Approaching Digital Accessibility

A primer for TPS Consortium members on improving accessibility for online and digital resources

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Key Resource Links:

You can find all the resources here (and we'll update this page with new links):

https://www.kidcitizen.net/accessibility

Ongoing discussion: https://tpsteachersnetwork.org/tps-tech-talk

You'll find a more complete set of links under Links and Resources at the bottom of this document.

Accessibility for Digital Resources

Accessibility in this context means providing ways for people with a range of abilities / disabilities to access and make effective use of the resource you are offering.

While accessibility for architecture means providing ways to enter, access and use buildings and spaces, for digital resources, it means accessing the web pages, buttons, links, videos, images, text, audio and other elements that make up digital resources.

For online resources, this is often defined as finding ways to help users who:

1. Might not be able to easily SEE what is on the screen
2. Might not be able to HEAR audio that you are presenting
3. Might have challenges with PHYSICAL DEXTERITY needed to mouse and tap etc. to interact with your offering.

Of course, this is just a small set of the many things that might limit who can make use of what you can offer. For instance, other barriers like access to devices, or speaking English , or even knowing the resources exist could be just as important.

Since online resources are such an intrinsic part of modern life and work, laws have been passed to require accessibility, and standards and guidelines created to help us do that.

A (very) brief history of Web Accessibility

As the internet became an important vehicle for communication and interaction, a movement began to make websites accessible for users with sight, hearing, and physical disabilities.

In 1998, Congress amended the Rehabilitation Act to require Federal agencies to make their electronic and information technology accessible to people with disabilities. This amendment, Section 508, was enacted to eliminate barriers in information tech, to make

new opportunities available to people with disabilities, and to encourage development of new tech to help achieve those goals.

W3C.org, the group that sets technical and other standards for the web, formed an initiative, WAI (Web Accessibility Initiative), which formulated a set of standards, called the WCAG (Web Content Accessibility Guidelines.)

These guidelines have been developed and updated over time, and the current version is WCAG 2.1. While early on these guidelines were seen as "nice to have", today in many situations websites and web materials are legally required to meet guidelines. (For instance, an online university course may be required to meet a chosen level of the guidelines.)

Today, work on digital accessibility is organized around these two sets of rules (Section 508 and WCAG), plus the European Union's accessibility rules.

With three sets of complex standards, it can be daunting for organizations to tackle accessibility, and easy to lose sight of the core reasons and benefits of doing so.

Making Accessibility work approachable

In fact, organizations CAN reasonably work toward better accessibility by:

1. Understanding what kinds of accessibility will be most important to their users, and for the ways in which their resources are used.
2. Understanding what legal requirements do or do not apply.
3. Thinking of Accessibility work as a journey of continuing improvement over time: there might be some things you can do now, others you can do when you next update your website, and so forth. (In the development world, we often create a "roadmap" for introducing improvements like this.) Recognize that you don't need to do "everything" immediately: You can make improvements incrementally. The WCAG guidelines reflect this, with "A", "AA" and "AAA" levels for each guideline.
4. Remembering that there may be multiple ways to make your resources accessible, that may not be tech-oriented. For instance, in classroom use of digital resources, teacher assistance and student pairings may be more effective than technical solutions.

Accessibility Guidelines

In my work on digital learning projects, I've found some parts of the Section 508 and WCAG guidelines to be particularly useful, and I've found it helpful to focus on them - both for setting my plans, and for communicating with partners.

I've recently found that organizations like Education Testing Service (ETS), who have strong internal accessibility requirements, work in a similar way.

Here are the elements I've found most helpful:

Functional Performance Criteria (508 Chapter 3)

These criteria lay out the different types of disabilities for which you might aim to provide a good experience:

How well does your resource work for people:

- Without Vision
- With Limited Vision
- Without Perception of Color
- Without Hearing
- With Limited Hearing
- Without Speech
- With Limited Manipulation
- With Limited Reach and Strength

By looking at this list and thinking about your audience, and how your resource is used, you can work out how each group might access your resource. (For example, a person without hearing can turn on the captions for a video.) It can also help you prioritize what accessibility improvements will be most valuable to you.

