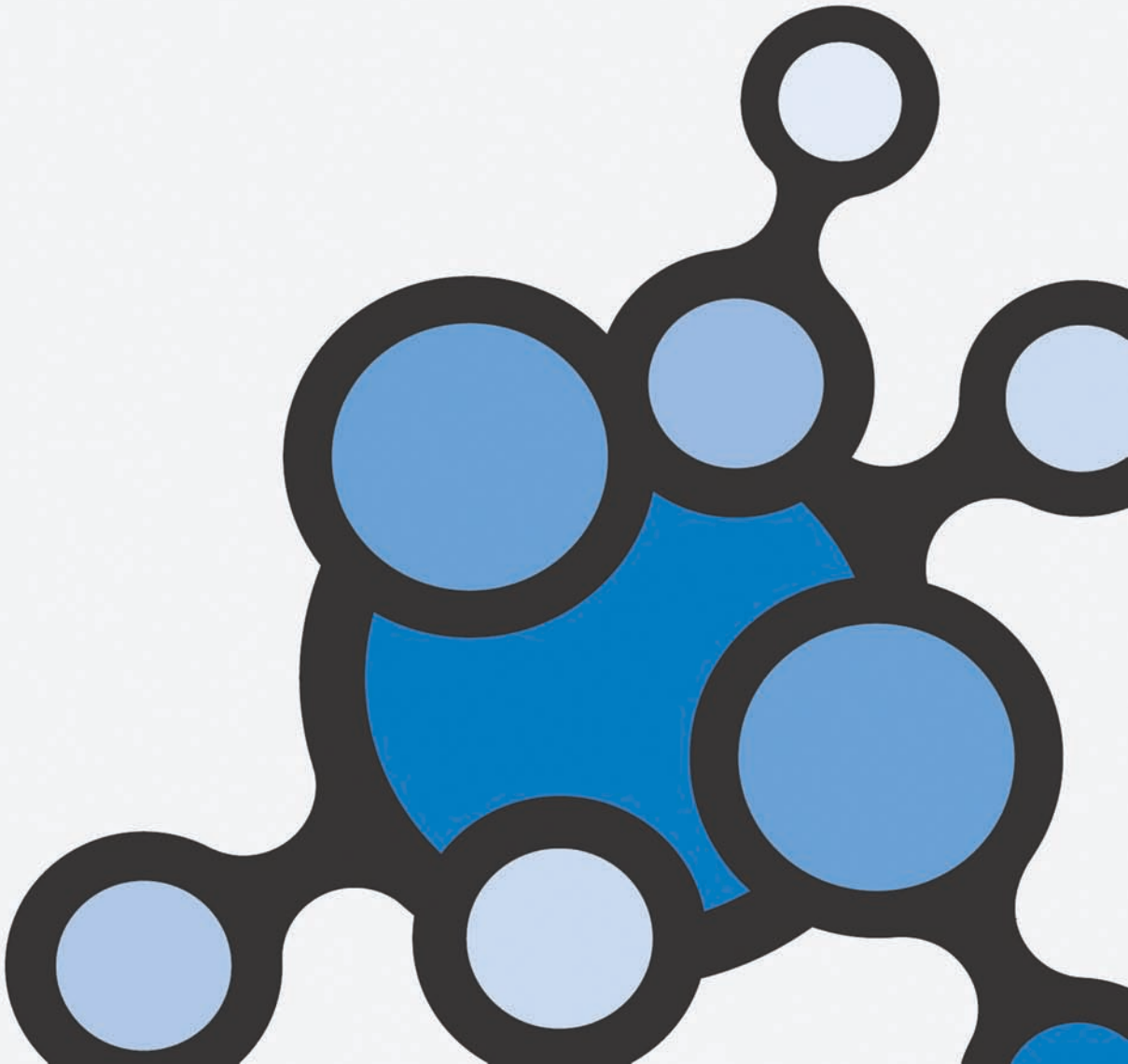


A **Gower** Book

Designing for the 21st Century

Interdisciplinary Questions and Insights

Edited by Tom Inns



Designing for the 21st Century



Designing for the 21st Century
Interdisciplinary Question and Insights

Edited by Prof. Tom Inns

 **Routledge**
Taylor & Francis Group
LONDON AND NEW YORK

First published 2007 by Gower Publishing

Published 2016 by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN
711 Third Avenue, New York, NY 10017, USA

Routledge is an imprint of the Taylor & Francis Group, an informa business

Copyright © Tom Inns, December 2007

Tom Inns has asserted his moral right under the Copyright, Designs and Patents Act, 1988, to be identified as the author of this work.

All rights reserved. No part of this book may be reprinted or reproduced or utilised in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any information storage or retrieval system, without permission in writing from the publishers.

Notice:

Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

British Library Cataloguing in Publication Data

Designing for the 21st Century : Interdisciplinary Questions and Insights

1. Design

I. Inns, Tom

745.4

Library of Congress Control Number: 2007936938

Design and Layout

Victoria Hale, Gary Gowans, Dave Herbert

Overleaf

Image courtesy of Gus Colvin

ISBN 13: 978-0-566-08737-0 (hbk)

Dedication

This book is dedicated to my Dad, Prof. Frank Inns, whose designs have improved the lives of so many throughout the Third world.



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

Contents

- v **Acknowledgements**
- vii **Preface**

- 11 **Introduction** Prof. Tom Inns
- 27 **Ideal States: Engaging Patients in Healthcare Pathways Through Design Methodologies** Prof. Alastair S Macdonald
- 40 **The Healing Environment** Dr Jacques Mizan
- 54 **Designing Healthy and Inclusive Public Outdoor Spaces for Young People** Prof. Lamine Mahdjoubi
- 68 **The View of the Child: Explorations of the Visual Culture of the Made Environment** Dr Catherine Burke, Dr Claire Gallagher, Dr Jon Prosser and Judy Torrington
- 79 **Orientating the Future: Design Strategies for Non-Place** Prof. Richard Coyne and Dr James Stewart
- 91 **Screens and the Social Landscape: Digital Design, Representation, Communication and Interaction** Dr Carey Jewitt, Prof. Teal Triggs, and Prof. Gunther Kress
- 103 **Technology and Social Action** Dr Steve Walker and Dr Andy Dearden
- 114 **Win-Win-Win-Win: Synergy Tools for Metadesigners** Prof. John Wood
- 129 **Embracing Complexity in Design** Prof. Jeffrey Johnson, Katerina Alexiou, Dr Anne Creigh-Tyte, Dr Scott Chase, Prof. Alex Duffy, Dr Claudia Eckert, Damian Gascoigne, Prof. Bimal Kumar, Prof. Eve Mitleton-Kelly, Michael Petry, Dr Sheng Fen Qin, Prof. Alec Robertson, George Rzevski, Prof. Necdet Teymur, Avril Thompson, Prof. Robert Young, Mateo Willis and Theodore Zamenopoulos
- 150 **Emergent Objects: Design and Performance Research Cluster** Alice Bayliss and Joslin McKinney
- 166 **Designing Physical Artefacts from Computational Simulations and Building Computational Simulations of Physical Systems** Prof. Mark d'Inverno and Prof. Jane Prophet
- 177 **Understanding and Supporting Group Creativity Within Design** Dr Hilary Johnson, Prof. Peter Johnson, and Tim Coughlan

