

On your device go to ...
www.bbc.co.uk/cbbc/games
... and choose any game



Laptop: only use
Tab & Enter/Space



Mobile: only use
single finger taps



Disability

Disability happens when the environment does not match someone's ability

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Accessibility

Accessibility happens when
the environment is right for
someone's ability

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Accessibility for web & apps

Making things for everyone

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*What is
accessibility?*



Photo of rainbow stairs from Fraser Tours website

impairment
+
poor environment
↓
disability

Jamie Knight & Lion, Senior Accessibility Specialist, BBC
#NeurodiverCity 2016

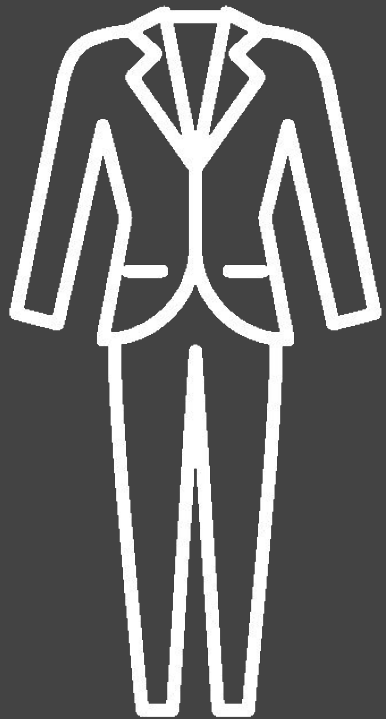
impairment

+

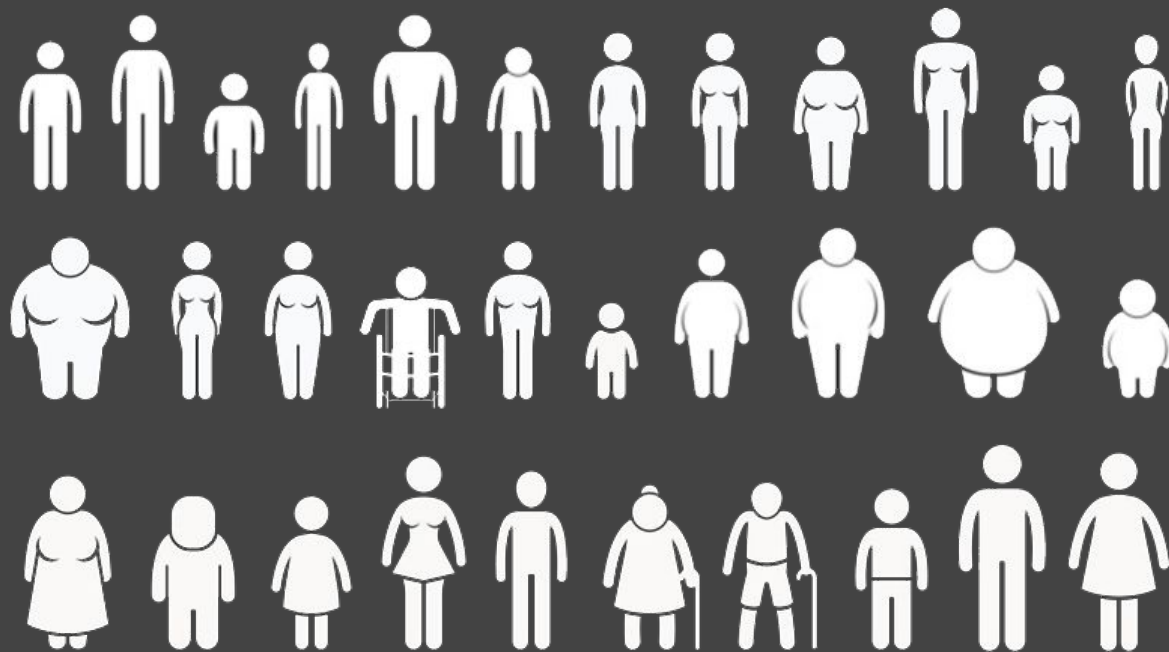
enabling environment

↓

accessability



**Available
in one size**



Different is normal

24% recognised disability

1/3 temporary impairment

ALL at some time
(includes you!)



