

INCORPORATING UNIVERSAL DESIGN PRINCIPLES INTO ASTRONOMY EDUCATION AND RESEARCH

Panelists:

Alicia Aarnio (*University of Colorado/AAS WGAD*)

Jackie Monkiewicz (*Arizona State/AAS WGAD*)

Sharron Rush (*Knowbility.org*)

Organized by:

Sarah Tuttle (*University of Washington/ AAS CWSA-WGAD liaison*)

CART captioning:

Polly Fife (*Texas Closed Captioning*)

Universal Access Note:

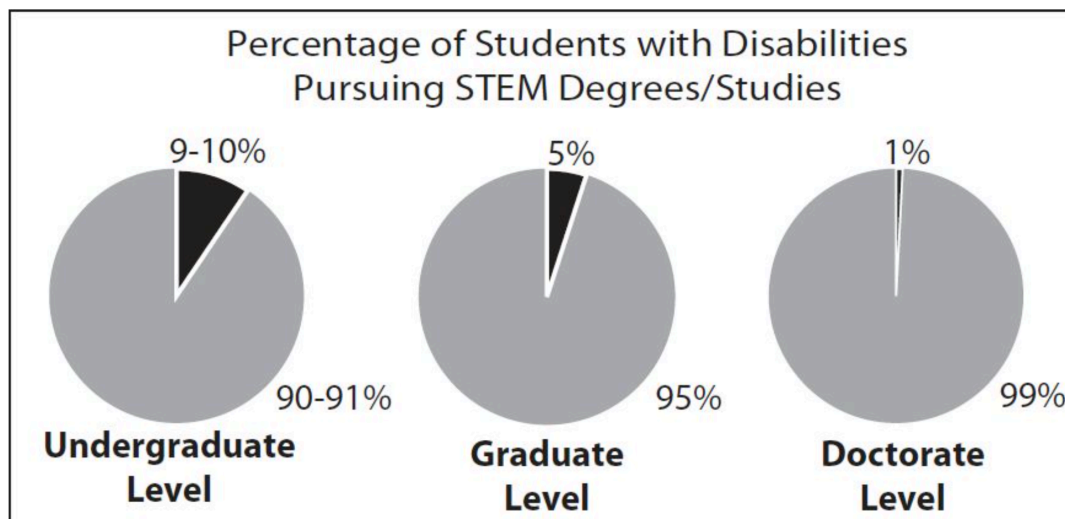
- Please use this space as you need or prefer.
- Sit in chairs or on the floor, pace, lie on the floor, rock, flap, spin, move around, knit, step in and out of the room.
- Feel free to use your laptop or your electronic devices or your mechanical fidget devices if you brought them. Take notes or play video games.
 - Meeting tag #wiaiv; us: @AAS_WGAD, @AliciaAarnio, @jmonkiew, @knowbility
- Please use headphones if you use audio.

-adapted from Lydia Brown, @autistichoya

Motivation

1 in 5 Americans is disabled (CDC, 2015)

- ADA: Americans with Disabilities Act (1990) prohibits discrimination...
- BUT Disability Offices and ADA compliance varies from institution to institution



Accessibility 101

- Intersectionality Reminder
- Medical vs. Social Model of Disability
- Visible vs. Invisible Disability, risks of disclosure
- ADA Compliance (and its limits)
- Common forms of Prejudice & Discrimination
- Representation
- Movement towards Self-Advocacy
- ADA Compliant vs. Barrier-free vs. Universal Design

Defining our terms:

- **Disability:** Condition which subjects individual to structural societal barriers
 - Visible & Invisible
 - Physical, Mental, & Cognitive
- **Medical vs. social models of disability:** Individual is sick/flawed vs. society imposes barriers unequally
- **Universal Design:** “barrier-free” -- equally accessible to disabled/neuroatypical and able-bodied/neurotypical
- **Self-advocacy:** *“Nothing About Us Without Us”*
- **Ableism/Disableism:** Institutionalized/societal discrimination