Contents *continued*

- 192 **Nature Inspired Creative Design – Bringing Together Ideas from Nature, Computer Science, Engineering, Art and Design** Thorsten Schnier, Russell Beale, Xin Yao, Bob Hendley and Will Byrne
- 205 **Spatial Imagination in Design** Dr Jane Rendell and Dr Peg Rawes
- 219 **Spatiality in Design** Dr John Stell, Prof. Lynne Cameron and Prof. Kenneth G. Hay
- 232 **Discovery in Design: People-centred Computational Issues** Prof. Ian Parmee, Prof. Lisa Hall, Prof. John Miles, Dr Jan Noyes, Christopher Simons and Dr David Smith,
- 246 **Design Imaging** Gordon M Mair and Kevin Miller
- 260 **Sensory Design and its Implications for Food Design and Presentation** Brent Richards
- 273 **The Emotional Wardrobe** Dr Sharon Baurley and Lisa Stead
- 299 **Interrogating Fashion: Practice Process and Presentation. New Paradigms for Fashion Design in the 21st Century** Prof. Sandy Black
- 315 **Design Performance** Dr Jillian MacBryde and Dr James Moultrie
- 331 **Index**

Acknowledgements

The Designing for the 21st Century Research Initiative is the result of an energetic contribution of time, mind and activity from many individuals and organisations. Thank you to everybody who has made an input to the work, in particular:

The AHRC and EPSRC for their vision in committing to the Initiative and to the staff in both organisations who have nurtured the Initiatives activities, in particular: Tony McEnery, Alicia Greated, Alison Henry, Gail Lambourne, Anne Sofield and Simon Glasser from the AHRC and Elizabeth Hylton, Andrew Clark, Jason Green, Stan Fowler, Paula Duxberry from the EPSRC.

The Advisory Group who have helped direct the Initiative through Phase 1 and Phase 2. In particular Rachel Cooper (Chair) who was instrumental in actually creating the Initiative, Stuart Walker, Bill Gaver, Alan Short, Stuart MacDonald, Fiona Lettice, Stephen Scrivener, David Humphries, Geoff Kirk and Andrea Siodmok.

Lesley Morris and the Design Council for advice and generous support of Initiative events.

All those who have contributed to the extensive peer review process associated with the Initiative and to those who made a considerable time commitment in sitting on commissioning panels for Phase 1 and Phase 2 projects, namely: Rachel Cooper, Stephen Scrivener, Chris Luebke, Rose Luckin, Sebastian Macmillan, Alex Duffy, Brian McClelland, Penny Sparkle, David Harrison, Colin Burns, Felicity Goodey, Alison Starr, Elizabeth Burton and Stephen Cage.

The Principal Investigators and researchers who bought the concept of the Phase 1 research clusters alive during 2005 and contributed to all the events organised through the Initiative Directors office.

Those that have authored chapter contributions for this book, taking the time to reflect on their activities and capture their thoughts in writing.

I would also like to thank: Suzie Duke, Fiona Martin, Gillian Steadman and their team at Gower Publishing Ltd for guiding us through the book writing process.

Dave Herbert and Gary Gowans, from the School of Design at Duncan of Jordanstone College of Art and Design, for both their design expertise and their generous guidance on the intricacies of typography.

All my colleagues at Duncan of Jordanstone College of Art and Design who have given me the mental space and support to undertake the role of Initiative Director, particularly Jeanette Paul, Seaton Baxter, Mike Press, Caroline Peters, Cathy Brown and Georgina Follett.

The biggest thank you has to be reserved for Initiative Co-ordinator, Vicky Hale, who over many hours, days, weeks and months has wrestled contributions from 60 authors into a meaningful format (whilst maintaining good humour, a considerable feat!)

And finally, both Vicky and I would like to say thank you to our loved ones for their support throughout this Initiative and book writing journey. Big hugs for Gavin from Vicky, and for Justine, Archie, Fergus and Ruby from me.

Prof. Tom Inns
Initiative Director
Designing for the 21st Century

Preface

Once you enter its world Design becomes a passion. For me it began in 1973 as an undergraduate on a new and very innovative Multidisciplinary Design course. I discovered I had the skill and imagination to create something not only visually interesting but also functional and useful, and had a way to improve aspects of the world around me. As so many (young and possibly naïve) designers had done before me, I wondered why so few people understood the power of design. Ever since I have been on a mission to illustrate the value of design and designers as professionals, as educators and as researchers. Indeed I realised there was very little design (other than engineering design) research undertaken in universities and very little funding to do it.

When I began my research career it was the Engineering and Physical Sciences Council (EPSRC), I turned to (well actually its predecessor Science and Engineering Research Council in 1993). Gradually EPSRC funded more design research, especially as it funded sector related work in manufacturing and construction. With the welcome formation of the Arts and Humanities Research Board (later Council) another opportunity arose to fund design research, especially when related to the creative industries. Having been closely connected through my own research and roles on EPSRC and AHRC panels and committees, I used every opportunity to promote design research. I was convinced there was value in funding research that addressed design research from every angle. I was therefore thrilled when AHRC and EPSRC joined forces to fund 'Designing for the 21st Century' as a research initiative, and very happy to promote and support its development, through the appointment of Tom Inns as Programme Director, the creation of an Advisory Group to the launch of the call for proposals.

Tom has led the programme with enthusiasm, energy and professionalism, whilst we have been guided by an Advisory Group championing the programme and advising Tom and the Research Councils. As Tom says in his introduction we did not have a clue what might emerge, yet this book is evidence of the startlingly rich picture, with the emergence of new directions and new roles for designers, researchers and others working in the field of design.

