Mainstream ICT and People with Cognitive Disabilities

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Abstract – Emerging Information and Communication Technology (ICT) offers many benefits for people with cognitive disabilities. Realizing these benefits at affordable cost requires that mainstream, high-volume technologies be shaped so as to provide value for people with cognitive disabilities. A combination of technical and organizational developments has great promise for accomplishing this goal.

I. INTRODUCTION

Emerging Information and Communication Technology (ICT) offers many benefits for people with cognitive disabilities, through increased opportunities to participate in many life and work activities, and through enhanced independence. Realizing these benefits at affordable cost requires that, as much as possible, mainstream, high-volume technologies be shaped so as to provide value for people with cognitive disabilities, rather than relying mainly on custom technology development. It also requires that community resources, such as student work and volunteer effort, be harnessed alongside commercial investments. These aims, in turn, require that efforts be coordinated, through standards and through open project structures.

II. METHODOLOGY

The Coleman Institute for Cognitive Disabilities has conducted a series of annual workshops on shaping mainstream ICT, bringing together academic researchers and people from commercial development organizations. Discussions at these workshops have led to input to and collaboration within widening circles of collaborative projects, including the Web Accessibility Initiative, the Fluid Project on pluggable user interface components, and the Raising the Floor Initiative for building needed assistive and accessibility technology into the public cyberinfrastructure.

III. RESULTS

Key directions for needed work identified in these collaborations include the following.

A. Technical Developments.

The trend towards cross-platform development of applications, notably in the form of services deployed on the Web, has many advantages in cost and availability. The emerging HTML5 standard is making it possible to offer as Web applications, usable in any compliant browser on any

device (phone, laptop, or desktop), programs that formerly could only operate outside the browser as separately developed native applications. Promoting the rapid development and spread of this technology is crucial.

Text to speech functionality should be made available on all platforms, because of its key role in enhancing the accessibility of text. Reading aids that use this technology to help sighted (as well as blind) users access text should be made available on all platforms. Further, existing smart phones often have restrictions on how telephone functions and computer functions can be integrated, that limit some useful applications, such as sending generated speech out to a phone call. These restrictions should be eased.

The widespread use of browsers on smart phones with small displays has highlighted the need to develop versions of Web sites that offer easy access to the most important content, eliminating the clutter common on nearly all conventional sites. Improved technology for doing this will greatly benefit people for whom reading, and especially rapid skimming to find needed content, is difficult.

The Single System Signon paradigm, in which a Web user need only logon once to access many different applications, should bring with it the use of online information presentation preference profiles. For example, a user who prefers an uncluttered presentation of a Web site, regardless of the platform they are using to view it, should be able to indicate this in a profile, and have the preference honored by any sites they visit.

The connectivity of smart phones makes possible remote management and configuration, already a feature of the use of tools like the Blackberry in corporate settings. The same technology can be extended to allow family members and caregivers to help manage a user's phone without having to handle it physically, increasing independence. For example, some users can benefit from picture dialing, but are not able to set up a new contact for themselves; a family member could do this for them.

B. Standards.

Many of the technical developments just described require standardization to work effectively. For example, information presentation preferences must be described in a standard way in order to work; the ISO/IEC 24751 standard on learners' accessibility needs and preferences is an important step in this direction. Similarly, HTML5 must be a standard (as it will be) to realize its potential.

C. Research.

Data on computer use, including Web use, by people with cognitive disabilities are far too rare. Developers, especially commercial ones, need compelling usage scenarios, backed by data, to drive investment. Further, the technical developments outlined above should be guided by data on effectiveness, and exploration of alternatives. Difficulty in recruiting research participants, and uncertainty about how to work with them, are major obstacles to progress today.

D. Organizational Directions.

As the success of many open source development projects shows, the means are now available to coordinate the work of many contributors to accomplish very worthwhile software developments. The community of people with cognitive disabilities, and those who support them, must take advantage of these means. In doing so there are great opportunities to work cooperatively across traditional disability boundaries. For example, many people with cognitive disabilities have difficulty reading, and can benefit from technologies developed initially to support blind people. The Raising the Floor Initiative (http://www.raisingthefloor.net/) provides a framework for the needed collaboration.

This collaboration will be much more effective with more participation by self-advocates. Development of better tools and practices for supporting this participation is needed.

Progress in research will be greatly accelerated by appropriate organizational support. For example, researchers can share best practices for working with people with disabilities. Efforts to make it easier to recruit participants for online research are underway; these will remove one of the main barriers to research progress today.

E. Regulation.

The needs of people with cognitive disabilities are not well covered by existing regulation, because of the difficulty of providing unambiguous guidelines for key attributes like "simple and clear language". Further, the legal status of accessibility of all kinds on the Web remains in doubt in the US, since the Web did not exist when key accessibility legislation, in particular the Americans with Disabilities Act, was written. In the long term, a move to rights-based regulation, that establishes a right of access to information, rather than technical regulations based on mandating specific practices, may be needed to bring about reasonable accommodation of the needs of people with cognitive disabilities.

IV. CONCLUSION

A combination of technical and organizational developments has great promise for people with cognitive disabilities. Effective cooperation can accelerate research and development.