Vision






Hearing









Motor
control






Cognitive

	Permanent	Temporary	Situational
Touch			
	One arm	Arm injury	New parent

See			
	Blind	Cataract	Distracted driver

	Permanent	Temporary	Situational
Hear			
	Deaf	Ear infection	Bartender

Speak			
	Non-verbal	Laryngitis	Heavy accent

Microsoft: Inclusive Design
<https://www.microsoft.com/en-us/design/practice>



An Alphabet of Accessibility Issues **by Anne Gibson**

<https://the-pastry-box-project.net/anne-gibson/2014-july-31>

<https://theinterconnected.net/kirabug/an-alphabet-of-accessibility-update/>



Making things for everyone
should include everyone

accessibleicon.org



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*What can
you do?*

TOGETHER
We can
do something

Together we can do something wonderful mural by K-W Bilingual School

Cognitive
very diverse



Receiving



Processing



Acting

Perception
Affordance

Filter
Decide

Plan
Do

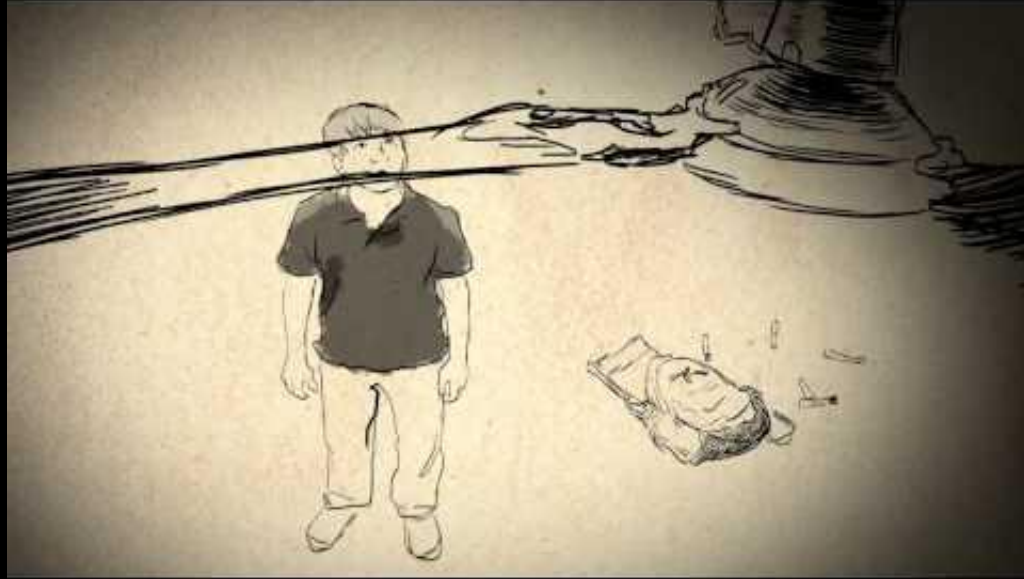
Jamie Knight & Lion, Senior Accessibility Specialist, BBC
Cognitive Accessibility 103, 2017

Cognitive
very diverse



Experience:

- Visit <https://svenskagruppspel.se/djur-quiz/> or <https://www.rekhta.org/games/urdu-crossword/>
- Try to complete a quiz or crossword



1. <https://www.youtube.com/watch?v=K2P4Ed6G3gw>



Good writing means that someone should be able to read and understand the text in a single reading.

