Designing *with* and *for* children with special needs: An inclusionary model

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Abstract

In order to design *for* children with special needs, we need to design *with* children with special needs. The inclusionary model proposed in this paper suggests that appropriate involvement of children with special needs in the design process begins with the *level of involvement* a team expects from children, and is additionally influenced by the *nature and severity of the child's disability* and the *availability and intensity of support* available to the child.

Keywords

Children, Special Needs, Design Process

ACM Classification Keywords

K3.1 Computer uses in education: Collaborative learning; H5.2: User interfaces

Introduction

As designers begin to develop technology specifically for children with special needs, consideration must be given to the unique needs of these children. While many designers do attend to such needs, as designers we need to take this attention one step further: to involve children with special needs in our design processes. Such a model can best be described as an "inclusionary model".

In a fully inclusive model as defined in education, a child with disabilities is included in as natural an environment as possible [9]. As a former Early Childhood Educator with a background in Special Education, the first author of this paper has seen many successes with inclusion. Successful inclusion generally occurs when a child is given all of the supports needed – both physical (i.e., assistive technology such as hearing aids) and human (i.e., a trained aide); and when the level of the disability matches appropriately the environment into which the child is placed. Experts also note that teamwork among adults is important in helping inclusion succeed [6].

The basis of this Inclusionary Model of Designing *With* and *For* Children with special needs is simple: combining the best educational inclusionary principles with information from past design work involving children with special needs to create a model for designing technology with children with special needs.

Literature Review
Recently, many designers have included children with special needs in the process of designing technology for children with special needs. Using Druin's levels of child involvement in the design process as users, testers, informants, or design partners [2], it is possible to create an overview of the ways in which children with special needs have been included in design processes (see figure 1). Numerous designers have included children with special needs in technology design processes, and children with a wide range of disabilities have participated in the design process, to varying degrees.

Disability	Reference	Level of Involvement
Blind/Visually Impaired	[8]	Design Partner
Behavioral Issues	[7]	Design Partner
Behavioral Issues	[4]	Design Partner
Hospital Isolation	[11]	Informant
Physical/Learning Disabilities	[1]	Informant
Deaf	[5]	Informant
Autistic Spectrum	[10]	Tester

Figure 1: Literature reporting work with children with special needs in the technology design process

An Inclusionary Model
By combining special education ideas of inclusion, previous work done by researchers, and Druin's levels of involvement, we can envision a model of how children with special needs can be involved in the design process. This model has three layers: Druin's levels of involvement, the nature and severity of the disability, and the availability and intensity of support.

The basis of this model is *Druin's Levels of Involvement*. Initially, a research team must decide how much involvement they are able to have with children in the design process [2]. Considerations would include time, access to children, and funding.

The second layer of the model is the *Nature and Severity of the Disability*. This will suggest a more limited or, conversely, a more open role for the child. This has been borne out in past research as children with more severe disabilities, such as autism, are likely to have a more limited role such as tester [10]; whereas children for whom the nature of the disability

is less severe may have a more involved role, such as children with behavioral issues being involved as design partners [4, 7].

The third and final layer of the model is the *Availability and Intensity of Support.* While the second layer may be seen as limiting the choices for involvement, this layer can open those choices back up. For instance, a child with autism may only be able to participate as a user given no support; however, given a one-on-one special education aide plus a communication device, the child could be a full design partner. Likewise, a deaf child may not be able to participate at all unless provided with a sign language interpreter – which could open up many levels of involvement for the child.

Cooperative Inquiry with Children with Special Needs

At the University of Maryland HCIL we design with children using a method called Cooperative Inquiry, a method that involves principles of Participatory Design tailored to be appropriate for working with children [3]. While we have never intentionally sought out design partners with special needs, over the past 10 years of our design work we have worked with a few children with disabilities.

One male design partner with Executive Function Disorder was a founding member of our Kidsteam and participated with us from age 6 to age 11, and then returned and remains with us as an aide at the age of 16. Our female design partner with Executive Function Disorder is in her third year as a design partner, having begun when she was 7. Our male design partner with ADD was with us for only a semester, when he was seven years old.

In looking at these design partners in light of the proposed model, we can begin by saying that our first layer is always to include children as design partners. However, when we add the next layer of the model, the nature and severity of the disability, we found that with these children, their appropriate involvement may have come at a less involved level were we not to move on to the third layer of the model.

Because we want to work with all of our children as design partners, we added the third layer – availability and intensity of support. For the children with Executive Function Disorder, we found the need to be involved intensively with these children throughout design sessions, to help with memory. Also, since they were reluctant readers and writers, adults would write down their ideas for them. We also offered these children the opportunity to remove themselves from the physical environment if needed to complete their work. For the child with ADD, we had an adult team member with intensive Special Education background experience who was able to work with him to stay on focus and on target.

In all cases, the most important support that we were able to provide these children with was one-on-one adult attention and interaction. Often, adults with no specialized training can fulfill this role – in fact, many times the adult working one on one with a child might change over the course of a session. However, some of our adult design partners have come to us with backgrounds in special education, and could fulfill this role for a child needing more support should the need be more intense.

Do we feel that the extra support we had to give these design partners was a burden to the team? Absolutely not. In fact, we found that our child design partners with Executive Function Disorder became some of our best brainstormers as they were often not constrained by needing to get the "right answer". The investment in these partners was well worth it in their amazing contributions as full members of a design team.

Lessons Learned and Future Directions

Designing for children should include designing with children. An extension of this is an inclusionary model of designing with children with special needs. We hope to work with more children with disabilities through Cooperative Inquiry in the future, and that, following the inclusionary model posited here, other researchers will find ways to include children in with disabilities in the design process as well.

Acknowledgements

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