WCAG Standards and guidelines

I have found the WCAG (Web Content Accessibility Group) standards to be most helpful in figuring out HOW to make digital resources more accessible - this makes sense, as they are created and updated by the web's tech standards group, W3C.org. Essentially, the WCAG standards define the elements that create accessibility. These standards are organized around 4 Principles:

1. **Perceivable:** Is the content perceivable by users with limited sight or hearing, and by the devices (like screen readers) that they use?

2. **Operable:** Can the site be operated by users who cannot interact with mice, pointers and screens? For example, with keyboards, or voice, or other tools?
3. **Understandable:** Is the content clear, and understandable to assistive devices as well as people?
4. **Robust:** Is the site compatible with assistive devices and technologies?

Under each Principle are more specific guidelines, related to meeting that goal.

WCAG 2.1 Summary

Currently, WCAG 2.1 is the most widely used set of standards. WCAG 2.2 is expected to be published in 2022. Each new update is backward-compatible: it adds new improvements to the existing standard. Here's my summary of the WCAG 2.1 standards. At the end of this doc are links to the actual standards, which also include helpful success criteria.

1. **Perceivable**
    a. Text alternatives: Provide "alt text" descriptions for images etc. that screen-readers can use.
    b. Adaptable: A program like a screen reader can determine the correct reading sequence or relationships between the information (ie text:) and navigation controls (ie: page controls) Distinguishable (elements can be distinguished from each other, by people or assistive tech)
        i. Instructions don't rely on just color, size, location, sound.
        ii. Color is not the only way meaning is conveyed.
        iii. Contrast standards for text: AA = 4.5 to 1 for normal text, 3 to 1 for large text.
        iv. Can screens or text be zoomed? (Modern browsers can do this)
        v. Devices can determine the purpose of User-interface elements like buttons and controls.
2. **Operable**
    a. Keyboard accessible?
        i. Can you use the resource entirely with a keyboard, or using keys like tab, spacebar, and arrow keys to move through?

ii. This is helpful for users who cannot use mice or pointers, and many other assistive devices are based on keyboard controls.

b. Enough Time: Do you give enough time for all users?

i. This means that timing or speed of interaction is not essential, and things like feedback don't disappear automatically.

ii. This is one area where games are often not accessible.

c. Navigable

i. Can a user usefully navigate through your content buttons and controls using a keyboard or assistive device?

ii. This involves the order of "Focus" of screen elements. Headings and labels often need to be provided in code to help with this.

iii. Can it work with single pointer and no movement? For example, a swipe or other gesture is not required.

iv. Can the user cancel after a down click? (Before they let up on a button). This is important for keyboard control.

v. Click targets are not too small (not less than roughly half inch)

3. Understandable

a. Can an assistive program determine what language (ie: English, Spanish) is being used?

b. Is language used consistently and clearly? Is jargon avoided?

c. Does the resource work predictably? For instance, does it NOT automatically do something unexpected (and hard to understand), or change the focus or "place" of the user in confusing ways?

4. Robust

a. This focuses on whether a website or resource is compatible with user agents and assistive tech.

b. If you are running in a browser, modern browsers like Chrome, Edge and Firefox do work with popular screen-readers like the NVDA screen reader (see resources below)

c. However, if you've developed a game with a game engine for example, it may not support a screen reader (because game engines render text to the

screen differently). That said, there is an active movement working on making games more accessible.

See resource links at the end of this doc for the actual WCAG guidelines and helpful surrounding criteria.

Devices and Assistive technologies

Computers and phones

The devices we use are constantly changing, and our smartphones are a central way that many of us use the internet (and digital resources) today.

The good news is that modern phones have a variety of accessibility features built in, including screen readers that read text aloud, and modes that don't require gesture interaction.

To take advantage of this, of course, your resource needs to adapt well to phone screens. This is the field of "responsive design" which we won't get into here.

However, while phones are critical and helpful, many people with sight or motor disabilities have specific equipment and tools set up and fine-tuned for their use, so computer support remains most important.

Assistive technologies

One important type of assistive tech are screen-readers, software tools that read text aloud and can often control the computer in various ways. The most prevalent is JAWS (Job Assist with Speech). Other top screen readers are NVDA (open source), and VoiceOver for Apple.

