

Concepts & Resources

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Digital Accessibility Workshop

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Digital accessibility – broad brushstrokes

- What is:
 - Impairment | Accessibility | Assistive technology
- Experience impairment:
 - Visual
 - Motor
 - Cognitive
- Constructing a “POUR” website
- (Starter guide to...) Design tips, tools, evaluation

What is Impairment?

- Impairment can manifest in many different ways.
 - Visual | Auditory | Motor | Cognitive
 - Permanent | Temporary | Situational
 - Wide range of severities – mild to extreme
- ~ 1.3 billion people have a disability or impairment worldwide.
 - [16% of world's population](#), 1 in 6.
- Impairments happen to EVERYONE

Image from <https://inclusive.microsoft.design/tools-and-activities/Inclusive101Guidebook.pdf>

	Permanent	Temporary	Situational
Touch	 One arm	 Arm injury	 New parent
See	 Blind	 Cataract	 Distracted driver
Hear	 Deaf	 Ear infection	 Bartender
Speak	 Non-verbal	 Laryngitis	 Heavy accent

What is Digital Accessibility

- Web Accessibility Initiative [\(WAI\) definition](#) underpinning the [Web Content Accessibility Guidelines](#) (WCAG)

“Web accessibility means that websites, tools, and technologies are designed and developed so that people with disabilities can use them.

More specifically, people can; perceive, understand, navigate, [...] interact with the Web, [and] contribute to the Web”

- **Lower the digital barriers that hinder access to your content.**

What is assistive technology?

- **Alternative methods to interact with websites**
- Helps impaired users depending on what is needed.
 - Screen-readers
 - Keyboard navigation
 - Input devices - Mouth-wands, eye-tracking software, voice recognition
 - Functions - Slow/sticky keys (eg. difficulties maintaining pressure on keyboard)
 - Live captioning and transcripts
- Look at your Accessibility settings on your device!
- **Only helpful if website has been designed and developed to take these technologies into account**

Showcasing: The screen-reader

- Software which allows people who are blind or visually impaired to use their computer.
 - Convert **digital text** into **synthesized speech**.
 - User can **hear content** and **navigate with the keyboard**.
 - Skim/scan text, keyboard tabs from link-to-link.
 - Describes images if “alternative” text has been included
- Requires:
 - Page structured logically, uses titles and headers (<h1>, <h2>...) to navigate
 - Images described with “alt” text
 - All page functionality to be accessible via keyboard

Experience impairment

Experience: Visual

Red/green colourblind simulation

Please change text marked in **red**, OK text in **green**.

At CERN, we probe the **fundamental structure** of particles that make up everything around us. We do so using the **world's largest** and most **complex scientific instruments**.

Please change text marked in **red**, OK text in **green**.

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Images of text

Actual text: can be resized without losing clarity

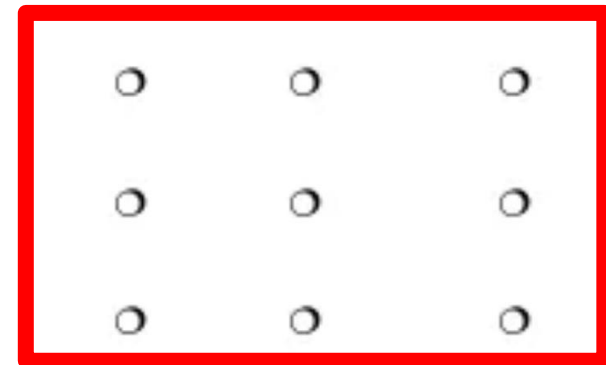
Helen

The name 'Helen' is shown in a highly pixelated, blocky font where individual characters are composed of large, distinct pixels, making it difficult to read at a glance.