Change is ever present, as the challenges of technology, environment and society demand our continuous attention and we struggle with issues of complexity, we see that the science, social science and humanities need a means of working together. Design research provides the orchestration, the systemisation and visualisation to bring together the disciplines to build bridges to the future. Such research will provide the evidence and insights upon which professional designers, industry and society can create solutions and contribute to global wellbeing.

This book is just the beginning. The programme continues and we look forward to a continuous flow of papers and books illustrating the value of design and design research.

Prof. Rachel Cooper

Chair

Designing for the 21st Century Advisory Group



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

What will the design disciplines look like in 2020?

- Emergence of networked structure
- Virtual collaboration
- Global design
- Distributed Agency
- User based design
- (Con)tribution
- Design as a service
- (Production) (Distribution) (Interactivity) (Experience)

Introduction

Prof. Tom Inns (Duncan of Jordanstone College of Art and Design, University of Dundee)

The Designing for the 21st Century Initiative journey began for me on a sunny day in July 2004. I had been invited to London for an interview for the role of Initiative Director. I was asked to make a presentation outlining my vision for design in the 21st century. Having originally trained as an engineer, worked in design practice, studied at an art college, directed a design research centre and with recent experience of teaching design in a business school I felt I might have some sense of the future of design. For the interview I cranked my mind and tried to broaden and then broaden again my view on where design might be heading in the 21st century. Staring at my presentation now, exactly 3 years on all I can say is nothing could have prepared for me how broad and interconnected the future opportunities for design might be. This book will hopefully communicate some sense of this territory through the words of a large team of researchers who spent time during the 2005 calendar year exploring future issues and research questions that might confront design in a 21st century setting. In total 21 projects were supported in Phase 1 of the Initiative, each one of these projects has contributed a chapter to this book.

In order to make sense of this work this chapter starts with an overview of what the Designing for the 21st Century Research Initiative is and how it is structured. The chapter then explores some of the lessons and insights that can be harvested from Phase 1 of this 5-year programme of research. Firstly, the generic journey taken by the researchers within each chapter is examined, this is useful as every project represents an interdisciplinary discourse over a 12-month period. There is a lot to be learned from the way the projects have engaged audiences, explored knowledge domains and harvested insights. The chapter then suggests a number of ways in which we can make sense of where design might be going. Many of the authors suggest ways of extending the knowledge domains of existing design disciplines, others report on the development of new design

¹ GREAT BRITAIN. Research Councils UK. Available at: <http://www.rcuk.ac.uk/research/multidis/default.htm>

² GREAT BRITAIN. Treasury, 2005. *Cox Review of Creativity in Business*. London: Stationary Office.

strands and the need for bridging or metadesign disciplines, throughout the book new interests in design beyond the traditional of existing design disciplines are also frequently mentioned. The role of the designer in 21st century settings is also explored. Six roles for the 21st century designer are described, each linked to insights from the collective work of the Initiative's Phase 1 cluster projects.

The chapters have been loosely ordered according to their topic of enquiry. Although each chapter covers similar territory, namely; background, activities and insights, the style of writing varies considerably. This reflects the many academic conventions associated with the broad range of disciplines represented in the book. Some of the contributions embody the style of an academic paper, others report in an essay form. In all chapters authors have been encouraged to reference carefully, a key value of a text like this being to quickly navigate through the literature associated with a specific topic or zone of enquiry.

What is the Designing for the 21st Century Research Initiative?

Academic research in the UK is supported by a number of research councils, each covering their own respective portfolio of disciplines and subject interests. The councils provide funding for research through a broad portfolio of project grants and studentships. Increasingly there is recognition that many of the problems, issues and opportunities that confront society can only be explored through an interdisciplinary research approach. As a result there are an increasing number of collaborative research programmes being supported jointly by these research bodies. In the words of Research Councils UK,¹ the body that represents all of the UK research councils: '*. . . novel interdisciplinary research is needed to solve many, if not all, of the next decade's major research challenges.*'

This approach is clearly highly relevant to current developments in the discipline of design. In the UK the Cox Review² has recently reported on the role design and creativity have to play in building the UK's national competitiveness. Like many reports before, the review concludes creativity and design have an important role to play, but only when integrated with technology and business, that is, driven by an interdisciplinary approach.

If we examine design in the 21st century we can quickly see why this might be the case, all around us what we are designing is changing. New technologies support the creation and embodiment of new forms of product and service; new pressures on business and society demand

the design of solutions to increasingly complex problems, sometimes local often global in nature; customers, users and stakeholders are no longer passive recipients of design, expectations are higher, increased participation is often demanded.

Design practice needs to be highly adaptive and innovative to meet the needs of this rapidly changing operating environment. Generating the new knowledge and understanding needed to support these developments requires a collaboration of minds and provides some clear challenges for those engaged in design research.

The Designing for the 21st Century Research Initiative was conceived in response to these demands for new understanding in the design domain. The Initiative is jointly supported by the Engineering and Physical Sciences Research Council (EPSRC), who have an established track record for funding design research, mainly within engineering and technological contexts, and the Arts and Humanities Research Council (AHRC), who have a responsibility for supporting design research within an art and design context.

The AHRC and the EPSRC both started considering a programme directed towards interdisciplinary design research in 2002. Following consultation with representatives from the UK design research community the Designing for the 21st Century Initiative was formally announced in March 2004 with a call for Phase 1 research cluster project proposals.

The AHRC and EPSRC have each committed £3.25 million to fund the Initiative activities between January 2005 and December 2009. The total budget of £6.5 million has been split between two phases of research. £1 million has been used to support the Phase 1 research cluster projects; £5.5 million is being used to fund Phase 2 research projects. Across both phases the Initiative has the following aims:

- To help build a new diverse research community with a common interest in 21st century design.
- To help stimulate new ways of design thinking to meet the challenges of designing for 21st century society.
- To help support leading edge design research that is self-reflective, socially aware, economically enterprising and internationally significant.

The chapters in this book describe both the journey and insights generated through the 21 Phase 1 cluster projects supported by the Initiative.

The Phase 1 research cluster call, announced in March 2004, was launched to support cross-sector and cross-disciplinary networking activities through the formation of research clusters. In doing this, the aim was to build new relationships within the design research community, particularly between design disciplines and groups sharing common ground but with limited previous opportunity for collaboration.