2. <https://www.youtube.com/watch?v=b7sCgRzvBS8>

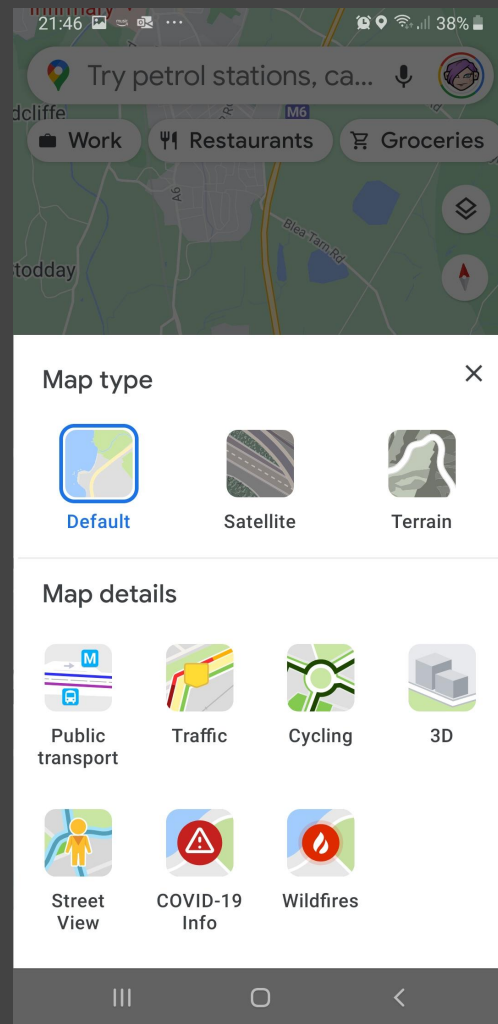
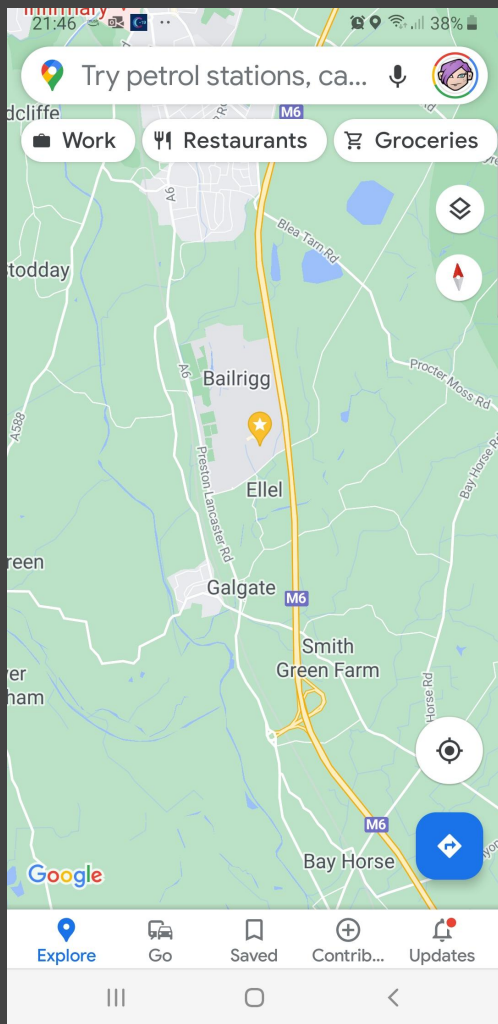
Cognitive
very diverse



Will it overload or distress?

Can it be understood?

Can it be customised?





Find a
Programme



Your
Favourites



Recently
Watched



London Spy
Episode 3



Storyville
2015-2016: 9. Cartel Land



Young, Trans and
Looking for Love



Most Popular

40 Programmes



NEW SERIES



Tomorrow's Food
1. Thanet



Mat
2015



Irela
Epis

Cognitive top tips



- Avoid clutter and flickering or distracting movement
- Use plain English – short sentences, active verbs, structure
- Use one main heading and hierarchical content subheadings
- Provide a caption or heading with any data tables
- Use native elements, visible navigation, and familiar labels
- Make sure something always has visible focus
- Do not use icon fonts, or important! in your styles
- Consider perceptive adaptations in interactive content
- Test with users, across a range of scenario perspectives

