Designing Wearables

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So what is Design?

i. “a plan or drawing produced to show the look and function or working of a building, garment or other object before it is made”

ii. “the art or action of conceiving of and producing a plan or drawing of something before it is made

iii. “purpose or planning that exists behind an action, fact or object”
The broad outlook of design

anthropology  
e-learning  
art  
engineering  
ergonomics  
fashion  
design studies  
history  
telecommunications  
psychology  
journalism  
visual design  
technical communication  
industrial engineering  
artificial intelligence  
cultural studies  
education  
interaction design  
interface design  
information systems  
interior design  
landscape architecture  
linguistics & semiotics  
media & entertainment  
sociology  
urban planning  
software  
industrial design  
human-computer interface  
software engineering
Complexity of Wearable Technology

- Design Processes
- Functional Clothing
- Wearable Electronics
- Clothing & Textiles Industry
- Computing/Electronics Industry
- Fashion / Identity
- Social Change
- Personal / Social Economic / Political

Smart Clothes and Wearable Technology

http://artschool.newport.ac.uk/smartclothes
Technology Versus Aesthetics

1980
Mid 1980’s
Early 1990’s
Mid 1990’s
Late 1990’s
Collaborative & Interdisciplinary working gives rise to a range of dialectical tension. Choosing one set of vocabularies, metaphors, contexts or language discriminates against others.

Ken Friedman
Basic Process Framework

- Research
- Research & technology support (Textiles)
- Research & technology support (Electronics)
- Fashion development
- Electronic development
- Strategy
- Prototyping
- Output

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Framework presenting all tasks in detail
Participatory Design

It is important to understanding potential & current customers/users

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User-Centred Design

Research
Context studies
Focus groups
Competitor comparisons
Depth interviews
Questionnaires
User personas and scenarios
User goals
Usability goals

Implementation
Usability testing
Expert evaluation
Accessibility evaluation

Launch
Usability testing
Expert evaluation
Accessibility evaluation
Focus groups
Competitor comparison
Metrics

Concept
Concept models
Usage scenarios
Paper prototypes
Usability testing
Expert evaluation

Design
Product structure diagram
Process flows
Wireframes
Interactive prototypes
Card sorting
Usability testing
Accessibility evaluation
Expert evaluation
Card sorting
Functional specifications

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Lead-User Design

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Participatory Design Process

1. Recognize need/opportunity
   - Identify generic potential
   - Illustrate/make useful

2. Identify and gather user communities

3. Co-design/create/model scenarios of systems

4. Assemble mock-ups or demos

5. Co-design/test

6. Co-design/test

7. Create initial prototypes

Diaz & Kommonen (2003)

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The Research Assessment Exercise 2008 (RAE) demonstrates how art and design research can be effectively assessed in a formal context.

For more information about the RAE: www.rae.ac.uk
RAE 2008, Unit of Assessment 63 - Art & Design
Practice-Based Research

Practice-based researchers face complex, fast changing structures and expect methodological debates to surround thier work.

Art & Design education originates from medieval craft apprenticeship model, but it is now expected to fit into the scientific academic model.

However Practice-based research techniques better suited to some problems, as demonstrated by Marshall & Newton:

“scientific inquiry, like any form of inquiry explores only certain kinds of problems and validates only certain kinds of solutions. The kind of problems scientific inquiry has most difficulty in exposing are precisely the kinds of problems and situations faced by practitioners: problems and situation that are complex, uncertain, unstable and uniquew, often articulated across conflicting value systems.”

Contextualisation of artefacts is crucial for practive-based research. Without contextualisation the piece of work holds little value as research.
Design Assessment

The RAE doesn’t accept practice per se, but it allows for the practice to be focused on a research question (and methodological context). The contextualisation of research for Art & Design disciplines has been given greater emphasis than in other areas of the RAE.

Research is assessed against several criteria:

**Originality**
The degree to which the work and its organisation have evolved. New methods, insights and formulations from known forms and practices

**Significance**
The degree to which the work and its organisation have enhanced, or are likely to enhance, knowledge or understanding in the field and the advancement of practice.

**Rigour**
The degree of intellectual precision and systematic methods embodied in the research practice, its organisation and peer recognition.

All of which must be demonstrated through evidence, based on a portfolio of evidence. All claims of impact and influence have to be justified, by bibliographic references or documentary evidence.
Interdisciplinary Working &
New Dynamics of Ageing
University of Ulster
Chris Nugent leads research into ‘smart homes and beyond’ and has an overview of medical concerns regarding older people.

University of Salford
Tracey Williamson provides contact with user groups and professional bodies. She brings experience of supporting older people as co-researchers, participants and advisers.

Ellis Development Ltd
Develops textile assemblies for medical applications, including a wide range of soft tissue implants. Julian Ellis was formerly chair of East Midlands Technical Textile Forum.

University of Wales, Newport
The Smart Clothes and Wearable Technology group provides expertise into the identification of end user design requirements.

Coleg Sir Gâr
Recently acquired state-of-the-art textile laser-welding equipment, which complements their existing garment technology centre.

University of Westminster
Professor Bryan Manning is involved in national strategy groups addressing issues within the ageing population. He is an expert in health informatics and care informatics.

London College of Fashion
Senior research fellow Jeni Bougourd was a project manager for in the ‘Size UK’ clothing survey and will contribute her expertise in garment sizing technologies.

National Centre for Product Design & Development Research (PDR)
Multi-disciplinary research into rapid prototyping and manufacture techniques, with expertise in the design of medical products.

Mike Timmins is an independent environmental consultant, specialising in textile and product recycling.

University of Bristol
Mobile & Wearable Computing Group conducts research into architectures and applications for ultra-mobile systems. Including the integration of medical devices with wearables.

Wireless Edge Communications
Provides commercial expertise in ‘next generation’ national and global wireless telecommunications systems, and innovative business practices.

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Design Issues for Wearable Computing

- Wearability
- Wash-ability/Durability
- Standards & Interoperability
- Reference designs
- Design Process
- Security & Privacy
- Ethics

How can non-computing experts get involved?

How is mobile, pervasive and ubiquitous computing effecting ISWC?