

2008 Coleman Workshop on Mobile Technologies and Web Accessibility

Whitepaper Summary

Preamble. This document is a product from discussions which took place at the 2008 Coleman Pre-conference Workshop on Mobile Technologies and Web Accessibility on October 15, 2008 in Boulder, Colorado. The initial audience for this document includes workshop members representing industry, academia, government, advocacy, law and policy; however it is anticipated this paper will be shared with other communities. It is also hoped that this whitepaper may serve as a background and motivation for the creation of companion whitepapers that explore in greater detail several of the issues and identified in this summary.

Background. This document is targeted towards industry, engineers, policy makers, advocacy experts, and educators in an applicable way. As a historical reference, the Technology Advisory Committee (TEITAC) Report to the Access Board: Refreshed Accessibility Standards and Guidelines in Telecommunications and Electronic and Information Technology published in April 2008 for the first time, contains language recognizing the needs of people with cognitive disabilities in the development of electronic and information technology standards. However, since there is an extremely wide spectrum of abilities and needs that exist within the field of cognitive disabilities, ranging from developmental disabilities to acquired conditions including dementia, the TEITAC report only provides "suggested provisions included in the advisory notes for developers". A key opportunity identified within this workshop is to identify concrete initiatives that can be used by industry to facilitate the development of new mobile and web technologies that are more accessible and usable by communities of people with cognitive disabilities and their caregivers.

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Policies. The following rules are used for contributing and editing this document:

- **charterhouse rules:** contributions are accepted without attribution or credit to allow participants to freely speak their minds.
- **document editing:** This whitepaper is shared in Google documents to support concurrent review and editing by multiple editors. In terms of editing, wordsmithing and additions are fine, but please use the 'comment' feature (Insert -> Comment) to indicate if you don't agree with something rather than deleting a section. Suggestions for major structural changes should also be noted as a comment in order to maintain organizational coherence.

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Mobile Technology Workshop Summary

Long-term goal. This workshop explored how mobile technologies and services could be designed so that people with cognitive disabilities and their caregivers could improve choice, independence and quality of life.

Overview. The following questions were explored to develop the the Mobile Technology Workshop Recommendations (see Workshop Recommendations below).

- What issues regarding mobile technologies impact people with cognitive disabilities?
- What can and should be done today?
- What is needed to shape the technology?
- What are the application and technology issues?
- What will motivate developments?
- What actions are needed?

Key mobile technology issues impacting people with cognitive disabilities

- lack of guidelines concerning the proper design of menus, features and choices and requisite cognitive skills necessary to complete tasks, especially in noisy, mobile environments.
- complex menus and customization features; inability to easily tailor menus, features.
- lack of security to allow trusted people (caregivers, family members) to monitor, administer, or assist persons with cognitive disabilities using all available context information (location, schedule, task, etc.) from mobile handsets
- inability to detect and report if user is not in vicinity of the device potentially indicating a problem situation, or misplaced/stolen hardware
- inability to capture context of problems encountered while using mobile technology including menu choices and selections, keys pressed, etc.
- inability to easily ask for help and receive remote assistance (e.g. "panic button")
- problems for mobiles in a non-PDA form factor (separate screens and hardware buttons):
 - tiny screen size, small buttons
 - understanding hardware buttons are mapped to screen menu choices
- ease of migration to new hardware
 - portability of customized menus and personalized settings and security settings
 - data portability is especially a problem when migrating across mobile platforms and service carriers
- lack of robustness
 - ability to withstand shocks, spills, and falls; easy replacement of screen or keypads in case of mishap
 - ability to easily switch networks while maintaining on-going services (digital -> analog; cellular network -> local network; etc.)
 - graceful degradation of services as power levels drop
 - ability to use alternative emergency power sources (USB, 110v, solar, automobile, etc)

Mobile Technology Workshop Recommendations

Technical and Development Recommendations --> of particular relevance to policy makers, technology managers, designers and engineers

- **Define a consistent SDK for cross-platform accessibility development**
 - Target the mainstream platform
 - Release the SDK as an open-source initiative allowing others to continually build upon functionality
 - Embrace the "long-tail" of user contributions
 - Promote unintended uses of developed software
 - Create reasonable project goals and timelines

- **Create accessibility solutions that are portable to other platforms**
 - Avoid creating monolithic solutions
 - Ensure technology can be migrated to future platforms
 - Create open interoperability standards, such as those proposed in the [TRACE Raising the Floor initiative \[pdf, 1.55mb\]](#). (A public website describe the Raising the Floor initiative will soon be available.)

