

Tools for Supporting Inclusive Design

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ABSTRACT

Despite the ageing population and the subsequent importance of considering older people in design, many designers struggle to do so. In particular, they often lack appropriate materials and tools to help them implement inclusive design in practice. This paper describes work at the Cambridge Engineering Design Centre to address this shortfall, developing resources to motivate and equip designers to produce more inclusive designs.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation (e.g., HCI)]: User Interfaces – *User centred* design.

General Terms

Design, Human Factors

Keywords

Inclusive design, design methods, design tools, designers, disability.

1. OUR APPROACH

The population of the developed world is rapidly ageing [8], making it increasingly important to consider older people in the design of products and services. A range of approaches have been developed to help with this, such as inclusive design, which aims to make mainstream products usable by as many people as is reasonably possible [3], with a particular focus on those with reduced capabilities, such as older people.

However, despite the usefulness of these approaches, many designers often struggle to put them into practice, or are not aware of them altogether [5]. In particular, a survey we conducted on industry response to inclusive design identified a lack of appropriate knowledge and tools for supporting inclusive design and a lack of conviction about its business case as common barriers to its uptake [5].

Therefore, in order to make a real difference to the products and services available in practice, we need to influence and equip those who design and produce these products. Consequently, a large part of our work in the inclusive design group at the Cambridge Engineering Design Centre focuses on

developing inclusive design materials, methods and tools to motivate and support practicing designers. This paper describes our work in this area.

2. STUDY OF DESIGN PRACTICE

Although a variety of methods and tools already exist, they are not always used. There are many reasons for this, but an important underlying factor appears to be a poor fit between the some of the methods and the ways in which designers think and work (see, for example, [1]). Therefore, it is vitally important that our inclusive design materials are built on a good understanding of design practice.

We therefore conducted a study of design practice, using observations, interviews and a literature review, to understand more about the ways in which designers currently work and currently consider users, as well as the factors that influence the uptake of new methods and ideas. Initial results are given in [4], and indicate the importance of informality in design practice and the need for more flexible, light-weight, yet reliable tools for inclusive design. Full analysis of these results is currently being written up.

3. INCLUSIVE DESIGN METHODS AND TOOLS

Building on our understanding of design practice, we have developed a range of materials and tools to encourage and support inclusive design, as illustrated in the following examples.

3.1 Inclusive Design Toolkit

A principal output of the research is the Inclusive Design Toolkit [3], commissioned by BT, and developed in collaboration with product development company Sagentia and the Helen Hamlyn Centre at the Royal College of Art. This toolkit draws together the results of two successive collaborative research programs on inclusive design, funded by the Engineering and Physical Sciences Research Council. The toolkit presents the business case for inclusive design and describes how it can be incorporated into existing product development processes. Furthermore, it provides information on capability loss and practical design guidance, and acts a portal to the other inclusive design resources we are developing, which are described later in this paper.

3.2 Impairment simulation

One of the barriers to considering older people in design is that designers are often young and able-bodied and find it difficult to understand and empathise with users who are so different from themselves. Impairment simulation tools are very effective in addressing this barrier by enabling designers to

experience some of the effects of capability loss for themselves [2].

We have therefore developed both wearable and software simulators, which improve over existing simulation kits by being modular, developed for use in design, and able to simulate variable levels of functional loss [2,6]. The wearable simulators directly restrict the ability to see and move, while the software simulators demonstrate the main effects of common vision and hearing impairments on image and sound files (see Figure 1). These simulators can be used simply and informally to give an insight into the effects of ageing and to provide initial feedback on design ideas.



Figure 1. Screenshot from the impairment simulator, showing some of the effects of glaucoma on viewing an interface.

3.3 Exclusion audit

We have also developed an exclusion audit procedure, which enables designers to quantitatively assess the inclusivity of a product or service, by calculating how many people would be unable to perform the specific tasks involved with using that product or service [9]. The audit involves assessing these tasks according to the demands they place on seven key user capabilities, as shown in Figure 2. For example, using a cash machine may place a medium level of demand on reach & stretch and dexterity and a high level on vision. The audit procedure is supported by an exclusion calculator, available on the Inclusive Design Toolkit, which uses these demand assessments to calculate how many adults in the UK would be excluded from using the design.

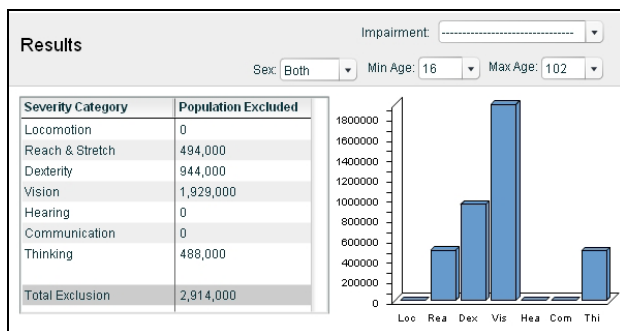


Figure 2. Screenshot from the exclusion calculator, showing the total exclusion resulting from demands on various capabilities.

3.4 Database of user methods

The methods detailed so far are intended to complement, not replace, direct user contact. Our work therefore also examines how to encourage practicing designers to involve users more

frequently and more effectively. In particular, we are developing a database of user methods, including both methods for using information about users and methods for involving users directly. The database is built around the issues that designers themselves consider in selecting and evaluating methods, in order to encourage its use for this purpose [7]. The database will enable designers to select appropriate user methods that fit within the commercial pressures of their daily practice, thereby increasing the uptake and effectiveness of user involvement.

We are currently considering how to present the database in ways that designers will find usable and attractive. Possibilities include a card set, posters and software.

4. CONCLUSIONS

We have developed a range of practical tools and resources for designers to motivate and equip them to put inclusive design into practice, enabling them to better meet the needs of the older population.

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