Motor control

many people



Reach

Wheelchair
Paralysis

Control

Shaking
Spasm

Strength

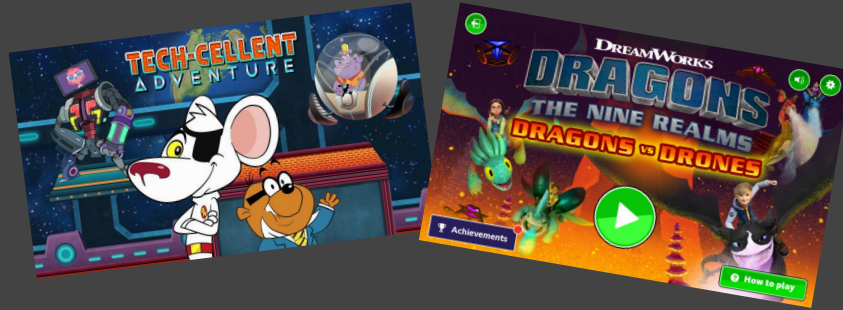
Discomfort
Fatigue

Motor control

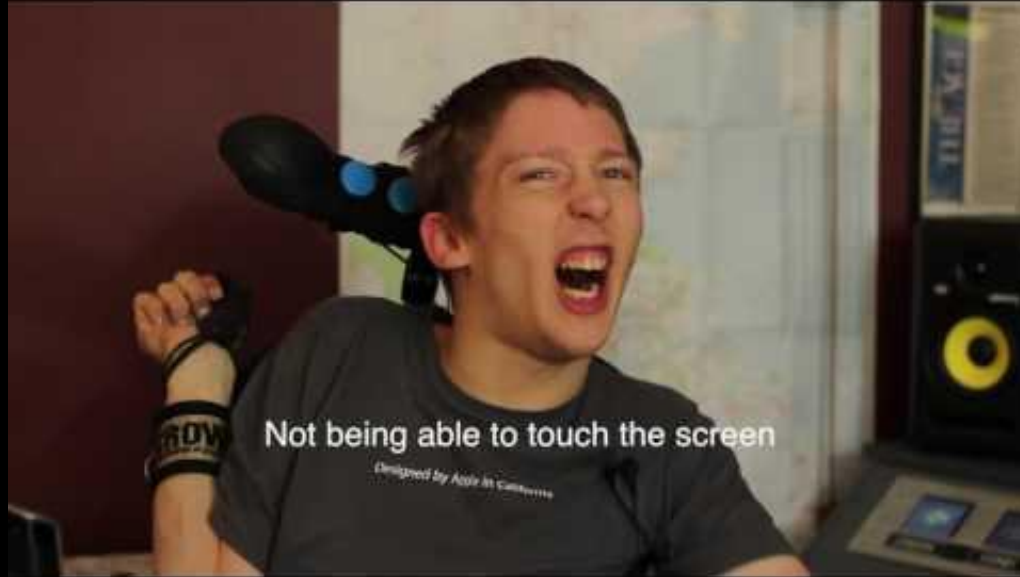
many people



Experience:



- Visit <https://www.bbc.co.uk/cbbc/games>
- Laptop - only use Tab and Enter/Space keys
- Mobile/Tablet - keep hand in a glove/sleeve



3. <https://www.youtube.com/watch?v=--Jakgk3tpA>



4. <https://www.youtube.com/watch?v=vQYzsiVscNg>

Motor control
many people



Does it support different controls?

Is it simple to interact with?

Is focus visible and in order?





ping
ad



NEW



NEW

Visit the library to find new stories to read!

Motor control

top tips



- Provide multiple ways to control and navigate content
- Code content in a logical order, especially forms
- Associate form labels and input fields
- Make sure all active elements can receive visible focus
- Group link elements inside a single anchor
- Provide generously sized touch target areas
- Ensure appropriate focus after dynamic updates
- Keep user journeys short and interactions simple



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Hearing

more than 10 million



Volume

None

Low

Frequency

Bass

Treble

Interference

Noise

Static

Hearing

more than 10 million



Experience:

- Visit a news channel on YouTube or similar
- Mute the device sound and choose a story
- Try to understand what it is about



BSL IPSL ASL LSF
Auslan Libras etc.
SSE Makaton



5. https://www.youtube.com/watch?v=1Ks_p2Ailkl

Hearing

more than 10 million



Are there text or visual alternatives?

Can it be understood?

Is there supportive imagery?



and of course you at home. During
the conversation, you can argue



Hearing top tips



- Ensure instructions are provided as text
- Provide text or sign alternatives with all audible content
- Make good use of visual cues, such as icons
- Use plain English – short sentences, active verbs, etc.
- Use one main heading and hierarchical subheadings
- Provide assistance to correct errors
- Make use of haptic feedback, eg. vibration