- **Integrate accessibility features into mobile technology**
 - Consider how mobile technology can be used to digitally control devices in the home, exploit wireless broadband services, and geographical information services, as in the [PHARE project \[pdf, 89kb\]](#).
 - remote management, text <-> speech, sign language <-> text, OCR, etc.
 - Information modality conversions

- **Utilize and leverage existing technologies**
 - For example, the [Web Accessibility Versatility Evaluator \(WAVE\) project \[MSWord, 33kb\]](#) is considering how open source web design tools can be designed make information more accessible by people with cognitive disabilities.

- **Develop systems that are modularly designed**

- **Develop software applications on mainstream hardware** rather than specialized hardware.
 - Mobile applications should also be designed to inter-operate with mainstream hardware.
 - For example, an [automated reminder system \[pdf, 58kb\]](#) should be designed to "push" information to the client's current environment, regardless of what physical device is being used. When a client is using a desktop computer, the reminding system should communicate with the PC to provide alerts about an appointment or medication schedule if the client does not respond to the mobile device.
 - Similarly, portable handhelds and desktops should seamlessly share information, such as information gathered on a mobile device from the physical environment through a [mobile sign reader \[pdf, 687kb\]](#).
 - Likewise, mobile devices should be able to easily [translate and transfer travel instructions \[pdf, 63kb\]](#) located on the web through a desktop PC to a mobile device.

- **Create products that provide situational assistive technology to mainstream users.**
 - [The Smart Campus in Your Pocket \(SCYP\) project \[MSWord, 38kb\]](#) is designing a "knowledge broker framework" for delivering information in a highly contextualized manner "what I need to know, when I need to know it, in a form I can use". This framework could likewise be extended to consider the information needs of mobile mainstream users.

- **Create products that provide support for larger populations** including the aging population and impaired veterans.

- **Create products that address cross-disability needs**
- **Create products that are sustainable**
 - Provide long-term support for products, especially new products transitioning out of pilot projects
- **Conduct user studies and focus groups and develop guidelines and heuristics of user needs**
 - Research personalization and customization of interfaces, workflows, and device behavior
 - Research caregiver needs, abilities, and cultures and their influence on technology adoption and use
 - Create a framework of disability classifications based on the range of needs
- **Encourage designers and developers to include caregivers and person with needs in the creation process**

Community Building --> of particular relevance to technology managers, designers, engineers, disability advocates, and educators
- **establish a structure for people to contribute and collaborate**
 - Provide a means for people with disabilities to articulate their needs
 - Use this structure to provide motivation for technology developers and students
 - Create a community of idea sharers with trust.
 - [The FLUID Project \[MSWord, 38kb\]](#) is an example of a community initiative to create and share software applications and interfaces with a high standard of usability, accessibility, internationalization, and security.
- **gather real stories of how assistive technology is used** to improve quality of life and how mainstream products are often limiting
 - Share the stories with designers and developers
 - Educate the public with how technology is used by those with disabilities
- **spread identified user needs to industry, developers, and researchers**
- **improve communication and contributions across projects and universities at all levels**
 - Build consortia at the international, national, and educational levels
- **Establish a structure for students to contribute efforts to assistive technology**
 - Design education projects, studies, and curricula
 - Create motivational awards to encourage student participation i.e. Google Android Challenge, tie contributions to senior faculty
 - Avoid isolated projects and create commitments to sustainable projects across semesters

- **Create a library and showcase of reusable examples of useful accessibility solutions and novel, innovative uses**
- **Establish a place to find commercial and publicly available assistive technologies**
 - Create a matrix relation assistive technology needs and available solutions and projects
- **Create a system to support the value chain**
 - Ensure consumers, caregivers, clinicians, and social care works are all aware of specific needs and provide support
- **Make business cases and value propositions** highlighting the benefits of universal design
 - Explain how universal design can benefit the mainstream and global markets
- **Conduct a needs-analysis** for governments, industry, clients, and customers
- **Inform and support policy makers**
 - Highlight international movements such as the UN Treaty on Accessibility and foreign incentive systems
- **Improve financial access** to assistive technology
 - Transition away from the medical model of technology subsidy

Web Accessibility Workshop Summary

Long-term goal. This workshop explored how content on the web can be designed to be accessible and usable by people with cognitive disabilities who have a need or interest in it.

