

Dual User Interface Design As Key To Adoption For Personally Customizable Assistive Technology Tools

Stefan Carmien, Anja Kintsch

University of Colorado, Center for LifeLong Learning and Design, Boulder, CO USA

Designing artifacts that enable people with disabilities to complete activities of daily living are the domain of rehabilitation engineers and assistive technology professionals. Yet, however exquisitely designed and executed a piece of assistive technology (AT) is, if it is not adopted and used by the population it is designed for, it is a failure. Many ATs tools require a design approach that treats these complex devices as having two equally critical interfaces, one for the user (or client) with a disability and another for the teacher, parent, or other caregiver to personalize or customize the AT for successful use. It is the problems of adoption and abandonment that the approach of dual user interface is intended to ameliorate.

Customizable assistive technology devices involve not only the person with a disability, but also her caregivers, her community, and the ever-changing environment. To guide the design of the first interface, that of the one the person with an intellectual disability will use, one must take into account issues of differing intellectual abilities, physical access, sensory issues, and user preferences. To guide the design of the second, or caregiver interface for such devices, one must recognize that the configuration and reconfiguration of an AT tool for a specific user, requires the caregiver to become a programmer of the device, and therefore the task for the AT developer is to design tools that facilitate programming by then “non-programmer”. For example, a caregiver who is working with a person with intellectual disabilities in configuring a handheld prompting system not only supplies the necessary knowledge about their client’s abilities and preferences, they must also envision, create and program task prompts. Similarly the caregiver that re-configures an AAC device must have a high level comprehension of the communicative acts that a new set of overlays will facilitate, what their client may wish to say, and how communicative messages can best be laid out for ease of access for a particular user. Basically the caregiver interface has to be concerned with providing content and structure that is the complement of the disability.

Awareness of this problem was explored during the development of MAPS (**M**emory **A**iding **P**rompting **S**ystem), a hand held prompting system that prompts a person with an intellectual disability through tasks that were previously difficult for them to complete independently due to difficulties with memory or executive functions. MAPS includes a script editing tool, designed to allow a caregiver with minimal computer skills to create, store and deliver scripts representing tasks, and a hand held prompter used by the person with intellectual disabilities.

Problems with the script editor were ameliorated by 1) modeling the script editor on common cognitive metaphors such as filmstrips and MS Power Point in order to draw upon existing knowledge, 2) testing not only client users but caregivers as well, resulting in several iterations of both components, and 3) providing caregivers instruction on not only how to use the script editor, but also on methods for producing effective task segmentation. Ultimately we found that 100% of the caregivers learned to use the final version of the script editor within 20 minutes and 75% learned to download script into handheld within 30 minutes.