Teaching Accessibility

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Goal of Special Session

Provide the basics of accessibility, including information about how people with disabilities interact with computers, accessibility standards, and basic curricula that can be included in courses in web and app design and development.
Introductions
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Founded 2006
AccessComputing Strategies

• Direct interventions

• Institutional change
Industry, academia and advocacy have come together to create models for teaching and training students of technology to create accessible experiences.

http://teachaccess.org/
Teach Access Initiatives

• Technology Industry
  – Job requirements
  – Teach Access tutorial

• Higher Education
  – Advancing Accessibility in Higher Education curriculums
Job Descriptions

• Adobe
  – All new product-related technical job descriptions will incorporate language related to accessibility.

• Facebook
  – Front-end Engineer: 3+ years of HTML/CSS experience, including concepts like layout, specificity, cross browser compatibility, and accessibility (requirement).
ABET

Engineering Design – Engineering design is the process of devising a system, component, or process to meet desired needs and specifications within constraints. ... examples of possible constraints include accessibility, aesthetics, constructability, cost, ergonomics, functionality, interoperability, legal considerations, maintainability, manufacturability, policy, regulations, schedule, sustainability, or usability.
Teach Access Supporters

- Yahoo!
- Adobe
- Microsoft
- Google
- Facebook
- LinkedIn
- AT&T
- Twitter
Agenda

• People with disabilities
  – How do they interact with computers
• Example users
• Accessibility Standards
• Model Curricula
• Resources
Who are they?

• 1 billion people world-wide
• 15% of the world’s population
Disabilities

• Vision
  – Blind
  – Low-Vision
  – Color Blind

• Hearing
  – Deaf
  – Hard of Hearing

• Speech
  – Ability to speak
  – Stuttering

• Mobility
  – Ability to walk
  – Ability to use hands/arms

• Cognition
  – Dyslexia
  – Short-term memory loss

• Multiple
  – Deaf-blind
  – Speech-mobility
High Variability

• Even with the same function, there is high variation in accessibility needs. Example:
  – Sign language
  – Captioning
  – Lip Reading
Situational Impairments

Even people without a disability can be temporarily “impaired.”

– Noisy environment
– Night
– Driving
– Holding a baby
Vision
Built-in Magnification

- Window magnifier

- Apple zoom
Magnification

ZoomText
Screen Reader for Blind Users

- Allows non-visual access to screens

Speech

Refreshable Braille Display
Screen Reader

JAWS® for Windows

Window-Eyes™

[Logos and icons related to screen readers]
iOS Accessibility

VoiceOver
- Off

Zoom
- Off

Large Text
- Off

Invert Colors
- Off

Speak Selection
- Off

Speak Auto-text
- Off

Automatically speak auto-corrections and auto-capitalizations.

Hearing

Hearing Aids

LED Flash for Alerts
- Off

VoiceOver:
- ON

VoiceOver speaks items on the screen:
- Tap once to select an item
- Double-Tap to activate the selected item
- Swipe three fingers to scroll

Speak Hints
- ON

Speaking Rate

Typing Feedback

Use Phonetics
- ON

Use Pitch Change
- ON
Key Issues

• Low Vision
  – Dynamic content
  – Pop-ups
  – Change of focus

• Blind
  – Dependence on mouse
  – Dynamic content
  – Images and video
  – Navigation
Hearing
It's like 'I see what you're doing but I don't know what you're saying'.

Captioned Video
Notification Issues

• Desktop
  – Audio notification not sufficient

• Smartphone
  – Vibration preferred
Mobility
Speech Input

Dragon Naturally Speaking
Mouse Keys

Windows Mouse Keys
Keyboard Scanning

Switch Activated WiViK
Switches

Sip and puff switch
Eye-Gaze

Tobii Eye Tracker
Key Issues

• High variation in speech ability
• Small targets
• Excessive text entry
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  – How do they interact with computers

➤ Example users

• Accessibility Standards

• Model Curricula

• Resources
Being blind in a university

• Uses university CMS
  – to register, manage classes, find transcripts
• Uses university LMS/webinar software
  – to read materials, view lessons, get feedback
• Receives print/PDF bills, grades, etc.
Aging users