Vision

almost 2 million



Light/Detail

Focus
Sensitivity

Obscured

Haze
Blindspots

Colour

Saturation
Absence

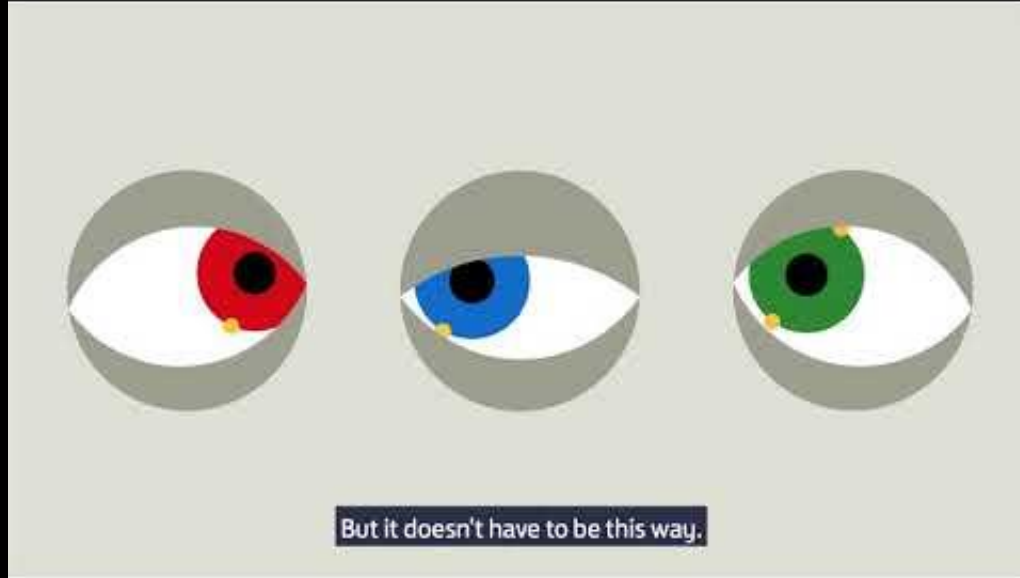
Vision

almost 2 million



Experience:

- Unmute the device sound
- Cover the screen
- Try to navigate and check email or similar