In June 2004, 129 proposals for Phase 1 research clusters were submitted. 21 of these proposals were selected for support by a commissioning panel in September 2004. Between January and December 2005 each of these funded research clusters organised a series of workshops, seminars and meetings to support the development of design understanding. [Table 1](#) provides an overview of each of the Phase 1 research cluster projects; more detailed information on each is available at www.design21.dundee.ac.uk or by accessing the relevant url in column 4 of [Table 1](#).

During the second half of 2005 the Phase 2 research call was drafted and the Phase 2 research call was announced in January 2006. This was launched to support more substantive interdisciplinary research projects of between 12–24 month duration. Funding of up to £400,000 was available for each project. In April 2006, 65 proposals for Phase 2 research funding were submitted. Following a detailed process of peer review over the summer of 2006, a commissioning panel met in September 2006 to consider project applications. 20 projects were selected for Phase 2 funding. [Table 2](#) provides a very brief overview of each of the 20 Phase 2 research projects, more detailed information on each is also available at the Initiative website. Many of the Phase 1 projects described in this book have developed ideas that have resulted in successful Phase 2 project bids. Some of the authors describe these ideas within their chapters. It is hoped that a second book will be published in 2009 describing the territory covered by this second cohort of projects.

Cluster title	PI	Institution	URL
Design and Performance	Dr Calvin Taylor	University of Leeds	www.emergentobjects.co.uk
Technology & Social Action	Dr Andy Dearden	Sheffield Hallam University	www.technologyandsocialaction.org
Non-Place	Prof. Richard Coyne	University of Edinburgh	http://ace.caad.ed.ac.uk/NonPlace
Group Creativity in Design	Dr Hilary Johnson	University of Bath	www.creativityindesign.org.uk
The Healing Environment	Dr Jacques Mizan	King's College London	www.the-space-works.org
Spatial Imagination in Design	Dr Jane Rendell	UCL	www.spatialimagination.org
Nature Inspired Creative Design	Thorsten Schnier	University of Birmingham	www.nature-inspired.org
The Emotional Wardrobe	Prof. Martin Woolley	University of the Arts	www.emotionalwardrobe.com
Spatiality in Design	Dr John Stell	University of Leeds	www.leeds.ac.uk/SiD
Discovery in Design	Prof. Ian Parmee	UWE	http://www.ip-cc.org.uk/did/
Design Imaging	Gordon Mair	University of Strathclyde	www.dmem.strath.ac.uk/designimaging/index.htm
Design Performance	Dr Jillian MacBryde	University of Strathclyde	www.dmem.strath.ac.uk/desperf
Synergy Tools	Prof. John Wood	Goldsmiths College	www.attainable-utopias.org/ds21
Screens and Social Landscape	Prof. Gunther Kress	Institute of Education	http://www.lkl.ac.uk/research/design.html
Outdoor Spaces for Young People	Prof. Lamine Mahdjoubi	UWE	http://environment.uwe.ac.uk/publicspaces/
The View of the Child	Judy Torrington	University of Sheffield	http://vkp.leeds.ac.uk/Drive/gotobuilding.jsp?building=416559
Interrogating Fashion	Prof. Sandy Black	University of the Arts	www.interrogatingfashion.org
Sensory Design	Brent Richards	University of the Arts	www.designlaboratory.co.uk
Designing Physical Artefacts	Prof. Mark d'Inverno	University of Westminster	www.interdisciplinary.co.uk
Ideal States	Prof. Alastair Macdonald	Glasgow School of Art	www.idealstates.co.uk
Complexity in Design	Prof. Jeffrey Johnson	Open University	www.complexityanddesign.net

Table 1, Summary of Phase 1 research cluster projects

Project title	PI	Institution
Personalised Fashion Products	Prof. Sandy Black	University of the Arts
Branded Meeting Places	Prof. Richard Coyne	University of Edinburgh
Practical Design for Social Action	Dr Andrew Dearden	Sheffield Hallam University
DEPtH: Designing for Physicality	Prof. Alan Dix	Lancaster University
Embracing Complexity in Design	Prof. Jeffrey Johnson	The Open University
Inclusive New Media Design	Dr Helen Kennedy	University of East London
Services in Science and Technology-based Enterprises	Lucy Kimbell	University of Oxford
Stress Computation Visualisation, and Measurement	Dr Wanda Lewis	University of Warwick
Design Synthesis and Shape Generation	Dr Alison McKay	University of Leeds
Design Performance: ScoreBOARD	Dr James Moultrie	University of Cambridge
The Welcoming Workplace	Prof. Jeremy Myerson	Royal College of Art
People-centred Computational Environments	Prof. Ian Parmee	University of the West of England
Affective Communication, Personalisation and Social Experience	Prof. Chris Rust	Sheffield Hallam University
Bike Off 2	Adam Thorpe	University of the Arts
Emergent Objects	Prof. Mick Wallis	University of Leeds
Democratising Technology	Lois Weaver	Queen Mary, University of London
2020 Vision – The UK Design Industry in 2020	Prof. Alex Williams	University of Salford
Sustainability for Metadesign	Prof. John Wood	Goldsmiths College
Multimodal Representation of Urban Space	Gordon Mair	University of Strathclyde
The Design and Refurbishment in Schools	Dr Andree Woodcock	Coventry University

Table 2, Summary of Phase 2 research projects

Stage 1: Identifying common goals

Each of the research clusters began operating in early 2005 with a set of goals that had been developed and laid out in the original proposal documentation. An early challenge for each of the cluster leaders was defining the topic of enquiry in an open way that stimulated interest from a wide range of disciplines. Different strategies were used for achieving this. The *Emotional Wardrobe* cluster very carefully chose a very charismatic title to describe their work. Some of the clusters sought to build a very large network of collaborators beyond the originating project team, using the cluster to build new connections. This was exemplified by the *Interrogating Fashion* cluster whose early events saw cluster membership grow substantially to 38 members, all united by an interest in the paradoxes of fashion. Others mindfully kept cluster membership more focused. The *Ideal States* team realised that by focusing their enquiry on the health-related issues of western Scotland, their exploration could be bounded and interaction between collaborators could be made focused, but with a clear intention to gain generic insights for broader application in other situations.

