

The Synergies between Universal Design and User-Centred Design

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Abstract

This paper discusses the synergies between the well-known and accepted processes of Universal Design (also called inclusive design and Design for All) and User-Centred Design (UCD).

The paper explores these synergies, both from a theoretical basis in the literature and also through the authors' experiences as part of the User-Centred Design project team at the Smart Internet Technology Cooperative Research Centre in Australia (SITCRC).

1The Two Design Processes

Information and communication technologies have become a large part of the everyday life experience of the majority of people in the industrialised world. The user response has ranged from embracing to despising these technologies. The pervasiveness of these products make it important that they be designed so that the end-user can gain maximum benefit from this experience. Focusing on the user throughout the design cycle should improve the usability and desirability of these products. A particular emphasis on the rich diversity of users will further strengthen the products and lead to the broader goal of universal access.

The approaches of Universal Design and User-Centred Design have similarities in that both design processes aim to improve the usability of products and services. However, the processes differ in approach and philosophy. To achieve synergies between the two approaches is challenging but can produce rewards in the way products are evolved and made more desirable through good design practices.

1.1Universal Design

Universal Design has its roots in architecture, engineering and environmental design and its principles espouses the “design of products, services and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (Center for Universal Design, 1997)

The Principles of Universal Design are:

- Equitable Use;

- Flexibility in Use;
- Simple and Intuitive Use;
- Perceptible Information;
- Tolerance for Error;
- Low Physical Effort;
- Size and Space for Approach and Use

(The Center for Universal Design, 1997)

These principles offer designers guidance to better integrate features at the outset that meet the needs of as many users as possible and consequently, people with disabilities. Designers also must incorporate other considerations such as economic, engineering, cultural, gender, and environmental concerns in their design processes.

The author's experience is that when engineers are presented with the concept of "Universal Design", they argue that it is nearly impossible to design for "one size fits all". There has been some confusion over the real meaning of Universal Design and thus several different terms are used. For example, Design For All is becoming the preferred term in Europe while the term "inclusive design" is also used in this context. However, inclusive design can also have extended implications as discussed in Section 2.

To further clarify the situation for engineers and other designers, and to move away from the difficult concept of "one size fits all", advocates of Design for All discuss three levels of design:

- ⑩ Mainstream products designed using the above principles to be used by a broad range of users including people with disabilities
- ⑩ Mainstream products which are designed so that assistive devices can be easily connected
- ⑩ Specially designed products for people with severe disabilities (COST 219, 1997)

1.2 User-Centred Design (UCD)

User-Centred Design (UCD) focuses on the active involvement of the user in the design process, trying to obtain a clear understanding of the exact task requirements, involving an iterative design and evaluation process, and utilising a multi-disciplinary approach. (Vredenburg, 2002) The key focus of UCD is that users play a critical role in the design of easy-to-use products throughout the entire development process.

User-Centered Design is a well established process that has been widely adopted by many organisations to deliver products that meet users' expectations. IBM has been a strong adopter of UCD methods to enhance their product development process. They have now consolidated this process with their broader framework of User Engineering. Formal UCD methods have proven successful in the development of effective software across a number of industries such as aerospace. These same processes have been used in the development of a powerful securities trading system currently operating in the world economy (Mauro, 2000).

The core goal of the User-Centered Design principles are to involve the users. This is done by adhering to the following:

- Set business goals;
- Understand users;

- Assess competitiveness;
- Design the total user experience;
- Evaluate designs;
- Manage by continual user observation.

(Vredenburg, 2002)

Interaction throughout the design process is necessary between users and developers in order to understand and define the context of use, the tasks, and how users are likely to work with the future product or system. (ETSI, 2002).

In order to make UCD common practice among designers, models for UCD have been proposed based on international standards. ISO 13407 (Human-Centred Design Processes for Interactive Systems) and ISO 18529 (Human-Centred Lifestyle Process Descriptions) are two examples. (Jokela, 2002)

2The Synergies

It is the synergies between these two design philosophies and processes using the set of Universal Design principles as part of the User-Centred Design process which potentially offer an enhanced opportunity to create more accessible, flexible and intuitive products and services.