• The effects of age on humans
• We are working later into our lives
• We do not consider these acquired limitations to mean we are disabled
  – so the “accessibility” panel may not come to mind
  – which leads us to Universal Design
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  ➢ Accessibility Standards

• Model Curricula

• Resources
Accessibility Standards

• Types of standards
  – Technical standards
  – Legal standards
  – APIs
Technical Standards

• W3C/WAI Web Content Accessibility Guidelines (WCAG) 2.0
  – Published in 2008
  – Forms the basis for effectively all legal policy
WCAG 2.0

• w3.org/TR/WCAG20
• Four principles—“POUR”
  – Perceivable
  – Operable
  – Understandable
  – Robust
• 25 level A, 13 level AA, 23 level AAA checkpoints
  – general standard is AA conformance
WCAG 2.0 beyond the web

• WCAG2ICT: spec for applying WCAG to software apps

• WCAG is intended to be technology-neutral
  – Web apps and content
    • HTML, PDF, SVG...
  – Desktop
  – Mobile
Legal policy around the world

- UN Convention on the Rights of People with Disabilities (CRPD)
- Europe: EN 301 549
  - purchasing standard for EU member states
- UK: Equality Act
- Canada: Charter of Rights and Freedoms, AODA
- <10 countries do not have some kind of policy
Accessibility Laws in the US (1/2)

• Federal
  – Rehabilitation Act
    • Section 504 (Prohibits discrimination based on disability in Federally-funded programs)
    • Section 508 (Federal Government development and procurement)
  – Americans with Disabilities Act
  – Individuals with Disabilities Education Act
Accessibility Laws in the US (2/2)

• Federal (cont.)
  – Telecommunications Act
  – Air Carrier Access Act
  – Accessible Instructional Materials in Higher Education Act

• States
  – State Civil Rights Acts (CA’s Unruh Act, New York State Human Rights Law, etc)
Accessibility APIs

• Basic model
  – Accessibility tree
    • Exposes objects with role, states, properties, events
    • OS keeps track of these things *if* using native controls
      – otherwise you have to roll your own
  – Interaction
    • Screen readers translate visual models into non-visual
      – into Braille and/or voice
    • Screen magnifiers track focus rects and move around
    • Deaf users may choose screen flash notifications

• All of this remains true on mobile platforms
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Model Curricula

• Adobe model
• Teach Access model
Adobe Model: Blue Belt

- 8 hours of engineering training
  - Roles/States/Properties/Events
  - Keyboard accessibility
  - Testing with assistive technology
  - Desktop APIs (Windows/macOS)
  - Mobile APIs (iOS/Android)
Teach Access curriculum project

• Developing a train-the-trainer session
  – Trial sessions in May/June
  – 2 hour lecture with supporting material

• Module for semester-long CSE intro
  – Disability awareness/societal context
  – Common barriers to using IT
  – Common assistive technologies
  – Best practices for design/engineering
  – Applied techniques
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Resources
Accessible Apps and Webpages

• Web Content Accessibility Guidelines 2.0
  – http://www.w3.org/TR/WCAG20/

• Microsoft Accessibility
  – http://www.microsoft.com/enable/

• Apple Accessibility

• Android Accessibility
Teach Access

• [http://teachaccess.org](http://teachaccess.org)

• Materials available later this year for higher ed accessibility instruction

• [http://teachaccess.org/initiatives/tutorial/](http://teachaccess.org/initiatives/tutorial/)

• Self-paced training with examples
Labeling Form Controls and Interactive Elements

Accessible labels are necessary to make several other types of elements understandable, such as inputs, widgets, and ARIA landmark regions. Accessible labels that create a delightful experience are:

1. Concise – 1 to 3 simple words. Only occasionally as many as 5 words.
2. Meaningful – accurately convey the purpose of the element.

There are many ways to label an interactive element such as a button or an input field, which you will see below. You can check the results of adding the various label types by testing in your screen reader too!

Self-labeled

Some elements, like links and buttons with display text, label themselves. In this case, screen reader users and all other users can perceive the label.
Accessibility Online Communities

- WebAIM: http://webaim.org
- IAAP: http://accessibilityassociation.org
- W3C WAI Interest Group: https://www.w3.org/WAI/IG/
Thanks!

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