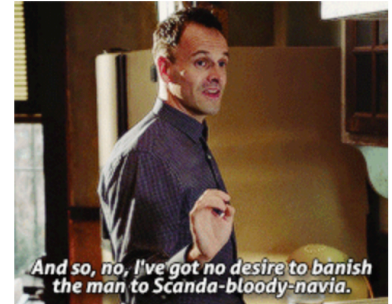
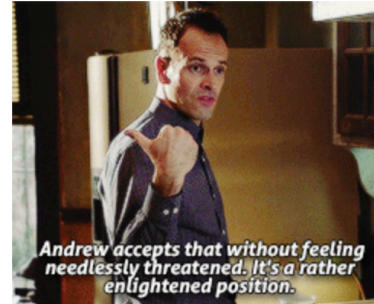
Representation matters

- **Person-centered language:**
 - “Persons with Disabilities” (PWDs) rather than “disabled people”
- **Inspiration Pr0n:** Stories which focus on PWDS “overcoming” their disability, designed to inspire/motivate able-bodied audience.
- **Self-advocacy:** *“Nothing About Us Without Us”*
 - Are disabled voices centered in your disability-focused organization?

Bad Representation



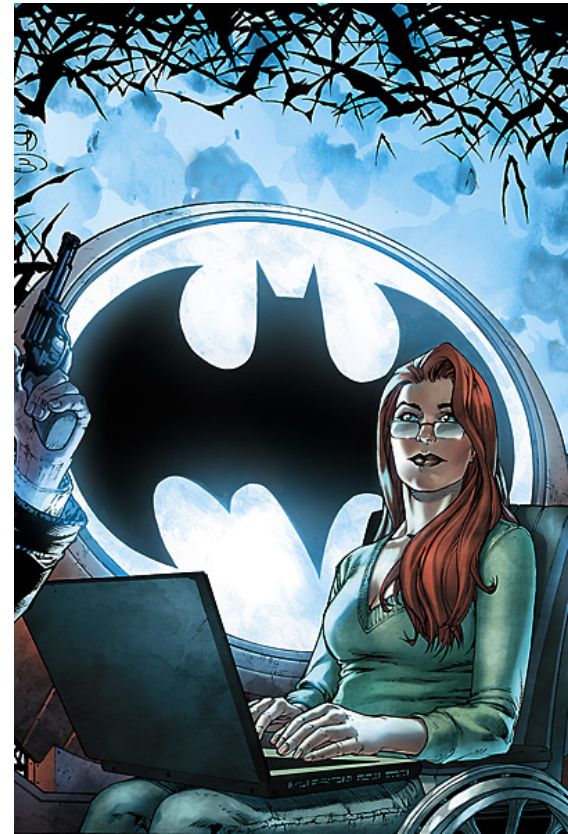
Better Representation



Bad Representation



Better Representation



Bad Advocacy



AUTISM SPEAKS™
It's time to listen.