Text embedded in image: distorts and pixelates when resized

Lose context on magnification

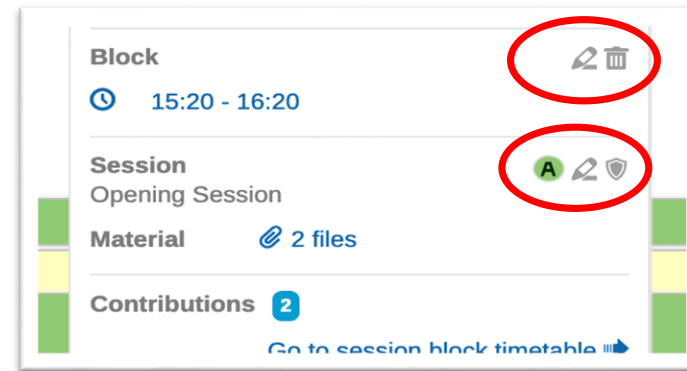
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The objectives of the training were clearly defined.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Participation and interaction were encouraged.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The topics covered were relevant to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The content was organized and easy to follow.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Experience: motor control

- Experience it yourself
 - Try 5 minutes using your non-dominant hand for everything: cleaning your teeth | computer mouse in non-dominant hand | NO mouse at all, use keyboard only...

- Itsy bitsy teeny weeny icons
 - Target area and spacing
 - Easy to click the wrong one
 - Icon placement – error risk



- User cannot use a mouse or pad: on keyboard navigation only
 - Inaccessible widgets (mouse-only target!)
 - Tab control: Lengthy navigation... or not be able to navigate at all

Experience: Cognitive

- Dyslexia
 - Complex words
 - Fonts

I love CERN

- Epilepsy, migraines, attention disorders
 - Autoplay on videos, unstoppable!
 - Sliding image banners
 - White on Black text ~ flickering/scrolling

Physicists and engineers at CERN use the world's largest and most complex scientific instruments to study the basic constituents of matter – fundamental particles. Subatomic particles are made to collide together at close to the speed of light. The process gives us clues about how the particles interact, and provides insights into the fundamental laws of nature. We want to advance the boundaries of human knowledge by delving into the smallest building blocks of our universe.

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Constructing a “POUR” website

Constructing a POUR interface

- Understand the rationale (the '**why**') then you can be more effective in applying the '**what**' and the '**how**'
- The principles: <https://webaim.org/articles/pour/>

P Perceivable
O Operable
U Understandable
R Robust

P is for Perceivable

- **If you can't perceive it, it's inaccessible.**
- Visual
 - Readable text, view images
 - Meaning not conveyed by colour alone
 - Colour contrast and background images not interfering with message
- Audio
 - Screen-reader friendly – navigable, scannable...
 - Captions on audio-heavy content
 - Audio not obscured by background sounds

O is for... Operable

- Input methods
 - Keyboard-accessible, voice responsive etc
- Interaction methods
 - Find/skip content, navigate menus, sidebar content
- User Control Over Timing
 - Timeouts (eg. banking), multi-media controls
- Error Recovery
 - Can back out of hitting (eg) wrong link

U is for... Understandable

- Language should be clear and as simple as possible
 - Audience
 - Non-native speakers
- Document/website language **MUST** be identified!
 - **Screen-readers pronounce text according to <lang> language attribute**
 - If text written in (eg) English is read with the pronunciation rules of another (eg. language attribute set to <html lang="fr">), results are incomprehensible.
 - EN/CZ audio example at <https://webaim.org/techniques/language/>

R is for... Robust

- Don't make up your own standards, internationally-agreed ones already exist...
 - <https://www.w3.org/WAI/standards-guidelines/>
 - <https://webaim.org/articles/> (for explanations)
- **Functionality : Current and Future Technologies**
 - Is your website/interface compatible with assistive technologies?
 - Developers: robust clean code, future-proof where possible ;-)

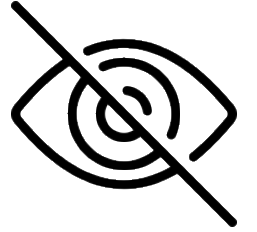
(Starter guide to...) Design tips,
tools, evaluation



Example solutions: auditory

- Create high-quality audio wherever humanly possible.
- Include (live) captions and transcripts
 - Not perfect but already very helpful
 - Live captions grant time and clues to figure out what's being said.
 - (automated) Transcripts = access all content after event
- Easy to switch on and costs you nothing; radical improvement for those that need it
 - Eg. Turn on live captioning in Zoom as a default!!!