Universal Design is based on design principles which are broad enough in themselves to offer a flexibility which product designers can use when developing any type of technology. Universal Design or Design for All may be applied to evaluate existing designs, guide the design process and educate both designers and consumers about the characteristics of more usable products and environments. It can be used at the beginning of the design process as a set of principles to guide the entire product development cycle.

Inclusive design is another term for Universal Design used in at least two different ways. A common definition is "the design of mainstream products and/or services that are accessible to, and usable by, as many people as reasonably possible on a global basis, in a wide variety of situations and to the greatest extent possible without the need for special adaptation or specialised design." (Tiresias, nd) Inclusive design has also been referred to as the integration of accessibility into a UCD process. (Lawnton, 2000).

Common arguments advanced by organisations such as COST 219 and Trace Center for the use of inclusive design is that designing for people with disabilities and accessibility ensures that products are more accessible for the broader community.

Another argument is that there is no clear dividing line between those who are disabled and those who are not. ETSI (2002) gives the example that for every person with a severe vision impairment, there are many others who wear glasses and could benefit from larger fonts on screens or signs especially in low light conditions.

There are many examples of technology which began as specialised equipment for people with disabilities and evolved to become popular mass market products. An example of this is speech recognition technology which was originally designed for people with limited upper limb mobility but has now been adopted by the wider community (Silverman, 2002)

User-Centred Design has a strong focus on the involvement of the user during the conceptualisation and development stage. It offers both a conceptual approach (through the use of a design model and process based on UCD principles) as well as a practical approach (through workshopping personas and scenarios, for example, and the actual involvement of user groups).

The key European telecommunications standards body, ETSI uses both Universal Design and UCD as primary concepts for the development of guidelines for ICT products and services. (ETSI, 2002)

It has been suggested that the methodologies of UCD be extended to form a paradigm called Designing for Dynamic Diversity. This would offer more opportunities for the diverse requirements of older people and people with certain disabilities to be considered in a new methodology called User Sensitive Inclusive Design. (Newell & Gregor, 2000). Understanding user diversity is the key to successful outcomes from the design process. This particular approach may offer useful insights.

3 Practical Applications at the Smart Internet Technology Cooperative Research Centre

The approaches taken within the Smart Internet Technology Cooperative Research Centre (SITCRC) are unique in that User-Centred Design is used in a collaborative academic and industrial research environment to scope broad project directions leading into specific product development and demonstrators.

The SITCRC is a consortium of Australian universities and industry partners integrating expertise in artificial intelligence, networking, security, software engineering and social science to develop Internet applications to enhance business and lifestyles in a more user-friendly manner.

The SITCRC User-Centred Design team has implemented UCD methodology such as personas and scenarios to perceive a number of different applications for the same technology. The use of a persona in a scenario setting gives a deeper understanding of how a user will interact with particular technologies.

This has been put into practice through workshopping with researchers from all the technology programs. This collaboration and use of personas/scenarios allowed the UCD team to explore the viability of certain technologies with the technology researchers. The collaboration also provided the technology researchers with an insight into the benefits of the use of personas/scenarios and thus the User-Centred Design approach.

In conjunction with the workshop, an Expert Panel on Disability was held with people with disabilities who are not only experienced users but also prominent representatives from the disability community. Much insight into the scenario development was provided. It also allowed direct discussion between users, the technology teams and the UCD team.

It was illustrative that the usual perceptions were initially held by technology researchers that products designed and built for people with disabilities were a niche market and had limited relevance to the mass market. However, the Expert Panel members easily changed this perception

through relating their experiences with technology and with their day-to-day lives and how these apply to a much wider community. It became clear that inclusive design principles could easily form an integral part of the R&D paradigm.

4 Conclusion

The authors argue that technologies based on the synergies between Universal Design and User-Centred Design result in products that could be much more usable by a wider community. It is suggested that adhering to both approaches or in fact, a new methodology that incorporates the two approaches could increase the benefits to a large number of individuals using products developed by the SITCRC. It is planned to continue testing this type of approach within demonstrator projects.

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