Accessibility in Front End Environments

Presented by Daniel Ramsayer
¡Hola!
Hello!
こんにちは!
こんにちは!
سلام
سلام
你好
你好
What is accessibility?

Accessibility refers to the design of products, devices, services, or environments for people with disabilities.

Who needs accessibility?

*Everyone!* But with particular emphasis on people with:
- Physical Impairments
- Vision Impairment
- Deaf or Hard of Hearing
- Cognitive or Intellectual Impairment
Whose Responsibility is Accessibility?

Many developers don’t have ‘Accessibility Expert’ in their job descriptions.

Who is responsible for accessibility?

Developing with accessibility in mind as standard.
Why Develop with Accessibility in Mind?

With as many people as there are with some form of disability, designing to include the greatest overlap for those needs makes sense from both an ethical and financial standpoint.

Accessible interfaces are simple and easy to use, ideal for all users.
# World Internet Users and 2018 Population Stats

## WORLD INTERNET USAGE AND POPULATION STATISTICS

**JUNE 30, 2018 - Update**

<table>
<thead>
<tr>
<th>World Regions</th>
<th>Population (2018 Est.)</th>
<th>Population % of World</th>
<th>Internet Users 30 June 2018</th>
<th>Penetration Rate (% Pop.)</th>
<th>Growth 2000-2018</th>
<th>Internet Users %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>1,287,914,329</td>
<td>16.9 %</td>
<td>464,923,169</td>
<td>36.1 %</td>
<td>10,199 %</td>
<td>11.0 %</td>
</tr>
<tr>
<td>Asia</td>
<td>4,207,588,157</td>
<td>55.1 %</td>
<td>2,062,197,366</td>
<td>49.0 %</td>
<td>1,704 %</td>
<td>49.0 %</td>
</tr>
<tr>
<td>Europe</td>
<td>827,650,849</td>
<td>10.8 %</td>
<td>705,064,923</td>
<td>85.2 %</td>
<td>570 %</td>
<td>16.8 %</td>
</tr>
<tr>
<td>Latin America / Caribbean</td>
<td>652,047,996</td>
<td>8.5 %</td>
<td>438,248,446</td>
<td>67.2 %</td>
<td>2,325 %</td>
<td>10.4 %</td>
</tr>
<tr>
<td>Middle East</td>
<td>254,438,981</td>
<td>3.3 %</td>
<td>164,037,259</td>
<td>64.5 %</td>
<td>4,894 %</td>
<td>3.9 %</td>
</tr>
<tr>
<td>North America</td>
<td>363,844,662</td>
<td>4.8 %</td>
<td>345,660,847</td>
<td>95.0 %</td>
<td>219 %</td>
<td>8.2 %</td>
</tr>
<tr>
<td>Oceania / Australia</td>
<td>41,273,454</td>
<td>0.6 %</td>
<td>28,439,277</td>
<td>68.9 %</td>
<td>273 %</td>
<td>0.7 %</td>
</tr>
<tr>
<td><strong>WORLD TOTAL</strong></td>
<td><strong>7,634,758,428</strong></td>
<td><strong>100.0 %</strong></td>
<td><strong>4,208,571,287</strong></td>
<td><strong>55.1 %</strong></td>
<td><strong>1,066 %</strong></td>
<td><strong>100.0 %</strong></td>
</tr>
</tbody>
</table>

**NOTES:**
2. CLICK on each world region name for detailed regional usage information.
3. Demographic (Population) numbers are based on data from the United Nations Population Division.
4. Internet usage information comes from data published by Nielsen Online, by the International Telecommunications Union, by GfK, by local ICT Regulators and other reliable sources.
5. For definitions, navigation help and disclaimers, please refer to the Website Surfing Guide.
6. The information from this website may be cited, giving the due credit and placing a link back to www.internetworldstats.com. Copyright © 2018, Miniwatts Marketing Group. All rights reserved worldwide.
Fairly Common

According to the W.H.O.: 15% of the world population experiences some form of disability.

This means almost 1.2 Billion people. (2)
Many people experience temporary as well as permanent accessibility issues.

- Broken limbs
- Lost glasses
- Aging
Overlapping Needs

Many groups have overlapping needs for technology. These overlaps offer the opportunity to produce beneficial tools for more groups of people than a more specialized tool with lower market share threshold. These needs are not exclusive to those with disabilities. Many people without a disability benefit from these designs.
The 4 Principles of Accessibilities

Perceivable - Information and user interface components must be presentable to users in ways they can perceive.

This means that users must be able to perceive the information being presented (it can't be invisible to all of their senses)

Operable - User interface components and navigation must be operable.

This means that users must be able to operate the interface (the interface cannot require interaction that a user cannot perform)

Understandable - Information and the operation of user interface must be understandable.

This means that users must be able to understand the information as well as the operation of the user interface (the content or operation cannot be beyond their understanding)

Robust - Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

This means that users must be able to access the content as technologies advance (as technologies and user agents evolve, the content should remain accessible)
Understanding WCAG 2.0 Conformance

What is WCAG 2.0?

- 3 Levels: A, AA, AAA.
  - A - Bare Minimum, non-text elements have text equivalent id’s, all content accessible via the keyboard. Works with a screen reader.
  - AA - A + strong text/background contrast. Well organized, consistent design, live subtitles on videos, text size changeable.
  - AAA - is the Gold Standard, though few sites meet this standard.
Understanding Disabilities
Most Common Vision Impairments

Medium Visual Acuity - Generally requires glasses

Low Visual Acuity - Blurred vision over 3 meters

Macular Degeneration - Blurred or dark central vision

Tunnel Vision - Blurred or dark peripheral vision

Limited Light Perception - Can only see light and shadows

Total Blindness - No Light Perception
The Implications

- 1.3 billion people live with some form of vision impairment.
  a. 188.5 million people have mild vision impairment
  b. 217 million have moderate to severe vision impairment
  c. 36 million people are blind.
  d. 826 million people live with a near vision impairment.

