

Building for everyone

Accessibility & Internationalisation

Accessibility

Accessibility

- What is it?
- Why is it important?
- What are some of the barriers?
- Guidelines for accessible apps/sites

What is accessibility?

- Site accessibility is a measure of how effectively all people, including those with disabilities, are able to access and use web pages.
- *“The power of the web is in its universality. Access by everyone regardless of disability is an essential aspect.”*

Tim Berners-Lee, Founder of the world Wide Web, Director of W3C

What is accessibility?

- See this video from Australian Govt about web accessibility:
<https://www.youtube.com/watch?v=bEM9Fn9aOG8>

Accessible design benefits who?

- People with disabilities
- People with temporary disabilities
 - 15% of the population at any one time
- Older people and new users

Accessible design benefits who?

- People with old/nonstandard equipment or poor communications infrastructure
 - Rural & remote Web users (estimated 30% have images turned off)
- People with restricted access environments
 - People with locked-down computers
 - People viewing PDA/mobile displays
- People in environments with sensory distractions
 - Noise, glare, etc.

Disability in Australia

- Australian Institute of Health and Welfare 2019:
 - 4.3 million people have disability
 - 13 million+ have one or more long-term eye conditions.
 - 548,600 with colour blindness, 131,500 partial and complete blindness
 - Including temporary disabilities, 30-35% are disabled at any one time!

Distribution of disabilities

- Australian Bureau of Statistics, 1998
 - Sight 34%
 - Physical 20%
 - Hearing 11%
 - Psychiatric 5%
 - Acquired brain damage 5%
 - Intellectual 4%
 - Speech 3%
 - Other 18%

No vision

Non-visual web access

- Screen readers
 - Screen reader limitations?
- Keyboard accessibility
 - Compensate for lack of mouse



Key issues for blind users

- Perceivable
 - Users cannot perceive (see) visual information such as graphics, layout, or colour-based cues
- Operable
 - Users usually depend on a keyboard to operate (navigate) web content functionality, rather than a mouse

<http://webaim.org/articles/visual/blind>

Key issues for blind users

- Understandable
 - Users cannot understand content that is presented in an illogical linear order, or which contains extraneous text not meant to be read word for word or character by character (such as long Web addresses), etc.
- Robust
 - Assistive technologies used by the blind are not always capable of accessing a broad range of technologies, especially if those technologies are new

Recommendations

Challenges	Solutions
Users generally do not use a mouse	Don't write scripts that require mouse usage. Supply keyboard alternatives.
Images, photos, graphics are unusable	Provide text descriptions, in alt text and, if necessary, longer explanations (either on the same page or with a link to another page).
Users often listen to the web pages using a screen reader	Allow for users to skip over navigational menus, long lists of items, ASCII art, and other things that might be difficult or tedious to listen to.
Users often jump from link to link using the Tab key	Make sure that links make sense out of context ("click here" is problematic).
Frames cannot be "seen" all at once. They must be visited separately, which can lead to disorientation.	Don't use frames unless you have to. If you use them, provide frame titles that communicate their purpose (e.g. "navigational frame", "main content").

Key concepts for blind people

Challenges	Solutions
It may be difficult for users to tell where they are when listening to table cell contents	Provide column and row headers (<th>). Make sure that tables—especially those with merged cells—make sense when read row by row from left to right.
Complex tables and graphs that are usually interpreted visually are unusable	Provide summaries and/or text descriptions.
Not all screen readers support image maps	Supply redundant text links for hot spots in image maps
Colors are unusable	Do not rely on color alone to convey meaning
Users expect links to take them somewhere	Don't write scripts in links that don't have true destinations associated with them (e.g. href="javascript: function(this)")

Need specialisation?

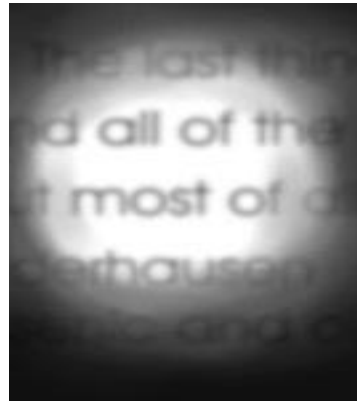
- *“screen-reader users submitted a lower number of queries and displayed comparatively limited exploratory behavior during search results exploration”*
 - “A Comparative Analysis of the Information-Seeking Behavior of Visually Impaired and Sighted Searchers”
 - Journal of the American Society for Information Science and Technology; Volume 63, Issue 2, pages 377–391, February 2012
- Develop different search engine?



