

Accessibility and Emerging Technology

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State of the Internet (Web)

It is rapidly becoming the

- ▶ Repository for global knowledge
- ▶ Infrastructure for real-time communications, collaborations, anytime/anywhere transactions
- ▶ Platform for traditional computing environments, applications and systems
- ▶ Place for commerce and education
- ▶ Space for community building and collective intelligence
- ▶ Web-enabled mobile/portable devices are changing the way information is accessed and used

Right to Access the Internet

- ▶ Access to the web / internet-based environments is now considered a basic human / civil right
- ▶ Recognized worldwide and access to Internet and web-enabled resources is included in Disability Rights Legislation

Emerging Technologies

- ▶ Are increasingly Internet / Web-enabled
- ▶ Uses dynamic, real-time, multi-modal, interlinked and interactive elements offering a wide set of options.
- ▶ Is modular, participative and user-centric, providing a rich user experience.
- ▶ Facilitates community building.

WEB 2.0 Technologies

- ▶ Not a single technology but a methodology
- ▶ It is strategy for using WEB as a platform
- ▶ Philosophy – user driven, interactive, collaborative, real-time, anytime/anywhere
- ▶ Design – service-based, contextual and action oriented
- ▶ Ecosystem – virtual and global
- ▶ Goal – harness collective intelligence

WEB 2 – Strategies

- ▶ Semantic Markup
- ▶ Collaborative and social tagging/ indexing
- ▶ Rich Internet Applications/ environments
- ▶ Micro-content - merging and distributing from/to different sources and device
- ▶ Syndication and distribution (information pull)
- ▶ Online/self publishing
- ▶ User generated content (text, multimedia)
- ▶ Social Networking

How people use the WEB

- ▶ **Sighted Users**
 - Perceive all content by sight, visually navigate to relevant information, use mouse for interaction
- ▶ **Blind Users**
 - Perceive text not graphics by listening, use semantic elements to navigate and use keyboard for interaction
- ▶ **Visual Impaired Users**
 - Use sight and hearing to perceive, keyboard or mouse to interact
- ▶ **Hearing Impaired Users**
 - Use sight to perceive visual content only, use mouse to interact
- ▶ **Physically Impaired Users**
 - Use sight to perceive but keyboard only to navigate and interact

Accessibility / Usability

It is the measure of how **easily** the resource can be accessed and used by the greatest number of people as possible.

- **Perceivable** – information presented in a way a user can perceive (read, see, hear, understand) content
- **Operable** – ability to appropriately perform all activities (component, navigation, menus, transactions)
- **Functionally Usable** – ability to use the resource with as little effort as possible

Rich Internet Applications

- ▶ Creates web-enabled User Interface
- ▶ Uses techniques like Ajax, Flex, Flash, Java, Silverlight, Curl Applets
 - Uses server side backend for data storage
 - Uses special protocols and API to extend functionality, user interaction and access to content
 - Use semantic markup (XHTML, XML) and style sheets to render and present content
 - Use client side agents (browsers, plugins) to view, generate and interact with content

RIA- Accessibility Challenges

- ▶ Non-interactive web content
 - Content rendering is linear
 - Established (W3C) standards and guidelines for page markup and setting relationships between content elements
 - Content re-renders with each user interaction
 - Assistive technology understand the markup and relationships between elements

RIA- Accessibility Challenges-2

- ▶ Rich Internet Applications
 - Content rendering can be non-linear
 - Page not up-dated with each interaction
 - User may not be aware of changing content
 - Programming techniques and tools may not integrate with or be aware of AT or provide for accessible content
 - Interaction tends to be mouse driven

RIA – Accessibility Considerations

- ▶ More Challenging than WEB 1 – less guideline driven
- ▶ Requires an understanding on people use the web
- ▶ Developers need knowledge of how AT augments web interaction or partner with accessibility professionals
- ▶ Design Consideration - the user must
 - be aware of the updated content
 - be able to easily access the new content
 - not be unduly interrupted in their current task
 - must have control when to view and act on new content
 - must also be able to use the keyboard for interaction

RIA – Accessibility Solutions

- ▶ W3C Guidelines are being drafted to help address the development of the accessible user interface ([WCAG 2.0](#) and [ARIA](#))
- ▶ Accessibility aware authoring tools, providing API and techniques to craft accessible content
- ▶ Most web developers are professionals
- ▶ Web-enabled devices have design and programming considerations similar to AT

Social Networks - Challenges

- ▶ Space may not always designed for accessibility
- ▶ Cluttered layout
- ▶ Navigation graphics not labeled
- ▶ Not keyboard accessible
- ▶ Use of CAPTCHA for registration and authentication

Collaborations – Accessibility Challenges

- ▶ Delivery space may not be accessible
- ▶ Web-based text editors may not be accessible or craft accessible content
- ▶ Increase use of graphics, visualizations and multimedia objects to deliver information
- ▶ Customized /proprietary media players and rendering tools that handle content differently
- ▶ Content not reviewed for accessibility

Immersive Environments

- ▶ 3 Dimensional World
 - A visual, sensory immersive medium, with complex spaces created using myriads of objects, user-avatars and multiple modalities for interaction

Immersive Environments - Considerations

- ▶ Determining spatial relationship between user avatar and nearby objects
- ▶ Distinguishing between operational and decorative objects
- ▶ Using aural and textual information about objects/avatar
- ▶ Text messaging to query objects/ environment
- ▶ Providing audio, haptic and textual feedback
- ▶ Joystick/ keyboard, hot keys for navigation and interaction with objects

Virtual / Cloud Environments

- ▶ Online productivity tools (Google Docs, OpenOffice online, Zoho)
- ▶ Virtual desktops environments
- ▶ Remote computing