

Online Accessibility

Introduction

Traditionally technologies have supported people with disabilities, such as

- wheelchairs aiding people with mobility problems
- Braille enabling blind people to read text.

Our most advanced technologies:

- computers
- the Internet, world wide web
- smart phones

provide the potential for greater support for people with disabilities than ever before experienced.

Ensuring buildings, the physical built environment, facilities are accessible to everyone depends on design and building for accessibility. Similarly, accessibility and usability of computer applications and websites depends on design and implementation.

Law

- Rights of accessibility to buildings and services for people with disabilities are enshrined in the Equality Act 2010.
- The rights of accessibility to services includes rights to online services, information and websites.

Types of disability

a) Visual: blindness, includes visual impairments

- glaucoma - peripheral sight loss
- macular degeneration - central vision loss/limited colour vision
- retinopathy - blurry or patchy vision loss (eg from diabetes)
- detached retina - dark shadow and/or bright flashes
- retinitis pigmentosa - degenerative vision loss, vision fades with time while exposed to light
- colour blindness/limited colour vision

b) Auditory

- deafness
- partial hearing problems

- c) Motor
 - loss of limb/arm use, for example from amputation or spinal cord injury
 - impaired motor control, difficulty with control of hand movements from tremor and/or involuntary movements from brain damage or neurological conditions
 - restricted hand use from arthritis, pain and/or fatigue from intense hand use

- d) Cognitive
 - memory problems
 - dyslexia
 - autism
 - concentration/attention difficulties
 - problem-solving difficulties, for example, inability to solve Captcha problems
 - web page design needs to be simple and uncluttered

- e) Seizure and vestibular disorders
 - epilepsy, epileptic seizures
 - vestibular disorders, balance/vestibular function depends on co-ordination of inner ear, eye movement and brain - can produce nausea

Constructing web pages

A web page is composed of the layers:

- structure and content, coded in HTML (hypertext markup language)
- presentation, coded in CSS (cascading stylesheets)
- behaviour, coded in JavaScript, scripting language interpreted by the user's browser

A web page content should be visible and accessible without JavaScript.

JavaScript provides progressive enhancement, such as

- initial form validation
- implementing simple applications within a web page

Accessing web pages

Web pages are accessed using a web browser which interprets the HTML, CSS and JavaScript delivered to it.

For users with disabilities this may include interacting with assistive technology which, in turn, interacts with the browser and HTML.

Assistive technology may be

- screen readers - used by blind, visually-impaired users and other users who find listening to content read out helpful
- speech recognition software - used by users who have problems using a keyboard or mouse
- input devices such as switches or head-wands - used by users without hand-use
- Braille displays - used by some blind users.

Accommodating users' needs

Simple, uncluttered, consistent page layout and visual design

- helps all users
- is essential for users with cognitive conditions and visual impairments.

One set of web pages should accommodate all users' needs. Real users have a range of preferences and combinations of conditions that need catering for. Some blind or visually-impaired users access web pages visually at the same time as listening to a screen reader. Not all screen reader users are blind or visually-impaired.

a) Navigation

Page layout and provision of links need to minimise need for scrolling, painful for some users and time-consuming for all users.

All web pages and content must be fully keyboard accessible such that

- the user able to use the tab key to step through links on the page and follow the link that has the focus using the enter key
- the link with the focus is clearly shown

Dynamic or drop-down menus should be avoided, but, if included, must allow the user to navigate the site using the keyboard.

A "skip to content" link should be included at the top of each page

- for screen reader users so they don't have to listen to menu items read out before hearing the content
- for keyboard users so they don't have to tab through all the menu items before reaching the content

- the “skip to content” link should always be visible

The head of the content for each page should include a breadcrumb trail with links back to preceding pages.

Menu item text should be clear and concise, while indicating the nature of the destination content.

For links included in main text content

- link text should be clear and concise, explicitly and briefly stating the nature of the destination content. The generic “click here” or “here” should **never** be used for link text.
- links should be underlined as a clear visual indication that they are links.
- link text should be long enough to see clearly and easily locate with a mouse.

For link text the use of “more”, “see more” or “read more” should be avoided unless the context makes the destination content unequivocally clear to both screen reader and sighted users.

A site map should be included.

Examples of site navigation:

Web accessibility in mind

<https://webaim.org/>

World Wide Web Consortium - Web Accessibility Initiative

<https://www.w3.org/WAI/>

Mozilla Foundation: Resources for Developers, by Developers

<https://developer.mozilla.org/en-US/>

NV Access - home page for NVDA screen reader

<https://www.nvaccess.org/>

b) Text and images

- Default font size for all text needs to be set to an easily readable size
- Users must be able to adjust font size to suit their personal needs.
- The page layout should accommodate increased font size without breaking or increasing width or introducing horizontal scrolling.