Stage 2: Pooling different approaches

Most of the clusters enjoyed the involvement of technology orientated disciplines such as computing and engineering alongside those homed within an Art and Design environment and areas such as Management, Psychology, Dance, Medicine, Language and Bioscience. All participants shared a passion for the topic under review but had to build respect for the diverse qualitative and quantitative research approaches taken by different cluster members in exploring territory. In most of the research clusters this was marked by an early conflict between rigour and holism. Many of the cluster members represented disciplines grounded in qualitative research methods and practice based modes of enquiry, others developed new knowledge and understanding through quantitative methods. It proved important to spend sufficient time to explain these approaches amongst cluster members. The *Embracing Complexity* cluster used a programme of 'Complexity Master Classes' to build understanding. Others chose to explore different standpoints by engaging in practical tasks, the *Emergent Objects* cluster for example used a series of workshop activities throughout the 12 months of the cluster operations.

³ DEARDEN, A., 2006. Technology and Social Action. In: T. G. INNS & V. HALE, (eds.) *Design Dialogues: Proceedings of Design Dialogues Symposium, London, 7th March 2006*. Dundee: Duncan of Jordanstone College of Art & Design, pp. 11: ISBN 1 899 837 493.

⁴ PARMEE, I., 2006. Discovery in Design: People-Centred Computational Environments. In: T.G. INNS & V. HALE, (eds.) *Design Dialogues: Proceedings of Design Dialogues Symposium, London, 7th March 2006*. Dundee: Duncan of Jordanstone College of Art & Design, pp. 19: ISBN 1 899 837 493.

A key observation from this stage is the importance of individuals actually being able to communicate their methods and practices to others, to work in an interdisciplinary manner we must first of all understand our own disciplines. This is an interesting challenge for those engaged in design research where so many methods and approaches are still emergent and poorly articulated.

Stage 3: Building a coherent view

Mapping existing knowledge and understanding within each zone of enquiry was a challenge for each research cluster. As Andy Dearden leader of the *Technology and Social Action* cluster commented:³

‘The early workshops were open-ended struggles to establish coherent clusters of issues from a diverse group that extended from Indymedia activists, through trade-unions to open-source software developers.’

Much knowledge and understanding could be extracted from published sources, and a number of the clusters have collated very useful lists of relevant past research material. For example, the *Design Imaging* cluster who have built a profile of the role of the different human senses in design. For most participants the large body of existing knowledge came as a surprise, as Prof. Ian Parmee leader of the *Discovery in Design* cluster noted:⁴

‘Most [participants] were largely unaware of the extensive body of existing design research although being active in their particular areas. The workshops therefore represented an opportunity to position and understand their design activities within a more global context in terms of associated research.’

In some areas of design practice where knowledge is emergent or highly tacit and consequently not codified in a written form researchers organised task orientated activities to help participants build an integrated view of territory.

Stage 4: Distilling key insights and questions

One of the core aims of the research cluster activity from the Research Council’s perspective was to help identify the project ambitions of the design research community to help frame the Designing for the 21st Century’s Phase 2 project call. Within the workshops and events being organised by each cluster this became a key area of focus in the latter part of 2005. Obviously this was a complicated area to navigate as

distilling key insights and questions inevitably meant mediating between the interests and aspirations of individual cluster members. To assist in this process the Initiative Director organised a 2.5 day workshop in Glasgow in November 2006 for representatives from each of the 21 research clusters. At this event presentations were made by investigators from all 21 of the research clusters. Delegates also participated in workshop activities designed to help develop an overview of future research ambitions. One of these activities involved mapping potential future research projects from each cluster onto a large floor-based 3x3 matrix with axis representing project risk and project priority. Use of this method allowed over 120 future design research projects to be profiled and explored. [Figure 2](#) shows the outcomes from this mapping process.



Figure 2, Images showing how a map of future project possibilities was built by cluster representatives during the November 2005 Reflection and Projection Workshop. (Images courtesy of Gus Colvin).

Stage 5: Planning outputs and cluster closure or continuity

Each of the clusters was given funding to operate for a 12-month period. A majority of the clusters used this support to pay for a cluster coordinator, to develop a web presence and to pay for organising events and the associated travel costs of delegates. Having demonstrated the potential for research in the topic of enquiry a majority of the clusters used the latter part of their period of operation planning future endeavours. For most this has meant identifying and applying for a portfolio of future grants to support further research. 15 out of the 21 clusters developed bids for the Phase 2 funding round, of which eight were successful. Interestingly of the 78 Principal and Co-Investigators associated with successful Phase 2 projects, 37 were involved in Phase 1 cluster project activity. Many identified opportunities for funding through other sources, one of the legacies of interdisciplinary discussion being the opportunity to see a broader range of funding sources for supporting

research. It will be interesting to map how the interests of the Designing for the 21st Century cluster members manifest themselves in future research bids to councils beyond the AHRC and EPSRC over the next 5-year period.

Insights for Design

Each Phase 1 research cluster has had its own zone of enquiry and has helped build new knowledge about the act of designing in the 21st century. When examined at an Initiative level a number of common themes emerge. It is useful to summarise these as four new emergent positions for design and six new roles for the designer.

Emergent positions for design disciplines in the 21st century

Close inspection of Table 1 shows the wide variety of topics covered by the discourse within the Phase 1 research clusters. Some of these clusters were located in the context of a particular design discipline, for example *Interrogating Fashion*, others explored generic issues shared by all design disciplines, for example *Nature Inspired Design*. Others examined design's role in resolving issues confronting society, exemplified by the *Healing Environment*. Review of work within all 21 clusters suggests four emergent positions or scenarios for design disciplines. These are described in the following four figures.

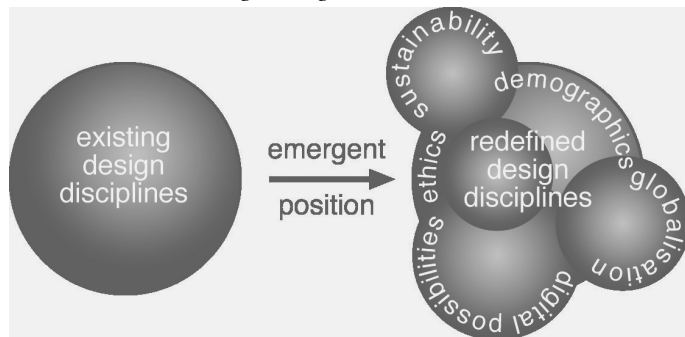


Figure 3, Emergent position 1 – Redefinition of existing design disciplines

One of the research clusters, *Interrogating Fashion* explored the emergent contexts within which fashion design is now operating and the strategies that the discipline of fashion design might follow to make the most valid future contribution. Such a research discourse could be happening within every design discipline, for example, product design, graphic design, engineering design and so on. We have a lot to learn from *Interrogating*

Fashion about how to conduct such a debate. Outlined in [Figure 3](#) is a graphical representation of how the boundaries of a design discipline might expand in response to the demands of new contexts associated with 21st century society. Many of the new contexts for every design discipline could be common, a lot could be learnt from comparing the strategies that each might adopt to deal with changing operating contexts.