Globally, the leading causes of vision impairment are uncorrected refractive errors and cataracts.

Approximately 80% of all vision impairment globally is considered avoidable.

The majority of people with vision impairment are over the age of 50 years. (1)
Types of Impairment - Colorblindness

1. Considered regular vision, this affects about 94% of sighted people.

2. Affects 1% of men. Red is completely absent and greens are not vibrant.

3. Most common colorblind type, affects 4.6% of men, .32% of women. Mostly experience a subdued palette.

4. Uncommon, this affects the ability to see yellow. Only about .0001% of people are affected.

Total color blindness, (Monochromacy), is actually very rare, at only .00003% of the population experiencing it.
To better understand the implications

- 374 Million people with deuteranomaly
- 76 Million people with Protanopia
- 760,000 people with Tritanopia and
- 260,000 people with Monochromacy
Common Examples

First Name  Last Name
Email
Password

Sign up for free

OR

Sign up with Google

By signing up, you agree to the Terms of Service.
This is an excellent use of ALT-TEXT.

- Good for visual impairment
- Good for Web Crawlers
Best Practices

For Those With Minor Sight Issues
● Higher Contrast Background and Text
● Punctuation for abbreviations
● Design Fluid Websites, using % or ems (Works well for mobile website dev)
● Streamline and simplify user interfaces

For Those with Major Sight Issues
● Clean Design
● Screen Reader Accessible
  ○ Provide Alt Text for all images, and alternative content for all other media
  ○ Use external CSS for styling and layout, and HTML for document structure.
● All elements accessible via tab
Tools for Checking Accessibility

Contrast:

- WebAIM - https://webaim.org/resources/contrastchecker/

Tooling:

- https://www.webaccessibility.com/
Hearing
Deaf and Hard of Hearing

About 5% of the population

Range of effects from tone/frequency deafness to total range deafness

Can be congenital or acquired

Not all deaf people sign, but many do. Providing the option of having interpreter videos for video’s is an AAA feature.
Overlapping Needs

Adding subtitles or transcriptions to your content is practical.

Many people experience content outside of an environment where they can have sound. Providing subtitles improves viewership and sharing for non-deaf users as well.

| 85% | +16% | +26% | +17% | +15% |
| videos on Facebook viewed without sound | average reach of subtitled videos vs. non-subtitled | CTA clicks of subtitled videos vs. non-subtitled | reactions to subtitled videos vs. non-subtitled | share rate of subtitled videos vs. non-subtitled |
Best Practices

Provide subtitles or text transcripts for videos or music. Good for deaf folks, web crawlers, and for people with cognitive disorders.

Have multiple ways to communicate on your site, including social media.
Physical
Physical Disabilities

Characterized as the lack of functional ability by a body part or system

Either the loss of the body part, or the loss of the ability to control a body part or system.

Multiple ways to be impacted

Some people are only minorly impacted, while others are significantly impacted.

Tool Users

Humans are tool users, and necessity is the mother of invention. Motor impaired users may use a keyboard, switch device, voice control, or even an eye-tracking device to interact with their computer.
The Tools

The most common tool is a keyboard. As motility issues increase, the products to address specific issues diversify.

- A Switch
- Voice Control
- Eye Tracker
- Mobility Stylus
The Good:

- Tabbing navigates through all sections in a comprehensive manner
- Clearly highlights where the selector is
- Exit and Esc close the modal
The Bad:

- Many Elements aren’t accessible by tabs
- There isn’t a logical progression between elements
- There is no active highlighting of elements when selected
Specific Concerns

Larger buttons or link margins for touching

Space between buttons for easy selection

All links or features accessible by using Tab and Shift+Tab key selection on a keyboard

\[
\text{TabIndex} <div \text{ tabindex } = 0 />
\]

Native elements like buttons

Many devices that improve usability for everyone are beneficial to those with disabilities
Cognitive
Many people range in their cognitive abilities during their lifetime.

Cognitive issues can be temporary (concussion) or permanent (traumatic brain injury).

Some are born with cognitive disabilities, others gain them from injury or disease.

Issues faced by this group are deep and wide, with some overlap.
Bare Basics

Functional disability or by clinical disability?

1. Memory
2. Problem-solving
3. Attention
4. Reading, linguistic, and verbal comprehension
5. Math comprehension
6. Visual comprehension
Cerebral or Mental Disabilities

Generally defined as those with cognitive, communication, problem solving, or information retention issues, these affect between 2-5% of the global population.

Variable intelligence, but often have difficulty following tasks.

Capable of learning, but either at a reduced speed or using different methodologies.

Active tool or methodology use is common in this group, with many options developed to help.
Best Practices

Clear, concise text
Smaller paragraphs
Consistent Page Design
Clear Functionality
Low learning threshold

Good Website Examples:
YouTube

Bad Website Examples:
Facebook
The Take Aways

- People with disabilities make up millions of users.
- When using the web, many find barriers and will often click away from sites that they have difficulty with. This is bad development.
- Users remember poorly running sites and avoid them in the future.
- Making websites accessible is good development because it makes it easier to all clients.
Open Source Projects For Accessibility

Screen Readers:
- NVDA (Python/Windows)
- ORCA (LINUX)

Magnifiers
- Virtual Magnifying Glass 3.7

Subtitle or Voice to Text
- Kaldi
- Simon

Gaze tracking
- PyGaze
- MIT Pupil
Thank you!
Daniel Ramsayer
Portland, Oregon
E-mail: daniel.ramsayer@gmail.com
Bibliography