Better Advocacy

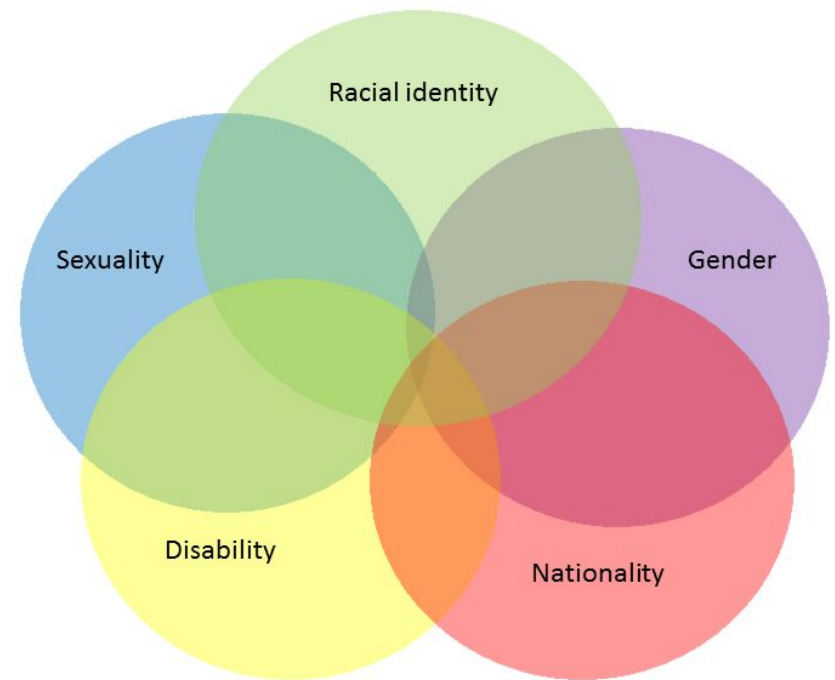


ASAN
AUTISTIC SELF ADVOCACY NETWORK

Intersectionality reminder

Disability incidence rates vary with racial demographics

- Associated with socioeconomic factors, lifespan, medical access
- URM disproportionately misdiagnosed with learning disabilities
- Psychological barriers inflicted on LGBTIAQ+ identities
- Incidence of chronic disease, mental illness among women



[1] Dunlop et al. 2007, *American Journal of Public Health*

[2] *Elementary & Middle Schools Technical Assistant Center*

Americans with Disabilities Act 1990

Makes discrimination against Americans with disabilities illegal; requires “reasonable accommodations” for employees; mandates accessibility on public transport

Problems:

- Requires disclosure to obtain accommodation
 - Possible discrimination
- Litigation only way to deal with non-compliance
- The “reasonability” clause...

ADA Complaint vs. Barrier-Free vs. Universal Design:

- **ADA Compliant** = Minimum requirements to avoid lawsuits...
- **Barrier-Free** = Anticipates and removes barriers to PWDs
- **Universal Design** = Anticipates and removes barriers to *everyone*

Examples:

- **ADA Compliant** = Ramp to one entrance, accessible bathroom stall on one floor, doors with push-buttons.
- **Barrier-Free** = Ramps at all entrances, accessible bathrooms on all floors, doors with push-buttons, lowered sinks in every bathroom.
- **Universal Design** = No-step entryways, accessible & gender-neutral bathrooms with change tables on all floors, doors & faucets that are motion-activated, sinks at varying heights.

Universal design

- Term coined by architect Ronald Mace
 - A method for creating spaces and products that are aesthetically pleasing and accessible to anyone regardless of age, status, ability, etc.
- Selwyn Goldsmith
 - Took UD and pushed for it in the context of accessibility for people with disabilities
 - *Designing for the Disabled* (1963)
 - Pioneered curb cuts
- Barrier-free vs accessible vs universal
 - When something is designed to be beneficial to the most people possible, inclusion in action: everyone gains

Universal design

- Overarching theme: think about the **user experience**.
 - Universal design isn't an abstract concept: if you're thinking about user experience and accessibility, you're doing it!
- Things to consider:
 - Equitable use
 - Flexibility
 - Simplicity/intuitiveness
 - Perceptibility of information
 - Tolerance for error
 - Physical effort required
 - Size/space for use

-Center for Universal Design, NCSU

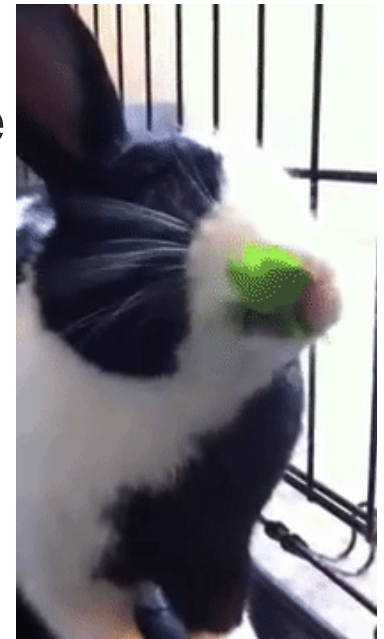
Universal design in the classroom

- Practice inclusive language, engagement
 - Person-first
 - Avoid old-fashioned terms like “handicapped”
 - Avoid activities that require physical activity as sole form of engagement (e.g., a running group/journal club)
- State clearly your intent to be inclusive in a syllabus/course webpage statement, e.g.:
 - *“Accessibility and learning needs: If you have any kind of disability, whether apparent or non-apparent, learning, emotional, physical, or cognitive, or you need alternative implementations of my lectures, assignments, or other materials for any reason, please contact me to discuss how I can help you learn. I try to provide a positive and supportive learning environment for everyone, and it’s always helpful for me to hear what works best for you. Note this building has accessible and non-gender-specific restrooms [location here].”*