The next emergent position for design, development of new design disciplines is shown in [Figure 4](#). This position embodies some of the debate generated within clusters like *Design Imaging* and *Sensory Design* clusters. Both these clusters (and others) suggested the emergence of new design disciplines based on the observation that we are designing new types of object, product and system in the 21st century, in the case of *Sensory Design*, potentially the design of the gastronomic experience. These new approaches find their routes in existing design disciplines but roadmaps for future discipline development needs to be identified.

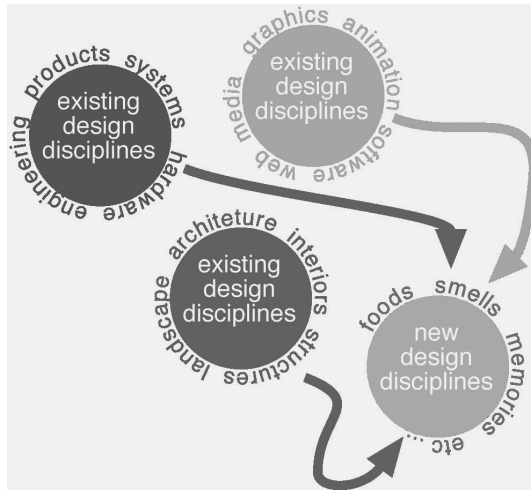


Figure 4, Emergent position 2 – Development of new design disciplines

[Figure 5](#) suggests the development of metadesign disciplines that act as a bridge between existing approaches to design. This development captures the spirit of discourse within clusters like *Synergy Tools* and *Screens and the Social Landscape*. Here we see 21st century design being dependent on the evolution of new metadesign disciplines that help navigate between existing discipline silos. Again driven by the need for new design approaches to address 21st century issues like sustainability, health and security.

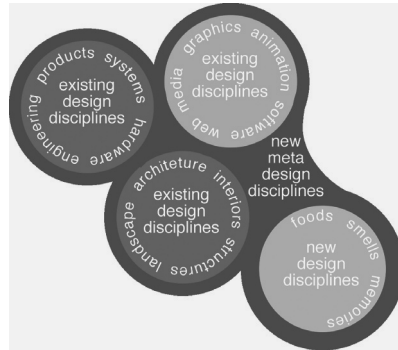


Figure 5, Emergent position 3 – Development of meta design disciplines

Finally, [Figure 6](#), explores the development of design outwith design (outwith being a quaint Medieval term associated with being beyond the city walls). Many of the research clusters found themselves with at least one foot in this camp. Clusters like *Ideal States*, *Technology and Social Action*, *Embracing Complexity in Design* all explored how design knowledge might be exported and imported across the traditional borders of design. How might design inform healthcare and vice versa, in the *Ideal States* cluster Prof. Alastair Macdonald explicitly explored design's contribution to healthcare beyond the design of product, environment and communication material. He suggests that design tends to person-centric, healthcare he suggests is not person-centric as we might think but pathology-centric, if we want to understand the export market for design we need to understand the currencies, concepts and values beyond the walls.

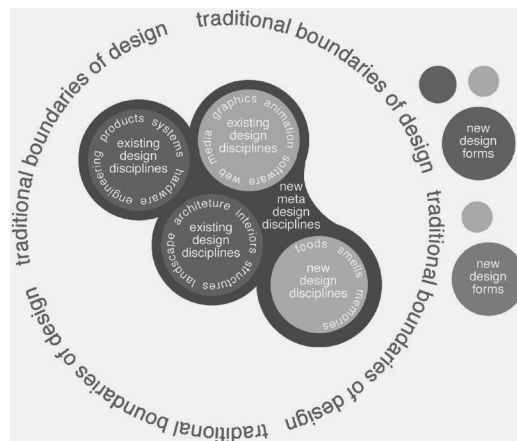


Figure 6, Emergent position 4 – Development of design outwith design

Emergent roles for the designer

Alongside these emergent positions for design disciplines the clusters also suggest many new emergent roles for the designer in the 21st century. These are probably best thought of as additional roles not displacement activities for the widely recognised skills of creativity and synthesis and the core technical skills associated with each design discipline. The six roles described below give a flavour of where the designer might be heading. The emergence of these roles is shown in [Figure 7](#).

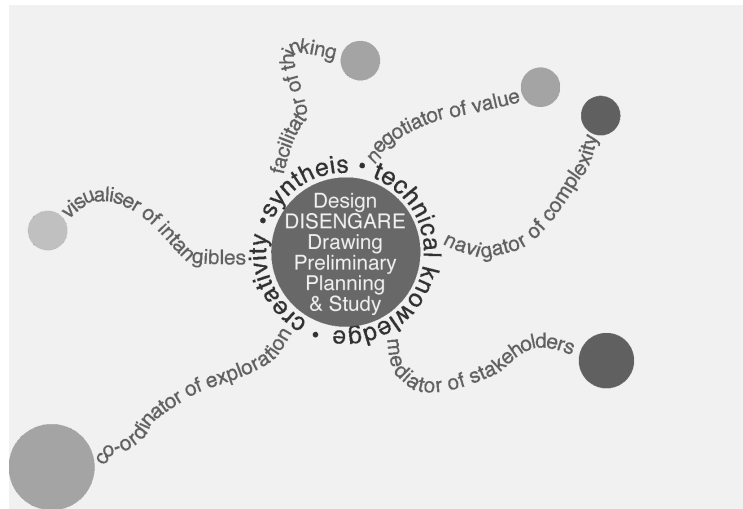


Figure 7, Emergent roles for the 21st century Designer

Designer as negotiator of value

We are now beginning to understand and articulate the financial value effective design can bring to a commercial situation, for example, how design can increase margins by reducing costs or enhancing price points. We also understand that this often calls for up-front investment and that value management involves a careful process of design trade-offs. The *Design Performance* cluster have carefully charted literature in this subject area. Value is however increasingly multi-dimensional, for example we must now consider ecological and ethical dimensions. The designer has an important role in negotiating decisions within these increasingly complex situations. The *Interrogating Fashion* cluster provides useful insights into the paradoxes associated with decision making in 21st century fashion design. Designers in all disciplines face similar challenges.

