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Special Issue of the Journal of Usability Studies: Designing Inclusive Systems

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The three co-editors of this special issue participated in the organization of the 2012 Cambridge Workshop on Universal Access and Assistive Technology (CWUAAT).

The Cambridge Workshop on Universal Access and Assistive Technology (CWUAAT) is held every other year at a UK Cambridge University college. CWUAAT '12 was part of this series, started in 2002, that presents research from the international inclusive design community. It is a unique multi-disciplinary workshop, where designers, computer scientists, engineers, architects, human factors specialists, policymakers, and user communities are encouraged to meet and discuss their common interests. This special issue of the Journal of Usability Studies contains a selection of papers that were re-written and expanded from their contributions presented at the 2012 workshop.

The workshop theme "Designing Inclusion for real-world applications" refers to the emerging potential and relevance of the latest generations of inclusive design data, tools, techniques, and thinking to mainstream project applications such as healthcare technology, education, rehabilitation, and the design of workplace environments. Inclusive design research involves developing tools, guidelines, and best practices that can help enable designers to design for the widest possible population, for a given range of capabilities. This includes users with perceptual, motor, and cognitive disabilities, and a diversity of age, computer literacy, general literacy, and socio-economic status. In the context of demographic changes leading to increasing numbers of older people and people with disabilities, the general field of inclusive design research strives to relate the capabilities of the population to the design of artifacts, environments, and technology by better characterizing the user and the task demand. For example, inclusive populations of older people contain a greater variation in sensory, cognitive, and physical capabilities (which are manifested in society as disabilities). These variations may be co-occurring and rapidly changing leading to a demanding design environment. Similar concepts appear in different countries, different fields of study, and under different names such as "universal design" or "universal usability." Inclusive design sounds easy and logical, right? Everyone should do it, right? While the case for doing inclusive design is very logical and apparent, the logistics of doing it often means that it is not carried out. This work is time-consuming, expensive, and can sometimes be challenging.

In the next few years, user experience professionals can expect to be called on to increasingly involve diverse users in development and evaluation. The policy landscape is clearly changing. While the Web Content Accessibility Guidelines (WCAG) 2.0 have been the standard since 2008, there are efforts to develop methods for applying WCAG 2.0 to non-web-based interfaces. In the US, the Department of Justice has clearly increased their enforcement of accessibility requirements for technology, as required by Sections 504 and 508 of the Rehabilitation Act, the Americans with Disabilities Act, and the 21st Century Communications and Video Accessibility Act. In addition, a new set of technical standards for Section 508 has been going through the regulatory process and is expected to be approved shortly. In the European Union, EU Mandate 376, a multi-national effort involving three European standards organizations, has been ongoing since 2005 and relates to the development and procurement of accessible IT. It is expected that a final standard may be approved in 2014, which will also include the development of online toolkits and supporting documents. For instance, the draft document includes not only technical standards, but also notes how procurements should require evidence to support the vendor claims of accessibility. It is expected that the technical specifications will be designed to harmonize with the Section 508 requirements in the US so that information technology that meets the accessibility requirements of the US also meets the accessibility requirements of the EU.

To help user experience professionals understand some of the complex issues involved with inclusive design, this special issue includes three papers expanded from the CWUAAT 2012 workshop. The topics addressed range from using sound to display data on weather maps for blind users, to a two-player gaming system used in a school environment that was intended to aid in arm rehabilitation for children with cerebral palsy, to an exploratory field study that observed and interviewed experienced industrial designers to discover how industry views inclusive design and the tools and techniques that industry could use to make their products more inclusive.

There are some common themes among the three papers: Perhaps the most important theme is to conduct evaluations of universal accessibility and assistive technologies with the participation of people with disabilities. While manufacturers often say things like "our technologies must be accessible, after all, we haven't received any complaints" or "we don't have any users with disabilities" or "we tested with an automated software tool, so we're accessible," the reality is that nothing replaces real-world evaluations involving people with disabilities. The more inclusive the design and evaluation, the more universally usable a product or interface becomes. Guidelines alone do not lead to universally usable products.

In addition, when working at the intersection of users with disabilities and new technologies, it's important for investigators to be flexible and be able to adjust quickly to get the most out of field studies. Both the Holt et al. and the Lazar et al. studies included in this special issue faced the challenge of the technologies not working properly in their respective environments. Both studies had to overcome barriers that limited access to users. But both studies had some unexpected findings. The Holt team concluded that "Taking a hands-off approach allowed us to find that schools are not an effective environment for rehabilitation." The Lazar team recognized that the sonification application for weather maps could have an additional purpose—to teach geography. These studies illustrate that usability testing involving people with disabilities is logistically challenging, especially for the investigators if they don't sufficiently plan ahead. However, empirical testing can be immensely useful in understanding usage, usability, and adoption of new technologies. Do you need to be flexible and make changes quickly? Often. But don't let that stop you!

The paper from Zitkus et al. took a different approach by investigating designer practices in industry. How can industrial designers be supported to improve the inclusiveness of their products? Zitkus et al. sought to make steps toward answering this very big question by observing and interviewing 20 experienced industrial designers in their working environment. Zitkus' group also developed a CAD-based program that gave designers small hints that, if followed, could make more inclusive products for a greater percentage of the population, such as people with disabilities. However, by having this tool, Zitkus and her team were able to gather more information about how and why design decisions are made. For example, designers rarely include user evaluations in their design process because clients rarely ask for them, and often designers feel that the evaluations are not needed. Zitkus' approach compliments the

approach described in the Holt and Lazar papers; there is a commonality: all three papers report empirical data, in the real world, from real users.

Making products and interfaces inclusive of broad user populations is a part of the responsibility of user experience professionals. It takes commitment and extra effort to make that happen. All products need to be designed and evaluated for people with and without disabilities. Over time, user experience professionals have worked hard to be included in the development process. They now are often involved in the planning of the scope of user involvement in requirements and evaluation studies. That is the best time to advocate for accessible products. The studies in this special issue show that while it can take more effort to design inclusively, the rewards are worth the effort. Modifications may need to be made to typical methods for usability evaluation, such as ensuring that the location for any interviews or usability evaluations are wheelchair-accessible, providing materials in alternate formats (captioned video, Braille, etc.), or having a sign language interpreter take part in the user experience activities. These minor modifications are important to ensure the successful integration of people with disabilities into the user experience landscape. We encourage user experience professionals, designers, developers, product managers, engineers, and policymakers to require and advocate for "Design Beyond Guidelines." Having accessibility or inclusive design guidelines simply isn't enough.

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