-Jennifer Hoffman, University of Denver; adapted from Lydia X. Z. Brown (@autistichoya)

Universal design in the classroom

- Use Styles in Word, Google docs
 - Saves you time
 - Heading-level tags added automatically
- Avoid text in boxes/shapes in Word or Powerpoint!
 - They appear blank to screen readers
- Use Powerpoint templates, they are accessible
 - Outline view shows you what a screen reader will find
- Test PDFs
 - Use OCR software if PDF pages are images, not text
 - Tag images in Acrobat Pro



*Text box test
Gratuitous bunny gif*

Universal design in the classroom

- Insert alt-text, but not too much. Think: about tweet-length (140chars)

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- Describe hyperlinks based on context
 - Digitally: embed and use alt-text/in-line description
 - On paper: copy/paste full link



Outline view

The screenshot shows a presentation software interface with two main panels. The left panel is titled 'Outline' and contains a list of slide topics and their sub-points. The right panel shows the main slide content, which is a slide titled 'Universal design in the classroom' with a bulleted list of points and an image of a rabbit.

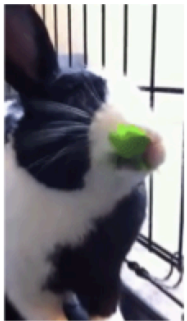
Outline View (Left Panel):

- Digitally: embed and use alt-text/in-line description
- On paper: copy/paste full link
- :
- 5 **Universal design in the classroom**
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- 6 **Outline view**
- 7 **Spot issues in outline view, fix!**
 - Right click -> format picture/shape -> alt text
- 8 **See what else I did there?**
 - Instead of text boxes, you can move the template text box off-page and put notes there! If you need more text boxes, edit the slide master.
- 9 **Universal design in the classroom**

Main Slide Content (Right Panel):

Universal design in the classroom

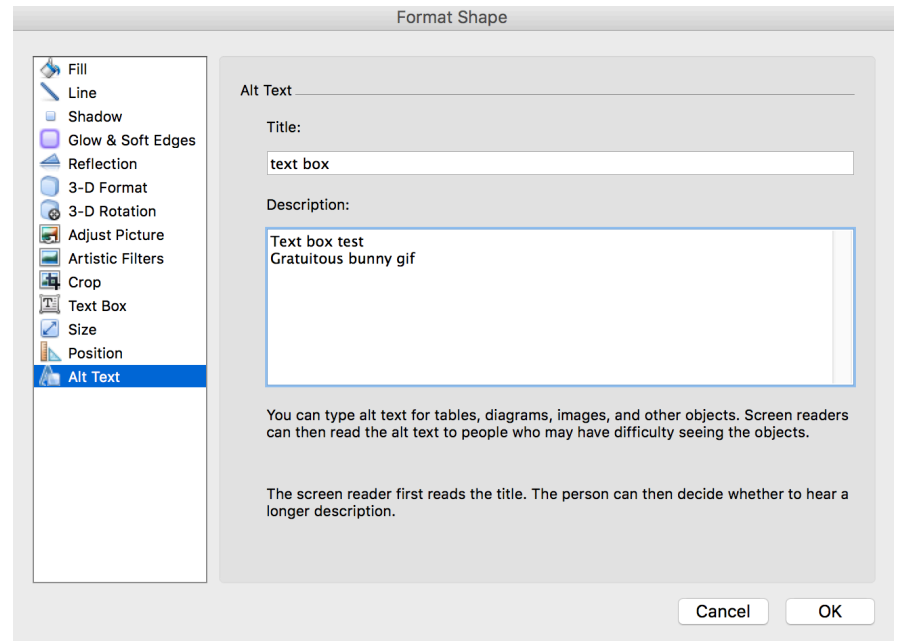
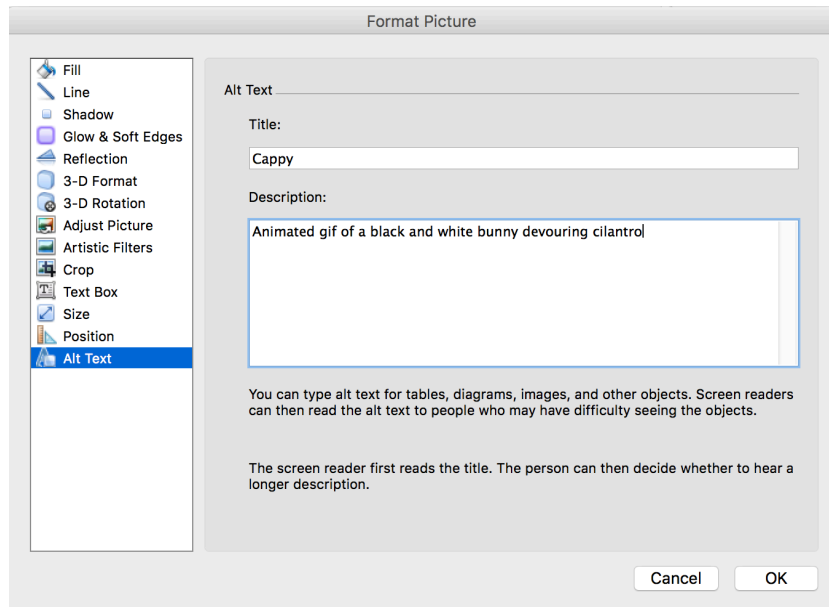
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*Text box test
Gratuitous bunny gif*