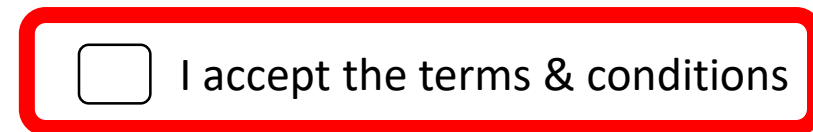
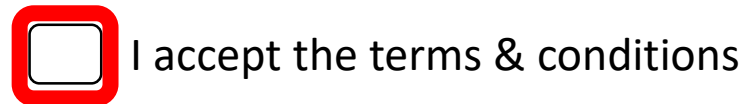
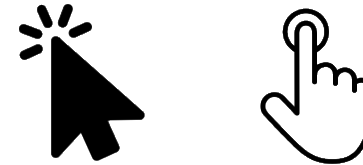
Example solutions: visual



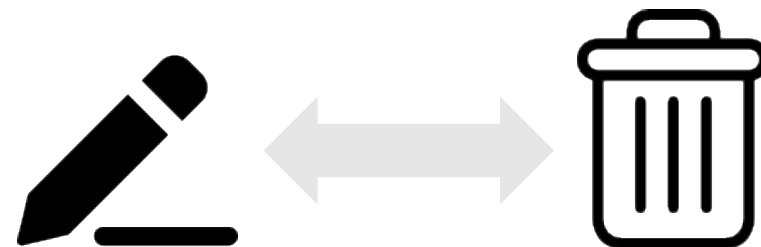
- Colour perception
 - Use [accessible colour palettes](#), including for [data visualisation](#)
 - Use texture/shape as well as colour to convey meaning
 - not **changes marked in red** alone
 - but **changes marked in red and underlined**
- Feed the screen-reader
 - **Include “ALT” text (a descriptive snippet) for screen-reader to describe pictures**
 - No more “[Click here](#)” / “[Read more](#)” labels - use labels that make sense, based on destination rather than action (see Webaim for [link text advice](#))

Example solutions: motor control

- Mouse/tap methods
- Icons: bigger **target areas**
 - Min 44px x 44px ¹



- Icon placement
 - Consider error-forcing placements.
 - Space them well if you do....



¹ WCAG recommendation at <https://www.w3.org/TR/WCAG21/#target-size>

WAVE – automatic accessibility evaluation

- <https://wave.webaim.org/>
- Web interface version
- Browser extensions
 - Firefox, Edge, Chrome
 - Works behind SSO

