

Stephanie Chen

Stephanie Chen is a designer and engineer. She began her career as an aspiring astronaut, completing a BSc in Aeronautics & Astronautics from the Massachusetts Institute of Technology in 2000. Working in the aerospace industry, she designed and built experimental hardware for the International Space Station. Looking for an opportunity to put her engineering background toward more tangible and socially relevant endeavours, she studied Industrial Design Engineering at the Royal College of Art, graduating with an MA in 2007. Since then Stephanie has been working at the Helen Hamlyn Centre on a project for Nokia focused on service design for older people in transition periods. Previous projects include exhibition, interaction and textile design, large-scale installations, and medical products.

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Paul Clarke

Paul Clarke is an architectural designer, researcher and filmmaker with a Masters degree in Architecture from the Royal College of Art. He has an avid interest in the extraordinary and unforeseen implications of future technologies, as well as socio-economic and demographic change. Paul suggests a way of understanding future worlds, the psychologies of society and its inhabitants through narrative futurology. It is a critical design approach that provides a creative tool to explore alternative horizons. JG Ballard once described this process and its outcomes as ‘creepy truths’. Paul has exhibited his work at the Architecture Foundation’s ‘Best in Show’ in 2006. Paul has also worked for architecture practice Project Orange, on private residences, boutique hotels, bars and restaurants.

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Sally Halls

Sally Halls graduated with a BSc in Mechanical Engineering at Bristol University. She then went on to study Industrial Design Engineering at the Royal College of Art, where she developed an interest in medical design. Her graduation project looked at ways in which incubators could be humanised to allow more contact between mother and child. This received a Dyson development grant and a Design for Future Selves award for health and patient safety. Since graduation Sally has worked at the Helen Hamlyn Centre, where she was involved in the development of the Resuscitation Station, which recently received two Medical Futures Innovation Awards for Best Medical Device and Overall Winner in the Anaesthesia and Critical Care category.

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Catherine Greene

Catherine grew up in Ireland and studied Textiles in Dublin at the National College of Art and Design (2000 BDes Hons). Moving to London after finishing her studies, she worked as project manager for a media start-up company where she was involved in the creation of brand identity, exhibition design and design of the office space. Catherine then came to the Royal College of Art to study Product Design, graduating with an MA in 2007. She is now pursuing her research through the Welcoming Workplace project at the Helen Hamlyn Centre. Catherine also freelances for Totem Design, most recently working on a workbook called Sustainable Building for Cambridgeshire Council.

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Maja Kecman is an industrial design engineer with a Masters degree in Industrial Design Engineering from the Royal College of Art and an undergraduate degree in Manufacturing Engineering from Cambridge University. Her design experience ranges from medical devices and consumer products to factory layouts and processes. Maja has won a number of awards including first prize in the Helen Hamlyn Design for our Future Selves Awards 2005 and she was also shortlisted for British Female Inventor of the Year 2006. In addition to being a Helen Hamlyn Research Associate, Maja has provided consulting services to several companies, including healthcare and medical devices consultancy Pearson Matthews.

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Chris McGinley is a Scottish-born designer based in London. His qualifications include a MEng from Strathclyde University, and an MA from the Royal College of Art. Chris received the Anthea & Thomas Gibson Award two years running based on scholarly achievement, and the Most Outstanding Team Design Award from the Royal Commission of Design Engineers. Chris has worked in a design and research capacity for groups such as Strathclyde University and the Central Research Laboratories (CRL), and has experience in giving presentations and running workshops in the UK, USA and Japan. He has developed a robust understanding of inclusive design and the sensual and experiential needs of the user. He has held creative roles in groups such as Joseph Duggan Photography and DooD Design, and exhibited graphic and product design work internationally.

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Cian Plumbe completed his first studies at the University of Bristol where he earned a Masters degree in Mechanical Engineering. After graduation, his desire to work more directly at the interface between people and objects led him to the Royal College of Art, where he graduated in 2004 with an MA in Industrial Design Engineering. This is his second project at the Helen Hamlyn Centre, having completed a project for BT last year looking at bringing broadband to older non-computer users. He continues exploring his interest in the interactions between people and technology in his latest project entitled Seamless Mobility, for Research In Motion (RIM). In this conceptual project he examines scenarios for how future technologies can enable life in the work-life blend.

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Tomek Rygalik grew up in Poland. He studied Architecture in Lodz, and then Industrial Design at Pratt Institute (1999 BA Hons). After completing his studies, he worked with several design consultancies in New York. Tomek then came to the Royal College of Art’s Design Products postgraduate programme, graduating in 2005. Since then he has worked as a research associate and also runs his own design practice. Tomek has won many prizes and awards including First Prize Award in the 2006 International Bombay Sapphire Martini Glass Design Competition, BSI Environmental Design Award 2005, and Rosenthal Design Award 2004. Two of his furniture pieces were part of the British Council’s Talent/Talento selection in 2005. In recent years his work has been exhibited in London, Milan, New York, Tokyo and Valencia.

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Lisa Stroux has a broad and multi-disciplinary background in both design and engineering. After completing her BSc at Delft Technical University she gained an MA from the Royal College of Art in Industrial Design Engineering. She then provided R&D services for several leading design consultancies in London before joining the Helen Hamlyn Centre in 2007. In addition to being a Helen Hamlyn Research Associate, Lisa is also a visiting tutor in the Industrial Design Engineering department at the Royal College of Art and she is pursuing the commercial application of her graduation work in conjunction with InnovationRCA.

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David Sweeney grew up in Ireland. He graduated from University College Dublin where he studied Electronic Engineering (2004 BEng Hons). After working at the MIT Media Lab Europe in Dublin he came to study on the Royal College of Art’s Industrial Design Engineering programme and graduated in 2007. He has recently worked with Olympus and for Panasonic in Japan and does ongoing work as a freelance designer. In 2006 he was awarded the Dyson Centenary Scholarship.

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What external partners say about the Helen Hamlyn Research Associates Programme

“The RCA is unique. There are many advantages for 3DReid in supporting the Research Associates programme. Not only do we advance our knowledge in a particular area but we are exposed to a whole spectrum of brilliant research projects and design solutions from other disciplines that make us reflect on our own world of design.”

3DReid Architects

“Involvement in the Helen Hamlyn Research Associates programme has been stimulating, producing innovative design concepts, developing these into prototype products and assessing their feasibility - not only to help those with sight loss in their everyday lives, but in the true spirit of inclusive design, to form attractive lighting solutions with a wide appeal.”

Thomas Pocklington Trust

“It has been a great experience to be involved in the Research Associates programme. The exploration of ideas by the talented people at RCA is an extremely worthwhile opportunity for BlackBerry® and we are pleased to participate.”

Research in Motion, maker of the Blackberry®

“Besides working with highly creative designers, the great thing about working with the Research Associates programme is the insights gained through the in-depth user research, which is not often part of our process at Ideal Standard.”

Ideal Standard

“The discussion of ideas is challenging, the presentations are provocative”

Peabody Trust

“There’s a degree of excellence in analysis, interpretation, idea creation and development”

Omron Japan

“The Audi Design Foundation continues to work with the RCA Helen Hamlyn Centre simply because they are the best in class”

Audi Design Foundation
The Helen Hamlyn Research Associates Programme

If you would like to be part of the Helen Hamlyn Research Associates programme please contact:
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