Designer as facilitator of thinking

Enhanced facilitation skills are another addition to the designers growing portfolio of skills in a 21st century context. We can see from the clusters that others are being empowered to design. The *View of the Child* captures a child's perspective in the design process. How do we design, design to allow extended participation? The 21st century designer will need to know how to mobilise and energeise the thinking of others.

Designer as visualiser of the intangible

Perhaps more of an extension of existing roles than an entirely new one, the contemporary designer already visualises and synthesises future possibilities but still this role is mainly associated with physical entities. In the emergent positions for design, so many of the challenges might be associated with the visualisation of the abstract and intangible, perhaps the visualisation of systems, relationships, emotions, experiences and networks. The work of the *Designing Physical Artefacts* cluster and others centred on translating concepts from one form to another, particularly the physical to the digital and back again. *Spatial Imagination in Design* explored the translations of the intangible in the mind. Visualising, modelling and prototyping in this zone demands new skills from the designer. How do you communicate intangible concepts to others, how do you prototype them, test them and implement them?

Designer as navigator of complexity

We now no longer live in a world of linear systems and mechanistic processes. The interdisciplinary world is a world of complexity and ambiguity, work from clusters like *Embracing Complexity in Design*, demonstrated the role design could play in helping us understand complexity, but also the role an understanding of complexity theory might play in helping designers understand their own roles.

Designer as mediator of stakeholders

The designer often no longer designs solely for a customer, the user or a client, increasingly design solutions are for multiple stakeholders, often with different perspectives, needs and expectations. The designer must act as mediator to resolve multiple requirements within a design solution. The *metadesign* cluster have paid close attention to these issues, carefully unpacking the multiple relationships that are associated with contemporary design projects and suggesting tools that might help

manage the mediation process. Likewise the *Designing Healthy and Inclusive Spaces* cluster have demonstrated how design can act as an organising concept to allow multiple stakeholders debate a complex issue such as obesity in young people.

Designer as coordinator of exploration

The designer has always played a lead role in planning future outputs. During the design process ideas are synthesised into concepts, developed into prototypes and realised as plans for future implementation and production. With technologies evolving quickly, the cultural context for design becoming a critical component within competitiveness and the boundaries of design steadily migrating a growing number of territories must be considered during the upfront exploration of ideas. Clusters such as *Nature Inspired Creative Design* explain the rich possibilities within the natural world, the 21st century designer must be able to coordinate the exploration of relevant technical and contextual sources to maximise creativity in early stages of design.

Conclusion

These thoughts on developments within design disciplines and emergent roles for the 21st century designer are my interpretation of the work that has been conducted during Phase 1 of the Designing for the 21st Century Research Initiative. They are based on the mental models of design that I carry in my mind. These models have evolved in the last 3 years as I have observed the ongoing discourse within the cluster projects. As you read this book you will interrogate the work from your own perspective and perhaps draw different conclusions and suggest different frameworks that capture the generic picture. Certainly there is clearly a great deal that needs to be researched within the design domain. We will need a great deal of new knowledge and understanding to help the discipline of design fulfil its potential in 21st century society. The 20 Phase 2 projects are exploring some of these issues in more detail.

Within the UK the Initiative has tapped into an appetite for design research within many parts of the academic and design practice community, it is likely that future initiatives will build on this portfolio of activity as the century progresses.

Ideal States: Engaging Patients in Healthcare Pathways Through Design Methodologies

Prof. Alastair S Macdonald, (The Glasgow School of Art)

Overview

The age shift

¹ ROYAL SOCIETY OF ARTS. Inclusive Design resource. Available at: <http://www.inclusivedesign.org.uk/index.php?filters=f5> [accessed 28/4/06]

² GREAT BRITAIN. NHS Scotland, 2005. *Building a Health Service Fit for the Future: A National Framework for Service Change in the NHS in Scotland*. Edinburgh, Scottish Executive.

³ ISAACS, B., 1965. *An Introduction to Geriatrics*. London: Balliere, Tindall and Cassell.

⁴ COOPER, R., 2005. Ethics and altruism: what constitutes socially responsible design? *Design Management Review*, 16 (3), pp.10-18.

⁵ GREAT BRITAIN. Department for Innovation, Universities and Skills. Available at: <http://www.foresight.gov.uk/index.html>

⁶ GREAT BRITAIN. NHS. Available at: <http://www.expertpatients.co.uk/public/default.aspx> [accessed 07/06/06].

Ageing of populations is a phenomenon occurring throughout much of the developed world. The 20th century saw life expectancy rise by 30 years. By 2020, half the adults in the UK and Europe will be older than 50.¹ By 2030, there will be more people in Scotland of retirement age than there will be children, and one in four people will be aged 65+ and one in 12 aged over 80.² As populations age, the numbers affected by associated impairments increase, there is an accompanying shift from a predominance of infectious to chronic diseases, and pathologies tend to be complex in the geriatric domain.³ Global businesses responding to the demographic challenges of an ageing population have not only a vested interest but a moral responsibility in providing products and services that meet the needs of their clients⁴ and governmental foresight healthcare and ageing population panels have scoped trends, future scenarios and actions required.⁵ How can design respond to the challenges brought by an ageing population?

Healthcare delivery

Current healthcare tends to be organised for the convenience of the organisation and the clinical staff and most solutions are geared to the needs of these two stakeholders. The consumer of healthcare has traditionally been seen as the passive recipient; however, more recently through policy documents and the introduction of the 'Expert Patient' there has been a move to acknowledging the patient perspective.⁶ Although patients and professionals may share the same goals, that is, the successful management and treatment of the patient, they do not necessarily agree on the important routes to those goals. While clinical models are

⁷ GREAT BRITAIN. Health and Community Care, 2003. *Partnership for Care, Scotland's Health White Paper*. Edinburgh: Scottish Executive.

⁸ GREAT BRITAIN. NHS Scotland, 2005. *Delivering for Health*. Edinburgh: Scottish Executive.

⁹ GREAT BRITAIN. NHS Scotland, 2005. *Building a Health Service Fit for the Future: A National Framework for Service Change in the NHS in Scotland*. Edinburgh: Scottish Executive.