6. <https://www.youtube.com/watch?v=4m0JVI3Rfiw>



7. <https://www.youtube.com/watch?v=P1e7ZCKQfMA>

Vision

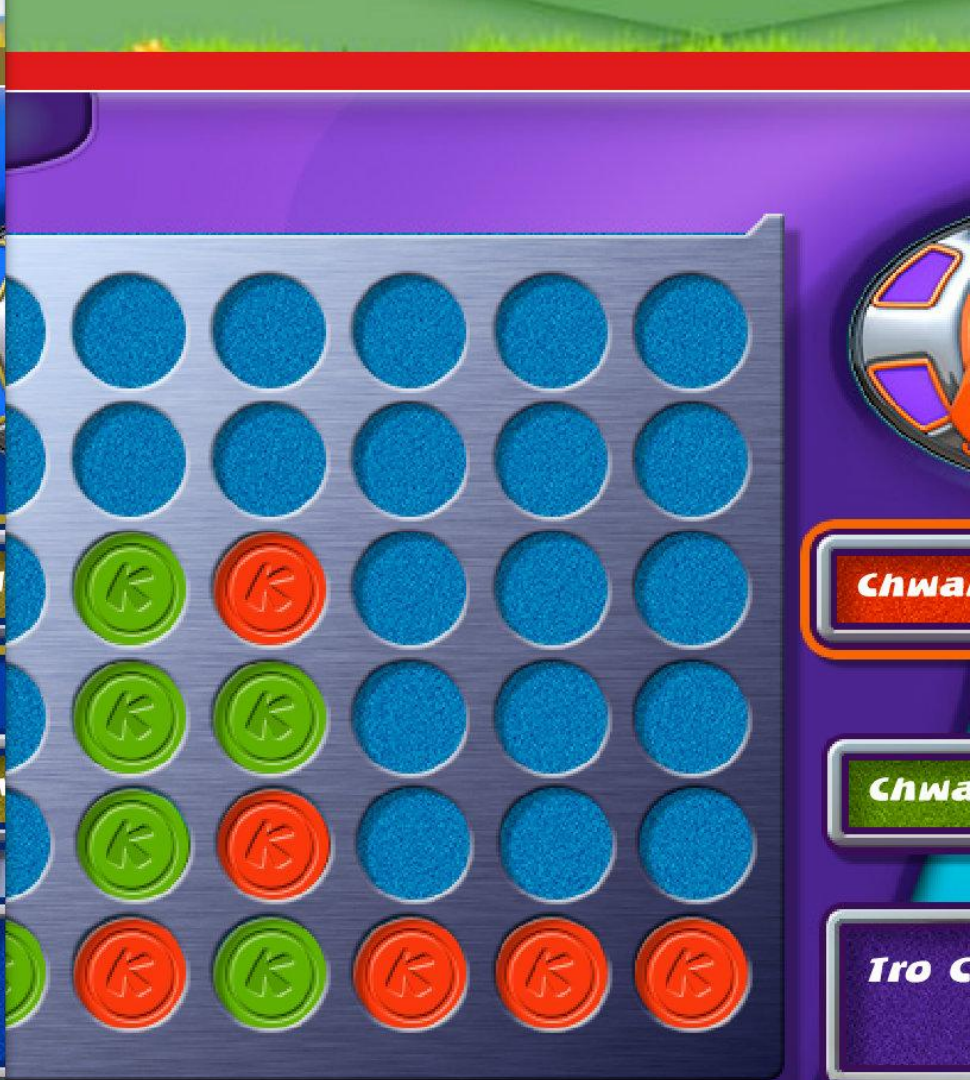
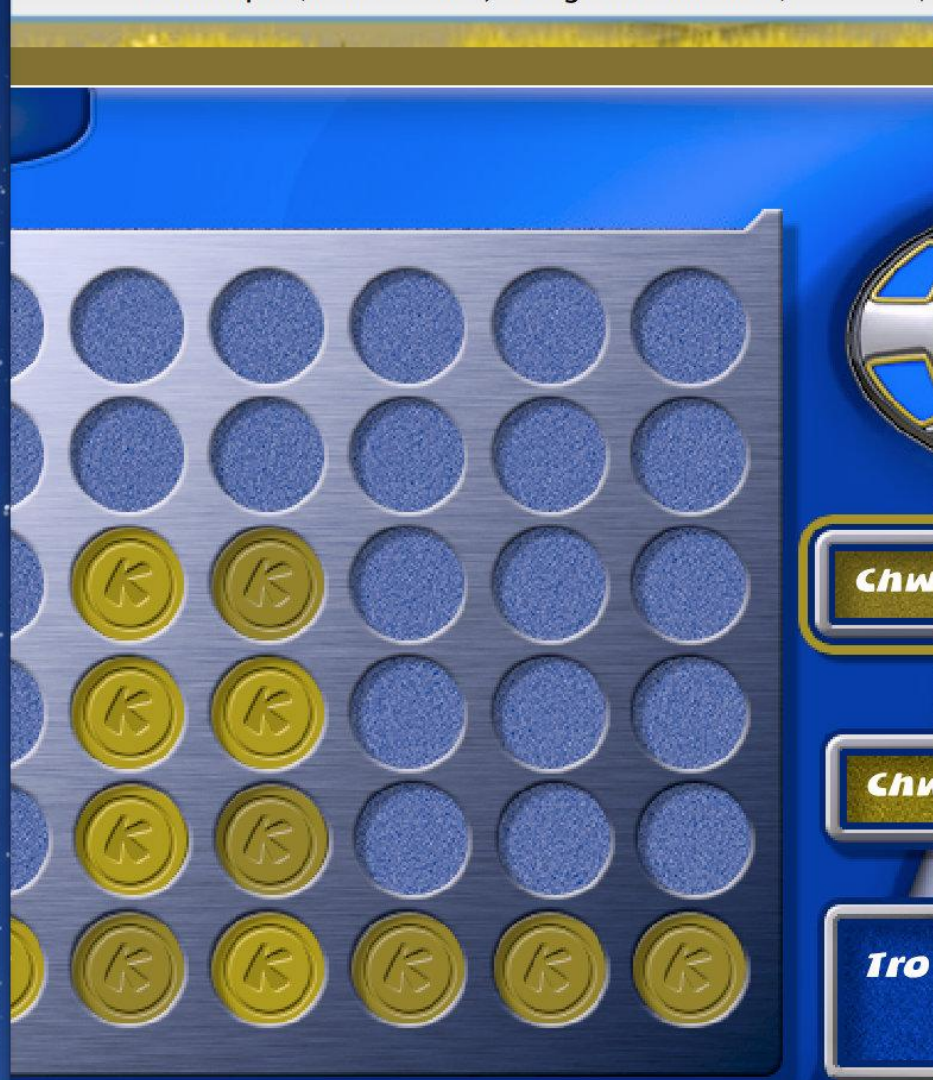
almost 2 million



Are there audible or tactile alternatives?

Can it be understood and navigated?

Is there good colour contrast and zoom?



1. ``
"image source weather dash icon dot P N G"
2. ``
""
3. ``
"image white outline of a cloud with seven yellow sun rays emanating from the right"
4. ``
"image sunny intervals"

Vision

top tips



- Make sure things speak well with a screen reader
- Use native elements lots and WAI-ARIA attributes sparingly
- Provide text or audio alternatives for still and video imagery
- Use plain English, consistent labels, logical content structure
- Check that headings and link text make sense out of context
- Ensure visual focus keeps in sync with the screen reader
- Check that zoom and font resizing work nicely
- Check colour contrasts
- Do not convey meaning by colour alone

Screen Readers



Screen Readers

screen reader first approach



When optimised for accessibility, content is:

- **Perceivable...** to vision impaired as well as sighted users.
- **Operable...** by assistive technology as well as mouse/touch.
- **Understandable...** because of clear, well structured plain language, and both visual and coded affordances.
- **Robust...** for older devices and slower connections.