Low vision

People with low vision

deep is an over-
waste of time--
out of energy,
it of ... The
and other fine
thoughts come
from Ben. My r



ers see. And
life is not who
you make it. I
; what life me
of you that de
whether you c
im. I, Tyler, de
here to go

/ gift is my so
d this one's f
d you can te
everybody that
s is your song
may be quite
mple, but now

Low vision and the web

- Screen magnifiers
 - Software program that zooms in on a small area of the screen, e.g. ZoomText and MAGic
- High contrast
- Overriding front and background colours

Recommendations

Challenges	Solutions
Text in graphics does not enlarge without special software, and looks pixilated when enlarge	Limit or eliminate text within graphics
Users may set their own font and background colors	Allow them to do so by using as much real text as possible, rather than text within graphics.
Screen magnifiers reduce the usable window size	To reduce that amount of horizontal scrolling, use relative rather than absolute units (e.g. use percentages for table widths instead of pixels)

Colour blindness

Colour-blindness



Red deficiencies



Green deficiencies



Blue deficiencies



No colour



Recommendations

Challenges	Solutions
Reds and greens are often indistinguishable	This is not normally a problem except in cases where the colors convey important information. Under these circumstances you will need to either change the graphic or provide an additional means of obtaining the same information. Oftentimes the most appropriate way to do this is to provide an explanation in the text itself.
Other colors may be indistinguishable	Same as above.

Colour blindness evaluation

- https://www.youtube.com/watch?v=FfvvdScxF_D0

Physical impairment

Examples



one-handed keyboards



mouth stick



speech input



Joystick: buttons left/right click, drag



headstick

Recommendations impairment

Challenges	Solutions
Users may not be able to use the mouse.	Make sure that all functions are available from the keyboard (try tabbing from link to link).
Users may not be able to control the mouse or the keyboard well.	Make sure that your pages are error-tolerant (e.g. ask "are you sure you want to delete this file?"), do not create small links or moving links.
Users may be using voice-activated software.	Voice-activated software can replicate mouse movement, but not as efficiently as it can replicate keyboard functionality, so make sure that all functions are available from the keyboard.
Users may become fatigued when using "puff-and-sip" or similar adaptive technologies.	Provide a method for skipping over long lists of links or other lengthy content.

Cognitive impairment

Impairment types

- Clinical cognitive disability
 - Learning disabilities: dyslexia
 - Attention deficit hyperactivity disorder
 - Brain injury (Accident, illness, stroke)
 - Genetic diseases (Down's syndrome, autism, dementia)

Impairment types

- Functional cognitive disability
 - Memory: to recall what have been learned over time
 - Problem-solving: to solve problems as they arise
 - Attention: to focus attention to the task at hand
 - Reading, linguistic, and verbal comprehension: to understand text
 - Visual comprehension: to process visual information

Recommendations

- Memory deficits
 - Break a length page into short separate pages
 - Write short and clear instructions
 - Have consistent interface and presentation
- Problem-solving deficits
 - Keep error messages as explanatory as possible
 - Tell users what they did wrong and how to fix the problem.
 - Suggest alternate spellings to users
 - Warn users when actions can cause potentially serious consequences, such as deleting a file.
 - Needs ideas expressed in clear, easy-to-understand language

Recommendations

- Attention deficits
 - Use visual cues to highlight important points or sections of the content
 - Eliminate advertisements if possible
 - Use headings to draw attention to the important points and outline of the content
 - Avoid background noises or images that distract
- Reading, linguistic and verbal comprehension deficits
 - Have a clear document organisation and structure
 - Write simple and clear
- Visual comprehension deficits
 - Provide information in multiple formats

Low literacy

People

- Australian Bureau of Statistics (2006)
 - 15%-20% 'level 1' literacy
 - <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4228.0Appendix202011-12>
- Wide range Non-English-speaking backgrounds
 - English as a second language

Issues

- Written vs. spoken English
- Non-literal text
 - sarcasm, satire, metaphor, slang, and colloquialisms
- Implications
 - Need ideas expressed in clear, easy-to-understand English
 - Need consistent presentation

Other accessibility issues

Hearing disabilities

Challenges	Solutions
Audio is unusable	<ul style="list-style-type: none">• Provide transcripts for audio clips.• Provide synchronous captioning and transcripts for video clips

Resources

Web accessibility initiative

- Site
 - <http://www.w3.org/WAI/intro/wcag.php>
- Accessibility guidelines
 - Web content
 - User agent
 - Authoring tool
 - XML

