

Chapter 30

Designing with Vulnerable Children: A Researcher's Perspective

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ABSTRACT

In this chapter, the authors consider a researcher's perspective in projects involving design of assistive technologies for and with children who have moderate to severe limitations, such as cognitive impairments, impulse control issues, strongly reduced vision, or speech problems. The secondary objective is to introduce the concept of vulnerability in such complex design contexts, exploring it in relation to researchers, the user group, and other stakeholders. They argue that awareness of diverse risks can lead to a design process that reduces or even eliminates some of these risks, empowering both researchers and users in the process. The case used as a basis for discussion is that of an iPad app design for and with children in a special education class, and later, with children in occupational therapy.

INTRODUCTION

Many millions of children and students between ages of 6 and 17 have a condition, cognitive, motor or sensory, that impairs their ability to participate in a typical classroom environment (Hasselbring & Glaser, 2000). Technology has long been seen as having a potential to benefit children with special education needs. Children with special education needs are those who have challenges in learning due to cognitive, motor or sensorial disabilities.

Any technology that may support such children in increasing, maintaining, or improving functional capabilities is considered an *assistive technology* (AT). Assistive technologies are of enormous interest for schools with special education classes, where the technology is used to support children with special needs in maximizing their learning potential.

In spite of their real or perceived usefulness, assistive technologies are frequently abandoned (Phillips & Zhao, 1993; Riemer-Reiss & Wacker,

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2000). The abandonment is often related to either inadequate design of ATs, or to users' perception of themselves in relation to their use. Adequate design of user interfaces is one of the key factors for both accessibility and adoption of assistive devices. It should also take into consideration users' self-perception. Users often feel stigmatized because of the visibility of technological assistance that they need. ATs can make their disability more obvious to others (Gasparini & Culén, 2012; Shinohara & Wobbrock, 2011) and negatively influence perception of the self. Thus, a good and adequate design of interfaces has a significant impact on integration of devices into children's daily lives, increasing chances for adoption of AT, better social integration and overall quality of life. The terms *design for all* and *inclusive design* refer to a design philosophy targeting the design of technology in ways that enable people with disabilities to use mainstream products and services without additional customization (Abascal & Nicolle, 2005; Goldsmith, 2012). Design for all is about ensuring that technology works for diverse people, towards increased social inclusion and equality. Mobile and personal technologies often follow design for all principles by providing for multimodal interactions, e.g. a voice-based interaction, in addition to a touch-based interaction. Further, a possibility for customization of interaction modes is enabled to a much higher degree than ever before by a wide choice of apps. At the same time, working with mobile devices makes special education children look and behave to a larger extent like typical peers, giving a significant appeal to these technologies. This appeal, in turn, may contribute to higher adoption rates of mobile and personal technologies as assistive technologies in education.

The appearance of tablets, in particular the iPad, on the market and their fast adoption by many schools worldwide, influenced also special education. The iPad was accepted as an adequate interface for many children with difficulties. It was also a mainstream, cool device, thus helping the

self-image for those who could use it as assistive technology, e.g., students with dyslexia (Culén & Gasparini, 2012). Scholarly work, as well as mass media coverage, started reporting on cases where tablets were used to assist children with difficulties, e.g. (Gasparini & Culén, 2012; Hourcade, Bullock-Rest, & Hansen, 2012; McClanahan, Williams, Kennedy, & Tate, 2012; Seshadri, 2012). The iPad and other personal mobile devices, unlike more traditional 'desktop technologies', are considered to be easier to integrate into daily lives, also for those with severe limitations.

The primary objective of this chapter is to reflect on a researcher's perspective in projects involving design of assistive technology for and with children who have moderate to severe limitations, such as cognitive impairments, impulse control issues, strongly reduced vision, or speech problems. The case used as a basis for discussion is that of an iPad app design for and with children in a special education class, and later, with children in occupational therapy. The secondary objective is to introduce the concept of *vulnerability* in such complex design contexts, exploring it in relation to researchers, the user group and other stakeholders. We argue that awareness of diverse risks may lead to a design process that reduces or even eliminates some of them, empowering all involved parties in the process.

In the literature, vulnerable users are often described as people at risk because of their age, frailty, diagnosis or limited capacities, both physically and cognitively. Since the children in need of special education have limited capacities, and are thus at risk, the term vulnerable applies to them. Vulnerability is a current topic of discussion within the HCI community, e.g., CHI 2013 workshop on designing for and with vulnerable people (Vines et al., 2013), where the authors state: *By questioning how the HCI community typically defines people as vulnerable (or not) we hope to inspire alternative visions of technology where individuals are provided means to having a voice rather than being stigmatized as vulnerable*

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