¹⁰ HANLON, P., 2005. Foreword. In: F. CRAWFORD, *Doing it Differently: An Asset-based Approach to Well-being*. Edinburgh: NHS Scotland, ISBN 1 901835 43 X.

evolving significantly, the tools to engage healthcare consumers are still rudimentary: very often the individual is disenfranchised from decisions about their care and not empowered to assist more effectively in their own recovery. However, the NHS is committed to change:⁷ NHS Scotland has stated that its vision is to reapply its founding principles to meet the needs of the people and that this requires a fundamental shift in how healthcare is delivered.^{8,9} Could design methods, particularly in the area of user-centred design, provide a way of engaging patients in this sector more effectively to obtain a better understanding of their needs and goals, and indeed, by increased empowerment, offer them a more proactive role?

Common purpose

The 'Ideal States' cluster was formed between individuals in the two fields of design and clinical healthcare, both concerned with people-centric practices and in how to respond to healthcare and quality of life issues associated with an ageing population. The cluster's title, 'Ideal States' refers to the aspiration for the two fields to be able to collaborate more effectively to the benefit of a healthier community. Joint preparation of the initial cluster research proposal had been an essential stage in clarifying its common purpose and agenda. The cluster's aims were 1) to identify ways to better understand one another's fields, and by so doing, 2) to explore how and in what ways the two fields could effectively collaborate to bring mutual benefit, through design thinking, to those individuals experiencing ageing, change in health, illness and disability, and 3) from the outset to engage clinicians, healthcare professionals and patients in this discussion.

Social context

Scotland has a problem: it faces the same spectrum of health and social issues as the rest of the world's post-industrial economies, but in a more virulent form.¹⁰ This formed the backcloth for our study: the cluster was to later focus on the ageing population, associated chronic disease, in particular stroke. Grounding its discussions and activities within the west of Scotland context, to use this as a 'test-bed', was vital in avoiding the cluster engaging in a purely academic exercise. One intention of the cluster from the outset was to gain generic insights that might be valuable for broader application in real situations nationally and internationally.

Anticipating future design practice

A pressing question underpinning discussion was how design as a field could begin to shape its perceptions, practice, its paradigms, to anticipate tomorrow's problems and challenges today, to understand, and provide for future needs and goals. Not only will tomorrow's populations be older, but they will be more demanding in how they choose to live and accommodate age, disability and illness. This will require not only effective healthcare including strategies for adapting to limitations and rehabilitation, but also flexibility in the means to enable active, healthy ageing, socialisation and independence.¹¹

¹¹ GREAT BRITAIN.
Department for Innovation,
Universities and Skills. Available
at: [http://www.foresight.gov.
uk/index.html](http://www.foresight.gov.uk/index.html)

Activities

Cluster members

The 'Ideal States' cluster held a number of meetings and workshops over a 12-month period to bring together practitioners and academics in the fields of healthcare, human factors and design, and to involve users (patients and carers), as well as attending Designing for the 21st Century events. Those substantially involved in shaping and driving the discussions forward were: Prof. Alastair Macdonald, Head of Department, Product Design Engineering, The Glasgow School of Art (GSA), as Principal Investigator; Prof. James McKillop, Head of Department, and Prof. David Stott, David Cargill Prof. of Geriatric Medicine, both in the Department of Medicine, Prof. Margaret Reid, Prof. of Women's Health, Department of Public Health, all at the University of Glasgow (GU); Lynn Legg, Project Manager, Stroke Therapy Evaluation Programme, Glasgow Royal Infirmary; Eleanor Forrest, Senior Consultant in Human Factors, HFE Solutions, Dunfermline; Gordon Hush, sociologist, Lecturer, Historical & Critical Studies, and Sally Stewart, Head of Undergraduate Studies at the Mackintosh School of Architecture, both at GSA. Cluster coordinator was Maggie MacRitchie and technical support was provided by David Loudon, both based at GSA.

Deeper understanding

An early decision was taken by the cluster to remain relatively small, to stay intensely focused, to concentrate initially on developing deeper insights into the two fields and cultures of design and healthcare, a choice of depth rather than breadth. The cluster was not so concerned with producing ideas for research or projects early on, but instead with listening to, and in beginning to really understand, how each field perceived its world, and how as a consequence these perceptions shaped

¹² COTTAM, H. & LEADBETTER, C., 2004. RED Paper 01, *Health: Co-creating Services*. London: Design Council. Available at: <http://www.designcouncil.org.uk/en/Design-Council/3/Publications/Red-Paper-01-Health/> [accessed 08/05/06]

¹³ GREAT BRITAIN. NHS Scotland, 2005. *Building a Health Service Fit for the Future: A National Framework for Service Change in the NHS in Scotland*. Edinburgh: Scottish Executive.

its respective world through how it acted and practiced. The first activities, then, were concerned with defining the respective fields, the areas of knowledge, normal practices and how subjects were engaged. As a result, perceptions changed and understanding deepened. When the cluster came to focus its enquiry and activity on the area of healthcare pathways, after we had developed a clearer understanding of our respective fields, the cluster began to make some real headway in how to begin to think its way forwards to meet these challenges.

Our subjects

Context was essential: the cluster was keen to continually reference the discussion back to the specific context of healthcare in its community. It was important to the cluster that the voice of the subjects, that is, older and disabled people, was introduced early on. Interestingly, a technique which is now commonplace in design research and which was used as a discussion activity (not research *per se*) in our March workshop generated a sustained interest in the healthcare professionals for the duration of the project that is, providing subjects with a disposable camera and questionnaire and asking them to document what enhanced or provided an obstacle to quality-of-life during a day of their lives and then to discuss the findings at a subsequent group session. Carers were also asked to participate in the same activity, which provided a complementary perspective. The cluster also ensured that advocates for its subjects, such as carers, public health and human factors professionals, were involved in some of the activities [Figures 1 and 2].

Emergent thinking, policy and practice

Having begun to develop a better mutual understanding of the nature of each other's field, the cluster then explored, in its June workshop, the changing contexts and practices of both design and healthcare through contributions from a series of invited speakers. For example, a member of the Design Council's Red team, whose stated purpose was to challenge accepted thinking on current social and economic problems by exploring new solutions through innovative design practice, provided an example of their approach to engaging people in the way that services were designed, through a process of co-creating.¹² From the healthcare side, a key briefing by a healthcare consultant provided a summary of the Kerr report. This outlined the Scottish Executive's new strategy for building a health service for the future through changing the nature of the way healthcare is delivered within the NHS in Scotland.¹³ This latter presentation, in retrospect, became a key reference-point in understanding what was