- Note how image, text box below it, don't appear in outline view

Spot issues in outline view, fix!



- Right click -> format picture/shape -> alt text

See what else I did there?

- Instead of text boxes, you can move the template text box off-page and put notes there! If you need more text boxes, edit the slide master.

Spot issues in outline view, fix!

• Right click -> format picture -> alt text

Universal design in the classroom

- Multimodal access
 - Don't ban laptops- use them for class engagement: chat, text-based question submission, following along with local copy of lecture slides
 - Caption video content (YouTube's automatic captioning is decent)
 - Provide multiple file formats: if providing a PDF made from a Word doc, also provide Word doc so users can manipulate to their own needs (e.g., font, layout)

AAS WGAD

- Working Group on Accessibility and Disability
 - Formed January 2016
 - Charge: chip away at/eliminate barriers to participation for astronomers with disabilities
 - Resources posted at wgad.aas.org
- Publication accessibility
- Meeting accessibility
- Database accessibility
- Coming soon: site visit guidelines



Web accessibility



*The power of the Web is in its universality.
Access by everyone regardless of disability is
an essential aspect.*

Tim Berners-Lee, W3C Founder and inventor of the World Wide Web

It's the law!



- United Nations Convention on the Rights of Persons with Disabilities
- Section 508 Rehabilitation Act, amended in 1999
- Oct 2010, 21st Century Communications and Video Accessibility Act
- Americans with Disabilities Act – increasingly, court interpretation includes web sites and applications