- Sans serif fonts are easier to read on screen, some fonts, eg verdana or trebuchet, are clearer than others.
- As they are hard to read, block capitals should be avoided in all contexts with mixed case text used instead.
- Large blocks of text are hard to read on a screen. Text needs to be displayed in small paragraphs, each separated by a blank space.
- Text in italics can be hard to read.
- Text should be coded as text in HTML to be accessible to screen reader users and to enable users to change the text size and colour to make it easier to read.
- Users should be able to change the size and/or colour of text in buttons to make it easier to read.

Images that form part of a page's information content should include an alt attribute in the HTML code containing a concise description of the content to be read out for screen reader users.

c) Colours

There is no single set of colours that can satisfy all users' individual needs and preferences

- some users need low contrast, some find high contrast, a white background or bright colours painfully glaring
- some users need high contrast, for example, blind or visually-impaired users need black text on a strong yellow background
- some users with cognitive conditions may prefer a bright coloured background, such as orange, pink or yellow
- textured or shaded backgrounds and background images make reading text a problem for all users
- some users have limited or no colour vision, for example, red-green colour blindness is common
- combining pure greys, black and white makes text harder to read
- light text on a dark background is harder to read, but, where it is included, the text should be bold
- some users find pages including a combination of different bright colours confusing or even painful to view

Users are not always able to choose their own text and background colours. Web pages should aim to cater for most users' needs with

- dark-coloured (cool colours such as green/turquoise/cyan/blue/indigo work best), near black text
- cream/grey-cream/pale beige works best for the background

A user's browser may allow them to choose their own text and background colours. When they do, only content specified using HTML elements will appear. Thus no essential content should be specified using CSS.

d) Problems with movement

There should be no movement at all on a web page when it loads.

- Attention is attracted towards movement away from the text to be read.
- This is annoying for all users.
- Visually-impaired users and users sensitive to movement are prevented from reading text at all.

Movement or attempts to read moving text can have the following effects

- vertigo attack
- epileptic fit
- eye pain or strain
- inability to focus
- nausea
- headache

Any carousels or videos should initially be paused or stationary with controls allowing the user to choose to play them.

e) Assistive technology

For compatibility with assistive technologies and users with a range of disabilities, it must be possible to navigate websites and web pages fully using a keyboard.

Screen readers

<https://webaim.org/articles/visual/blind#screenreaders>

User guide for NVDA - non-visual desktop access (screen reader)

<https://www.nvaccess.org/files/nvda/documentation/userGuide.html>

Download NVDA

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

Using NVDA to Evaluate Web Accessibility

<https://webaim.org/articles/nvda/>

Browser support for users' needs

All browsers include settings and functions to aid usability and accessibility, with Firefox provision being the most comprehensive. Some browsers provide a reader view setting which provides a simple page content layout in a clear font and easily readable text width.

- All browsers allow text size to be adjusted using either font size settings or a zoom function.
- SeaMonkey and Firefox allow the user to set their own choice of text and background colours.
- Firefox, Tor and Chrome provide the option of reader view on mobile devices. Firefox and Tor provide the option of reader view on PCs.
- Firefox and SeaMonkey provide options for reducing animations.

Blocking adverts and selectively disabling JavaScript can limit movement and reduce confusing clutter on websites.

PC versions of Firefox, Tor and SeaMonkey provide add-ons for blocking ads and selectively disabling JavaScript.

Android versions of Firefox and Tor are each installed with an ad-blocker and the ability to selectively disable JavaScript.

Firefox browser

<https://www.mozilla.org/en-US/firefox/>

SeaMonkey browser

<https://www.seamonkey-project.org/>

Tor browser

<https://www.torproject.org/download/>

Communicating online and by email

All organisations with a web presence need to provide an email address for contact. Plain text emails are guaranteed to be accessible to any user who can access the web irrespective of their accessibility needs.

Social media is unsuitable as a standard means of online communication. All social media platforms have accessibility, usability, privacy and security problems.

The best way to access emails, for both reading and composing them, is to set up an email client. Examples are Thunderbird and the SeaMonkey email client, both free and maintained by the Mozilla Foundation.

Thunderbird email client

<https://www.thunderbird.net/en-US/>

The SeaMonkey browser includes an email client

<https://www.seamonkey-project.org/>