Overview. The following questions were explored to develop the Web Accessibility Workshop Recommendations.

- What issues regarding web accessibility impact people with cognitive disabilities?
- What can and should be done today?
- What is needed to shape the technology?
- What are the application and technology issues?
- What will motivate developments?
- What actions are needed?

Key Web Accessibility issues impacting people with cognitive disabilities

- **executive function and time management** - problems with staying on task, not getting distracted while on the web
- **information complexity** - inappropriately complex grammar, syntax, or presentation modality for individual ability
- **information overload** - web pages with overflowing information requiring horizontal and vertical scrolling, distracting pop-ups or click-throughs
- **navigation problems** - keeping track of where you are, where you want to go, and how to get back
- **search problems** - knowing how to search, how to assess and use credible search results
- **problems with knowing what to do with useful information** - creating, using, and organizing bookmarks and other ways to organize and share personally relevant information
- **problems with security** - being able to tell when personally sensitive information is requested and should be shared (while avoiding phishing schemes and scams)

Web Accessibility Workshop Recommendations

Technical and Development Recommendations --> of particular relevance to policy makers, technology managers, designers and engineers

- **Research and improve screen readers**
 - Optimize screen readers to be task-aware and focus attention on relevant portions of the screen
- **Reduce information overload** by utilizing artificial intelligence technologies based on user abilities and needs
 - Trace user behavior to predict future behavior
 - Develop tools to perform semantic reprocessing and simplification of complex information
- **Support single sign-on authentication and authentication that is not username/password based**
- **Support login accounts that do not require personal information**
- **Develop support and tools to judge credibility and authenticity of content**

- **Implement better error prevention and error recovery strategies**
 - Have the ability for a caregiver to view limited usage history leading to a problem
 - Capture the application state, limited interaction history, and user comments leading up to an error
 - Support "Try Harder" and "Try Other" solutions
 - Try Harder: Escalation of services and help
 - Try Other: Different views of the same information
- **Support a wizard-based approach to personalization and customization** (Refer to ISO 24751)
 - Portable preference profile configuration
 - Not based on disability classification
 - Context-dependent
 - Supports for in-context adjustments
- **Develop collaboration technologies** that promote accessibility to support distributed content creation on Web 2.0 sites
- **Develop language engineering tools to assist with reading comprehension**
- **Implement multimodal mechanisms including pairings with images and text, and tactile sensors and stimulation**
 - For example, the [RIM M-Starr project \[pdf, 72kb\]](#) is exploring how multi-modal visual alerts, reminders and rewards, can be delivered to persons with autism using a 'just-in-time' to reduce distractions and enhance success.
- **Implement the ability to invoke videos or instructions based on content**
- **Utilize visual and structural elements** such as headings, lists, chunking, priority markers, and whitespace
- **Utilize mechanisms for task progress and completion** such as indicator bars and choice filtering
- **Limit the number of steps and options required to complete a task**
- **Limit distractions that draw focus away from content**
- **Provide methods to control time limits**
- **Be mindful of the user's environment and context** such as the time of day and the use of public terminals

Community Building --> of particular relevance to technology managers, designers, engineers, disability advocates, and educators

- **Address the legal reach and scope of the ADA**
 - Clarify or expand the extent to which the ADA applies to online sites

- **Commit the ACM to expand accessibility across the web**
- **Support the ["Raise the Floor Initiative" \[pdf, 1.55mb\]](#) and its goals**
 - Create assistive technology that can access not only current web content but also future content
 - Create assistive technology that is available in all languages
 - Transition assistive technology vendors from a workstation model to virtual and environmental accessibility
 - Develop an open source, common core technology that shifts the focus from constantly maintaining compatibility to developing new features and technologies
 - Centralize large bodies of work and allow the community to post progress, share results, and find solutions
- **Perform systematic analysis and achieve consensus on regulations**
 - Implement a rights-based framework for accessibility regulation
 - Perform behavioral testing to establish criteria for accessibility
- **Facilitate mutual support for those living with disabilities**
- **Promote funding of research and projects transitioning between research and commercialization**
- **Increase funding through grassroots efforts and non-profit organizations based on the Mozilla model**
- **Develop a NASA-like agency for disability research that combines research and execution**