Accessibility resources

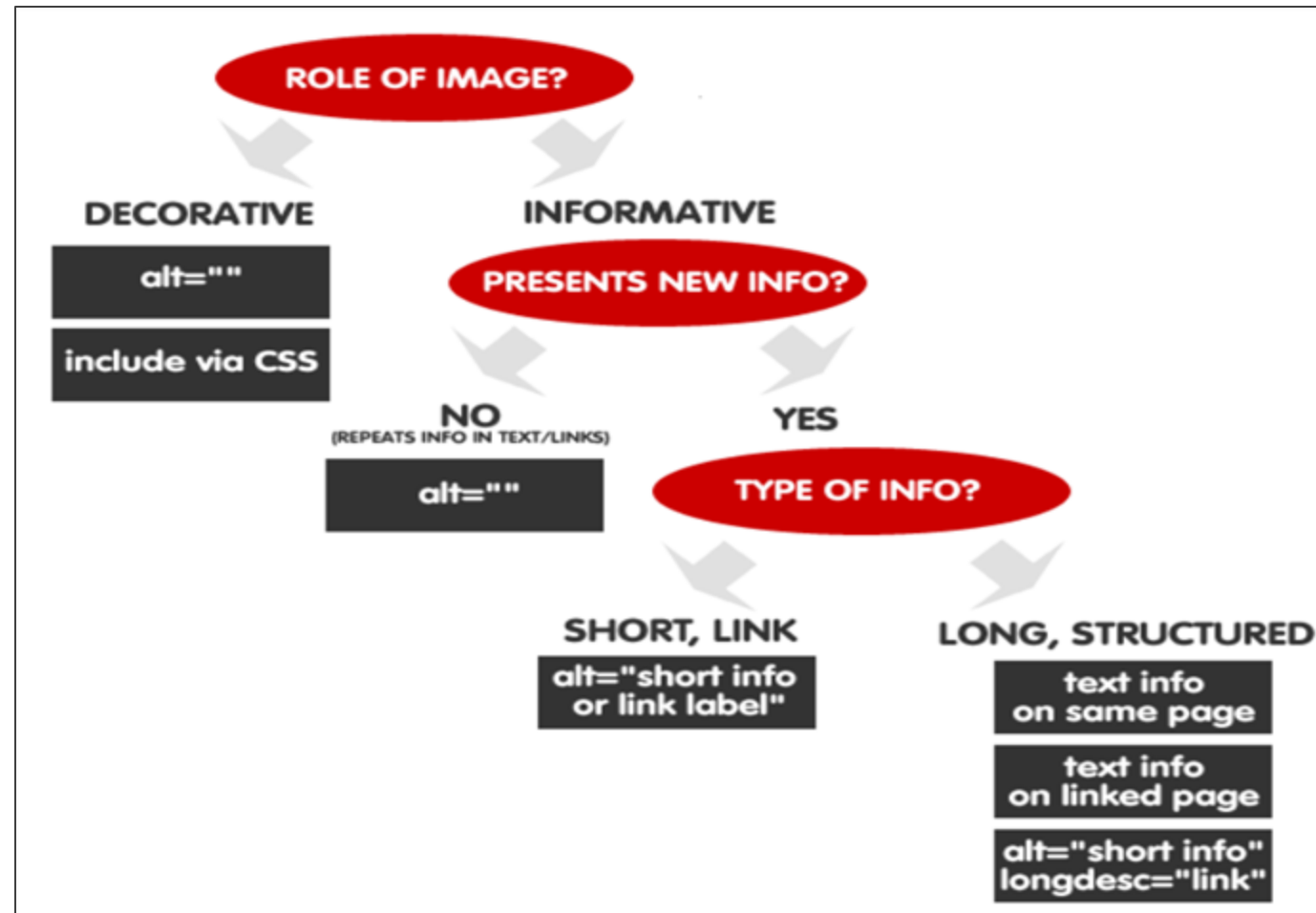
- Just Ask: integrating accessibility throughout design
 - <http://www.uiaccess.com/justask/>
 - Free online book on incorporating accessibility into user centred design
- Australian guidelines
 - <http://webguide.gov.au/accessibility-usability/accessibility/>

WebAIM

- Introductory articles on different disabilities:
 - Visual disability
 - <http://webaim.org/articles/visual/blind>
 - Auditory disability
 - <http://webaim.org/articles/auditory/>
 - Motor disability
 - <http://webaim.org/articles/motor/motordisabilities>
 - Cognitive disability
 - <http://webaim.org/articles/motor/>
 - Seizure
 - <http://webaim.org/articles/seizure/>

Accessibility resources

- Text alternatives for images:
 1. What is the role of the image?
 2. Does the image present new information?
 3. What type of information is presented in the image?



<http://www.4syllables.com.au/2010/12/text-alternatives-decision-tree/>

Quiz 10B

- Passcode: onecabbage

Internationalisation

Design for difference

- Language
- Numbers
- Direction
- Culture

Language

- Ensure all text is editable
 - Avoid text embedded in graphics
- Volume of text?
 - Generally, languages express same content in same number of bits
- Manipulating or searching text?
 - Some languages have no (reduced) space character
 - Some languages have multiple alphabets

Numbers

- Many languages use Arabic numbers (1, 2, 3, 4, etc.)
 - 1,234,567
 - 1.234.567
 - 12,34,567
- APIs for displaying numbers, use them

Direction

- Left to right
- Right to left
 - Languages?
- Affects
 - Page ordering (books)
 - Justification
 - Icons
- See more
 - <http://www.google.com/design/spec/usability/bidirectionality.html#bidirectionality-ui-mirroring-overview>

Culture

- More complex
 - Owl
 - Wise?
 - Evil?
- Hire third party
 - <https://developer.apple.com/internationalization/>
 - Example
 - <http://tilde.lv/>
 - Started out with internationalisation



<https://www.flickr.com/photos/wcdumonts/>

Resources

- <https://developer.apple.com/internationalization/>
- <http://www.google.com/design/spec/usability/bidirectionality.html#>