Identifying contextual factors in inclusive design

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Chapter 2

Identifying Contextual Factors in Inclusive Design

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2.1 Introduction

Defining the context in which a product is to be used is a fundamental part of any design process. Defining and exploring context in a meaningful way can lead to the design of more inclusive products; however, there is a tendency, especially in the early design stages, to use informal, exploratory lightweight methods, e.g., brainstorming, discussion, product searches, etc. (Goodman *et al.*, 2006). Such methods may fail to supply designers with detailed information regarding users and the context in which products are used. The reasons designers do not probe further have been shown in some cases to be a result of limited detail within project briefs and time and budgetary constraints (Goodman *et al.*, 2006; Chancellor of the Exchequer, 2005). A failure to consider context can lead to the development of products that place increased demand upon the user.

The overall purpose of this initial study was to explore context and how it impacts upon the demands placed on the user's capabilities during product use (Goodman and Waller, 2007). The research will ultimately lead to the development of a design resource which will raise a greater level of context awareness during the design process. At the same time, such a resource needs to be seen as supplementing, but not replacing, whatever real user research the designer's constraints will allow.

2.2 Understanding and Defining Context

A review of context revealed that it is an area that is considered in many disciplines and not just product design, e.g. ergonomics (e.g. ISO, 1997; ISO, 1999), computing (e.g. Dey et *al*., 2001), and mobile communications research (e.g. Tamminen et *al*., 2004).   Each discipline essentially expresses the same concept but with their own vocabulary or emphasis. In order to consider context in a meaningful way within inclusive design, there is a need to include not just the physical context of use but also the interplay between physical, social and emotive contextual factors. It is therefore important that an inclusive design definition of context adopts a holistic approach. It needs to recognise not only abilities and limitations of people within set environments, but also their needs, possible coping strategies, attitudes, motivation and aspirations towards existing or emerging products, technologies and services.

2.3 Approach

When speaking with older users, in most cases their difficulties emerge from a complex interplay between their limited capabilities and the demands of the product. Therefore, it was necessary to tease out the contextual issues from user data, starting from well-researched activities in and around the home. Scoping studies began the process of identifying and extracting problems which users experience with products as a result of context.   A selection of methods was used, which included:

- four focus groups that identified where context has the biggest impact upon product use (this included exploration of people's feelings and motivations);
- development of a Context Analysis Checklist, based on previous ergonomics research by Thomas and Bevan (1995);
- detailed observations, covering cooking and gardening activities, as the earlier focus groups identified that these rewarding activities for older people raise many contextual issues relating to both tasks and the environment.

2.4 Emerging Results

The scoping studies to date have confirmed the multi-faceted impact of context upon product use, product demand and user capabilities. Context may impact on the capabilities of the user. For example, bright sunlight can increase a user's visual ability in relation to some tasks (like threading a needle), but it can reduce

ability in other contexts (e.g., when sunlight is so bright it reduces the user's ability to read text on a mobile phone display). Context can also increase the demands imposed by the product (e.g., use of a product with a shiny handle can become more demanding in environments where the user has wet or slippery hands). Similarly, other tasks require products to be transported between locations either as part of the task (e.g., carrying a saucepan during cooking) or because they need to be stored away from the point of use in awkward locations (e.g., a lawnmower may need to be transported to and stored in a shed, which often requires the user to lift and manoeuvre the product in order to get it into and out of the appropriate storage area). These tasks create product demands that are in addition to the demands resulting directly from the product's characteristics.

The demand associated with using a product is therefore a result of both the product characteristics and the context in which they are used (Figure 2.1). The user's capability to cope with this demand, and therefore whether the demand results in exclusion, may also be affected by context.
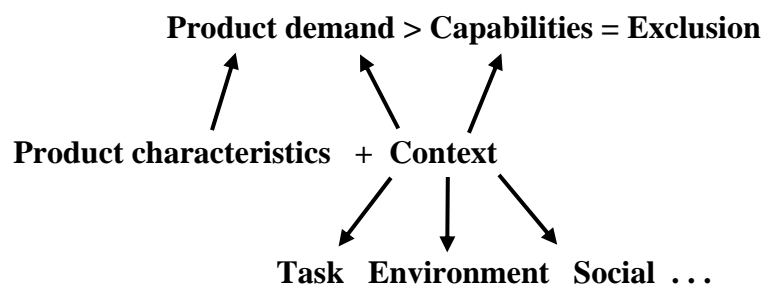
Product demand > Capabilities = Exclusion

Product characteristics   +   Context

Task   Environment   Social . . .

Figure 2.1. Multi-faceted impact of context

2.5 Conclusion and Next Steps

Consideration of the context of use is an integral, although sometimes implicit, part of any product design process. The challenge for inclusive design research is to develop methods that enable designers to judge when contextual factors *as well* as product characteristics result in exclusion. These tools must capture the rich interplay between different aspects of the context of use, the capabilities of the user and the product characteristics.

Such a resource is now under development to raise designers' awareness and knowledge of context in relation to inclusive design. Data from users is being supplemented with literature and best practice in ergonomics and inclusive design. Where gaps in the data exist, experimental studies are planned to build up a richer picture of the extent to which context can exclude older and disabled people from using products and technologies. For example, measurement of visual function in a lab or clinic is usually performed under ideal conditions; however, using a product in less than optimum conditions in the real world (e.g., bright sunlight, dark, dusk)

could have either a positive or negative impact, depending on the user, the product, the task and the environment. Future research will investigate the impact such contexts have on a person's visual ability and, most importantly, to translate this knowledge into useful guidance for designers.

It is important that the information obtained in these investigations is presented to designers in an acceptable and usable form, without prescribing specific design solutions or restricting innovation. Therefore the resource is being developed in collaboration with designers, and drawing from previous research in i~design2, to ensure that it meets the needs of designers, as well as the needs of the users of products, technologies and services.

2.6 Acknowledgements

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