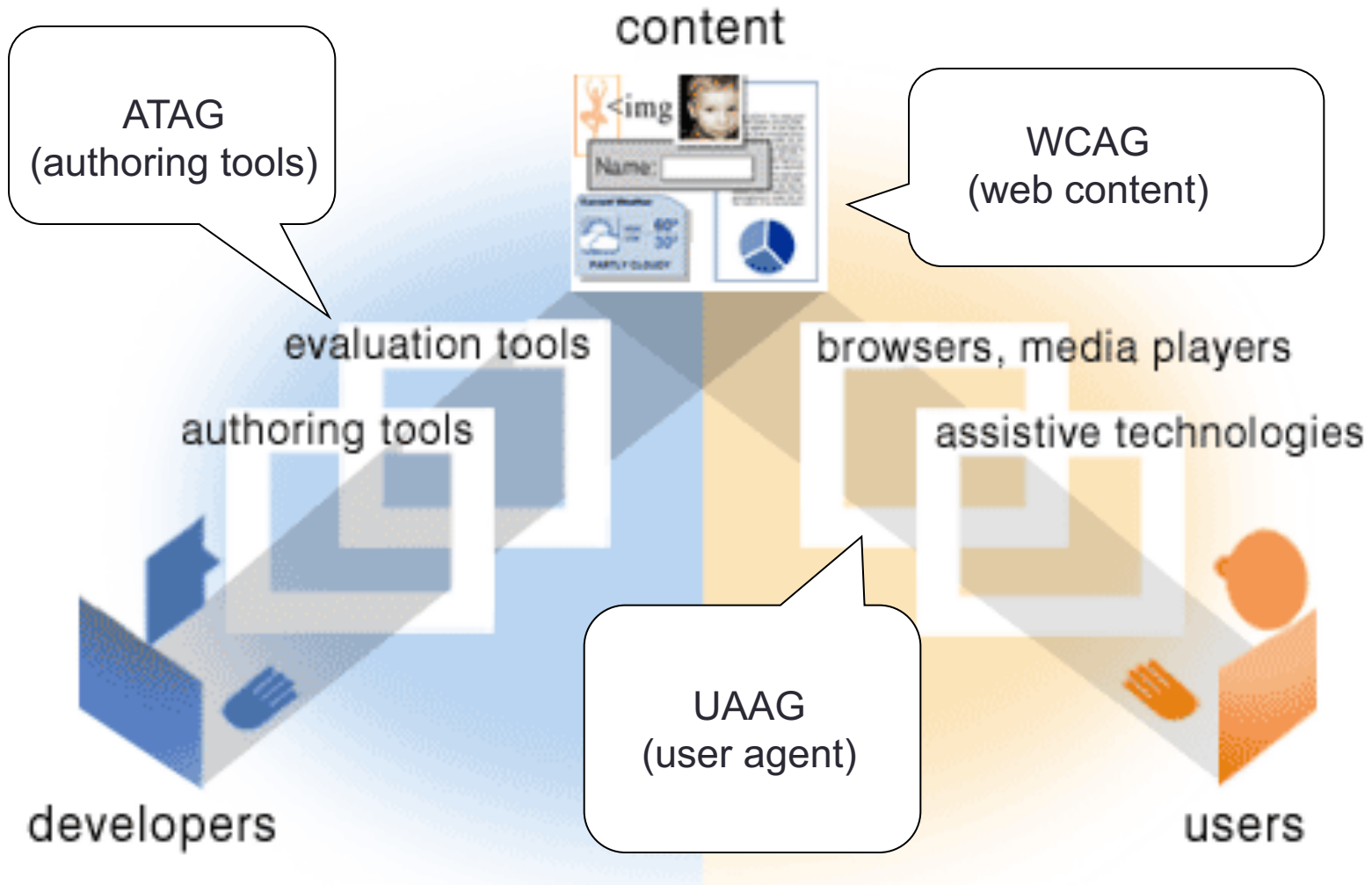
Global Standards



- WCAG - Web Content Accessibility Guidelines. International standards for the web
- ATAG - Authoring Tool Accessibility Guidelines. Vendor standards for interoperability
- UAAG - User Accessibility Guidelines for browsers and assistive technologies
- ARIA - Accessible Rich Internet Application research for emerging technologies

www.w3.org/WAI

Components of Web Accessibility





NIMAS FAPE NLS UDL OSEP WCAG RTF MP3 BookSh
WCAG2 UD ADA AMP AIM AU NIMA
SDHC WAV MP3 NIMAC NFF APH
508 ADA DAISY HTML EIR
ASCII 504 Indie-UI ATAG WA
Section 508 WAI-ARIA
XML UD

W3C WAI Web Accessibility Principles

I can perceive it.

I can use it.

I can grasp it.

I can access it.



1. Perceivable



2. Operable



3. Understandable



4. Robust

Common Barriers

- Alternatives for image content
- Charts and tables
- Generic link text – “click here” “read more”
- Color and contrast
- Embedded media – captions and controls
- Content Structure
 - Data tables
 - Headings
 - Lists
- Dynamic content
- Reading order



Inclusive design drives innovation

- Typewriter - Pellegrino Turri in 1808 for his blind friend Countess Carolina Fantoni da Fivizzano
- Telephone - Alexander Graham Bell invented telephone while working at school for Deaf
- Punch cards – Herman Hollerith, learning disabled, in 1890 used punch card system to tabulate U.S. Census.
- Siri – Introduced by Apple so blind students at California State University had usable device controls

diversity + inclusion = innovation

Free resources at W3C/WAI

Education and Outreach Working Group publishes resources to support web accessibility best practice at [W3.org/wai](https://www.w3.org/wai)



Designing for Web Accessibility

Tips for user interface and visual design.



Writing for Web Accessibility

Tips for writing and presenting content.



Developing for Web Accessibility

Tips for markup and coding.