Captioning technologies for videos are increasingly built into video platforms like YouTube.

We'll add links related to these technologies at the end of the doc.

How to get started

Some ideas for getting started without getting overwhelmed.

What types of accessibility will be most important for YOUR audience?

Given all this detail, and these options, it often makes sense to start by making your own list of important ways in which you want your users to be able access your offerings.

Are your resources used by individuals on computers? Or in classrooms? What opportunities are there to help users with disabilities that may not be tech-related? What are legal requirements, if any?

Once you have that list in hand, you can think about the kinds of accessibility that make sense for your specific resource (or don't), and you can think creatively about what you CAN do to lower barriers that are important to you.

> ***Example: Approaching accessibility for KidCitizen:***
>
> *KidCitizen provides digital interactive episodes for K-5 students that revolve around looking closely at and interacting with photographs (by tapping on them).*
>
> *Given the total visual focus, we determined that for non-sighted children, screen-reader solutions would not work, so instead we suggest pairing children to describe to each other the images, and choices present. (In fact, having children work in dyads is our most preferred model of use!)*
>
> *For non-hearing children, text is provided for everything our Ella character says. But since our age group may not be reading, other classroom or teacher support may also be important.*
>
> *On non-technical accessibility hurdle that we are addressing is English-language fluency: we are working with the University of Puerto Rico on Spanish-language version of our Episodes.*
>
> *And we are also refining our website itself, to allow better accessible navigation.*

Consider developing a Roadmap

Creating a roadmap simply means making a plan for what you will do related to accessibility over time. Often partners who require accessibility may be fine to work with you now if they can see your roadmap for improving accessibility in the future.

Testing for accessibility

How do you determine how your resources are or are not accessible, and in what ways?

In our case (Snow&Co), we've used the WCAG list to decide what we need to test, and set ourselves up with tools like the (free) NVDA screen reader, and done our own testing.

There are a variety of "WCAG Accessibility Checkers" on the internet, but I haven't used them. (Dev companies might have a free checker offered in hopes that you will hire them to fix what the checker finds).

Links and resources

Digital Accessibility

Section 508 Intro:

https://www.slideshare.net/Criterion508/understanding-section-508

Section 508 Functional Performance Criteria:

https://www.access-board.gov/ict/#302-functional-performance-criteria

Site devoted to WCAG standards:

https://wcag.com/

Video introducing accessibility standards and benefits

https://www.w3.org/WAI/videos/standards-and-benefits/

Quick reference guide to WCAG 2.1:

https://www.w3.org/WAI/WCAG21/quickref/

NVDA Screen reader:

https://www.nvaccess.org/download/

User Centered Design

What is User Centered Design (Interactive Design Foundation):

https://www.interaction-design.org/literature/topics/user-centered-design

UCD Principles and Methods (Adobe):

https://xd.adobe.com/ideas/principles/human-computer-interaction/user-centered-design/

UCD Definition, examples, tips (InVision):

https://www.invisionapp.com/inside-design/user-centered-design-definition-examples-and-tips/

Books:

Don't Make Me Think (Revisited) - Steve Krug

The Design of Everyday Things - Don Norman

User Centered Design - Travis Loudermilk

Additional links from Emerging America

Guidance on building better digital services in government https://digital.gov/

The National Library Service for the Blind and Print Disabled > Resources https://www.loc.gov/nls/resources/

Inclusive Digital Interactives: Best Practices + Research https://access.si.edu/sites/default/files/inclusive-digital-interactives-best-practices-research.pdf [I really like the "Jones' Short List of General Best Practices for Inclusion" starting on p. 15 - Alison Noyes]

PBS Becoming Helen Keller - Tools of the Film - see list of tools under "Support Materials for Use with Students" https://mass.pbslearningmedia.org/collection/helenkeller/

Resources for Education During a Pandemic. A compendium of links to digital resources, including digital teaching pedagogy and how-to advice, from making a plexiglass light board to write on during virtual teaching sessions to relational tips http://www.emergingamerica.org/blog/resources-education-during-pandemic