Add synced visible focus, and thoughtful use of colour and contrast, and be **accessible** for most people most of the time.



Screen Readers

set up shortcut & practice basics



Action	MS Narrator	VoiceOver MacOS Desktop	VoiceOver iOS Mobile	Android TalkBack	ChromeVox
Set up	Settings > Change PC Settings > Ease of Access	System Preferences > Accessibility	Settings > General > Accessibility	Settings > Accessibility	Ctrl + Alt + Z
Toggle reader on/off	Windows logo key + Ctrl + Enter	⌘ + F5	(set up) triple tap home or side button	(set up) varies per device (both volume)	Shift + Search + A + A
Pause/resume reading	Ctrl	Ctrl	2 finger tap	(set up) volume key	Ctrl
Read all from selected	Caps lock + R or down arrow	Ctrl + ⌘ + A	2 finger swipe down	(set up) shake device	Shift + Search + R
Next / Previous	Caps lock + right/left arrow key	Ctrl + ⌘ + right/left arrow key	Swipe right/left	Swipe right/left	Shift + Search + up/down arrow key
Activate item	Caps lock + Enter	Ctrl + ⌘ + Space bar	1 finger double tap	1 finger double tap	Enter
Initiate rotor or context menu	n/a	Ctrl + ⌘ + U	Press and twist 2 fingers	Swipe down/up then right for menus	n/a
Help	Caps lock + F1	Ctrl + ⌘ + H	n/a	n/a	Shift + Search + .

*Why should
you try?*



Photo of diversity and inclusion mural from Nottingham University website



8. <https://www.youtube.com/watch?v=J-bZ0Mbe7Dc>

“Society Benefits When Everyone Can Participate”

“Individuals with disabilities ... can add great value to society if we ensure society is accessible for all.”

“Technology innovations... are allowing persons with disabilities all over the world to tap into their potential and **the possibilities are unlimited.**”

Debra Ruh, Global Disability Inclusion Strategist

http://www.huffingtonpost.com/debra-ruh/abilities-society-benefit_b_8558946.html



“Neurodiversity is a superpower”

Leena Haque - CAPE - creating a positive environment

<https://twitter.com/BBCCape>

- 1808 – typewriter invented to help a blind friend
- 1821 – Braille alphabet initially invented for secret codes but better used by blind children
- 1876 – telephone patented, one of many devices developed to help deaf friends
- 1886 – punch cards used to transport information by someone with cognitive disability (company later renamed IBM)
- 1901 – first electric hearing aid built as a follow on from the loud speaker & telephone
- 1934 – first talking book invented
- 1948 – transistor invented to make hearing aids smaller and more reliable
- 1952 – first speech recognizer developed following earlier research to improve hearing aids
- 1964 – first teletype machine set up, precursor to TTY (instant messaging)
- 1972 – deaf man developed ARPANET protocol to text with deaf wife, precursor to email
 - first broadcast transmitted with open-captions for the deaf (subtitles)
- 1975 – OCR technology developed to scan and read text for blind people
- 1986 – first screen reader developed to assist blind colleague
- 1988 – picture based retail registers developed to help those who couldn't speak

based on <http://www.infinitec.org/history-of-tech-advance>

- **Live transcription and translation** - <https://www.youtube.com/watch?v=fcSmtHNR64M> and <https://www.youtube.com/watch?v=IAIcoZWoolc>
- **Haptics** - <https://www.youtube.com/watch?v=xnQB9Y77PXE>
- **Electrophysics** - <https://www.youtube.com/watch?v=rSQNi5sAwuc>
- **Bionic robotics** - https://www.youtube.com/watch?v=PLk8Pm_XBJE
- **Object and face recognition** - https://www.youtube.com/watch?v=bqeQByqf_f8 and <https://www.youtube.com/watch?v=CVClHLWv-4I> and https://youtu.be/dIImXx1C7_g
- **Augmented, virtual and mixed reality** - https://www.youtube.com/watch?v=3mr_S5mOtsw and <https://www.youtube.com/watch?v=J5m8JHWuu2o>
- **Eye tracking** - <https://www.youtube.com/watch?v=AKDI1A7UJXY>
- **Sound recognition** - <https://support.apple.com/en-gb/guide/iphone/iphf2dc33312/ios>
- **Gesture control** - <https://support.apple.com/en-gb/HT212760>
- **Brain-computer interfaces** - https://www.youtube.com/watch?v=U_WxaDHNw6I
- **Affective computing** - <https://www.youtube.com/watch?v=kq0VO1FqE6I>
- **Dynamic surfaces** - <https://www.youtube.com/watch?v=0flg4rI4cDw> and <https://www.youtube.com/watch?v=4-VmcsU11hY>
- **And more ...**