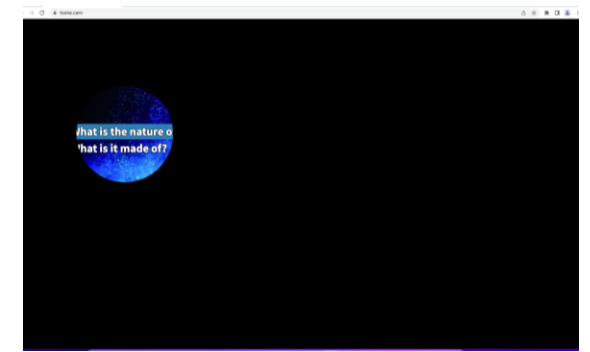
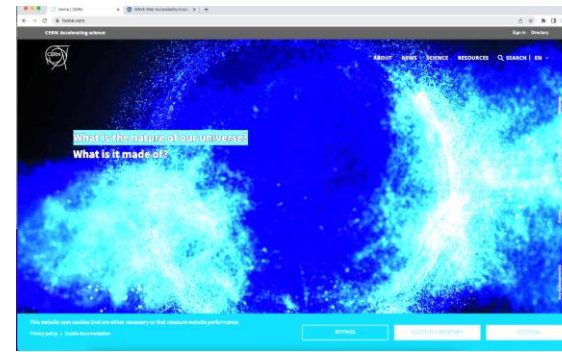
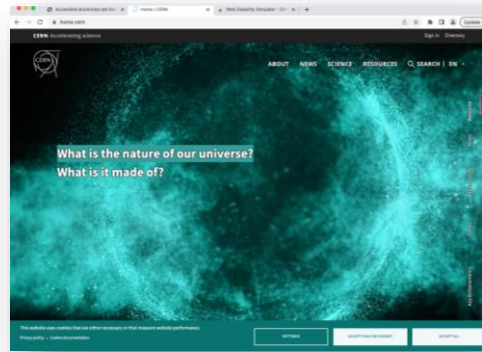
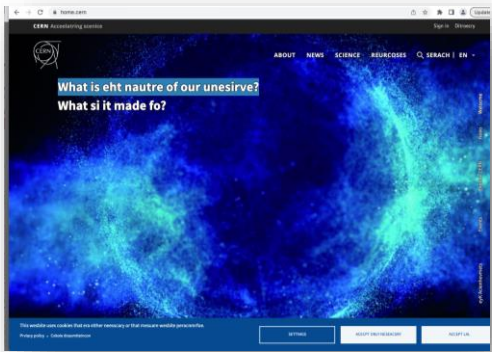
The screenshot displays the WAVE (Web Accessibility Evaluation Tool) interface overlaid on a CERN website. The WAVE panel on the left shows the following results:

- 11 Errors:**
 - 3 X Empty button
 - 7 X Empty link
 - 1 X Broken ARIA reference
- 25 Contrast Errors:**
 - 25 X Very low contrast
- 35 Alerts:**
 - 1 X Skipped heading level
 - 16 X Possible heading
 - 1 X Broken same-page link

The website content includes a navigation menu with links for **ABOUT**, **NEWS**, and **SCIENCE**. The main section is titled **Our Mission** and features a sub-section **WHAT IS CERN'S MISSION?** with a photograph of a CERN facility and text describing the organization's mission.

Web Disability Simulator

- Web Disability Simulator: [Chrome browser extension](#)
- Simulates how people with disabilities see the web.
- Pointers to promote your understanding + techniques for text/design choices



Accessibility Mindset - conclusion

- Invisible to you does not mean invisible to others.
- Educate yourself to understand the impact of your design choices.
- Do what you can. A little tweak can go a long way for those that need it.
- Start now!

Annex 1: Articles and tips

- **WebAim:** articles, resources, tools...
 - <https://webaim.org/>
 - <https://webaim.org/articles/userperspective/>
- **WAI:**
 - <https://www.w3.org/WAI/tutorials/>
- **Specifics**
 - Avoid using ‘Click Here’ – appropriate labelling for links (focus on destination, not on the action)
 - <https://www.lamar.edu/web-communication/resources/avoid-using-click-here.html>
 - Designing for red/green colourblindness
 - <https://visualisingdata.com/2019/08/five-ways-to-design-for-red-green-colour-blindness/>
- **WebAIM Million:** 2023 report on the accessibility of the top 1,000,000 home pages
 - <https://webaim.org/projects/million/>
- Including an **Accessibility Statement**
 - WAI’s “Developing an Accessibility Statement”
 - <https://www.w3.org/WAI/planning/statements/>

Annex 2: Tools (for starters)

- **WAVE:** Automated evaluation to highlight and resolve issues
 - <https://wave.webaim.org/>
- **Firefox:** (right click/Inspect Accessibility... or via menu/More Tools...)
- **WebAIM resources:** Checklists, tools
 - <https://webaim.org/resources/>
- **Web Disability Simulator** (Chrome browser extension)
 - <https://chrome.google.com/webstore/detail/web-disability-simulator/olioanlbgpmdlgjnnampnnlohigkjl>
- **Accessible Colour** palette generator
 - <https://venngage.com/tools/accessible-color-palette-generator>