9. <https://www.youtube.com/watch?v=XB4cjbYywqg>

- **Be interested** in how things impact others
- **Understand** that information is vital
 - Physical safety (natural disasters, crime, terrorism)
 - Political or financial affairs (laws, work, income)
 - Awareness and establishing of social norms (trends, fashion, culture, sport, news)
- **Remember** accessibility matters!

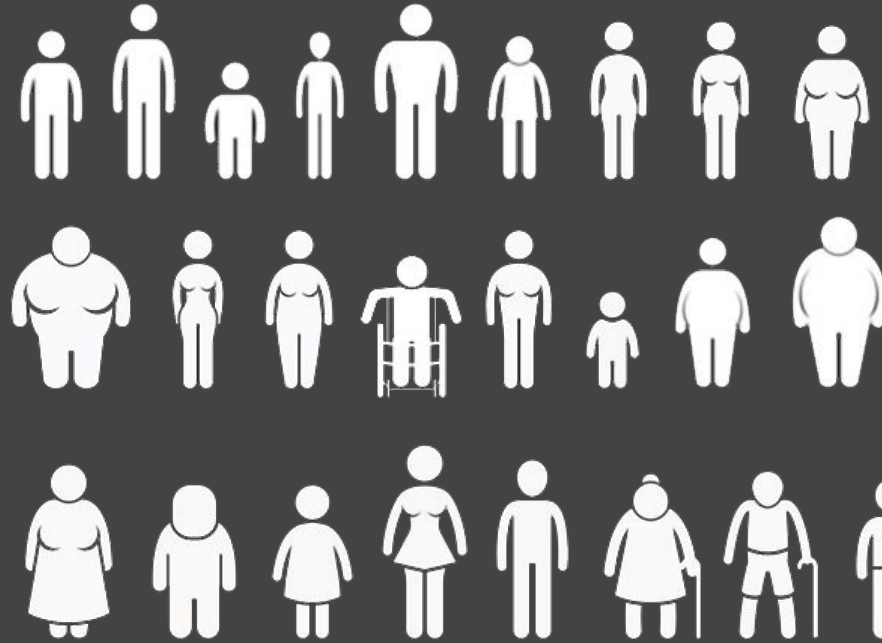
Accessible web & apps

Make things for everyone

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Useful resources and further references

- <http://webaim.org/intro/>
- <http://bitsofco.de/the-accessibility-cheatsheet/>
- <https://www.w3.org/TR/WCAG22/>
- <https://pages.18f.gov/accessibility/>
- <http://www.plainenglish.co.uk/>
- <http://www.bbc.co.uk/accessibility/forproducts/guides/>
- <https://accessible.canada.ca/en-301-549-accessibility-requirements-ict-products-and-services>

- <https://www.linkedin.com/pulse/alphabet-accessibility-issues-anne-gibson-parimala-hariprasad>
- <https://alistapart.com/article/my-accessibility-journey-what-ive-learned-so-far>
- <https://reciteme.com/news/wcag-3-0-guidelines/>
- <https://www.w3.org/TR/adapt-symbols/>
- <https://www.w3.org/TR/wai-aria-1.2/> and <https://w3.org/WAI/ARIA/apg/>
- <https://www.a11yproject.com/checklist/> and <https://www.magentaa11y.com/>







“I think if someone had told me that software is really about humanity, that it’s really about helping people by using computer technology, it would have changed my outlook a lot earlier.”

“Logic, visualization, **user empathy**
and language are described as the
most applicable skills required to succeed.”

“We need **diverse** tech leaders
who can **empathize** with
the full range of users.”

Marcia Bettina Starke, VP Human Resources at FCV Interactive
<https://www.linkedin.com/pulse/20140808193150-58202011-girls-who-code-insights-from-successful-women-in-technology>