

Accessibility for the web



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(Since spring 2002, several presentations have been given to webmasters and other interested parties. In parts, this course duplicates that information, which is still available with other supporting information at <http://web-support.csx.cam.ac.uk/access/>)

What does accessibility mean?

Web accessibility is giving universal access to information and services, regardless of disability or circumstance. By addressing issues that affect disabled users, many other users will derive the benefits of universal design.

The Web Accessibility Initiative (<http://www.w3.org/WAI/>) run by W3C is the cornerstone of information on the subject. Version 2 of the WAI accessibility guidelines is currently in draft.

Why do we have to be concerned with it?

The Special Educational Needs and Disability Act 2001 amends the Disability Discrimination Act 1995 Part 4 to remove the exemptions that the education sector previously had. The legislation is now in force and includes information accessible through the web. The requirement is that you must:

- Not treat disabled students or pupils less favourably without justification; and
- Make **reasonable adjustments** so that students or pupils are not at a **substantial disadvantage** compared to those who are not disabled

The terms of possible justifications are extremely limited, to;

- necessity to maintain academic standards or
- necessity to maintain standards of any other prescribed kind or occurring under prescribed circumstances (specifically, professional qualifications).

The upshot is that web information and services provided by an institution or part of an institution, either as information or services for students or prospective students or teaching materials, must be accessible, and you must **anticipate** this requirement.

Accessibility applies to:

- web pages
- web interfaces to databases
- online teaching materials
- catalogues and indexes
- any other online resources

In the USA, the equivalent legislation is known as Section 508, which you may see reference to on software websites in relation to accessibility.

University Web Accessibility Policy

The University Web Accessibility policy was agreed in October 2003 and may be found on the web at <http://www.cam.ac.uk/policies/accessibility/>. The policy sets out why it is required and makes the following policy statement:

All web pages should be assessed by the guidelines published by the Web Accessibility Initiative (WAI) from the World Wide Web Consortium (W3C), available at <http://www.w3.org/TR/WCAG10/>. The University requires that:

- All **new** web pages should be written to at least conformance level 2 standard (AA), but to conformance level 3 standard (AAA) if possible.
- All **existing** pages should meet at least conformance level 1 standard (A), if possible.
- **Most pages** should meet conformance level 2 standard (AA) by 1 September 2004. A development plan should be in hand to make all pages conformant to at least A level within as short a time as possible.

Departments, faculties and research groups and other groups that publish information on the web are responsible for being conversant with accessibility issues, auditing their web material and taking reasonable steps to ensure their websites comply with these requirements. Any third-party who is engaged to design web pages for the University, whether hosted within or without cam.ac.uk, will be required to comply with these guidelines. Sites will be checked periodically.

How is accessibility measured?

The Web Accessibility Initiative Guidelines (mentioned above) list guidelines you should follow and attach different levels of priority to each of the elements. These priority levels and the requirements are listed below:

- **[Priority 1]** A Web content developer **must** satisfy this checkpoint. Otherwise, one or more groups will find it impossible to access information in the document. Satisfying this checkpoint is a basic requirement for some groups to be able to use Web documents.
- **[Priority 2]** A Web content developer **should** satisfy this checkpoint. Otherwise, one or more groups will find it difficult to access information in the document. Satisfying this checkpoint will remove significant barriers to accessing Web documents.
- **[Priority 3]** A Web content developer **may** address this checkpoint. Otherwise, one or more groups will find it somewhat difficult to access information in the document. Satisfying this checkpoint will improve access to Web documents.

If **priority points** of a page are fixed, a **web page** can be said to be compliant with these guidelines:

- Conformance Level "**A**": all Priority 1 checkpoints are satisfied
- Conformance Level "**Double-A**": all Priority 1 and 2 checkpoints are satisfied
- Conformance Level "**Triple-A**": all Priority 1, 2, and 3 checkpoints are satisfied

Evaluating your whole site

There are several different schemes for allowing you to evaluate how your website currently stands and helps you prepare a work list of what needs to be done to attain accessibility. Two of the best are:

- **WAI Evaluation** at <http://www.w3.org/WAI/eval/>
This resource gives a scheme of work for assessing the site, involving assessment of sample pages.
- **TechDis Accessibility and Usability Evaluation** at <http://www.techdis.ac.uk/seven/>
This resource breaks down what you are assessing into the seven precepts, which are then further broken down and examined.

One : Navigation and page layout

Web Site navigation design and page layout.

Two : Visual Presentation and customisation

Design, colour and presentation issues including the requirements for user control.

Three : Text descriptions for images

Implementation and appropriate use of various tags or attributes for images.

Four : Accessible mark-up: forms, lists, scripts and tables

Use of appropriate mark-up language to achieve accessible elements.

Five : Use and presentation of written language

Use of clear and concise, recognisable language conventions and configuration of letters, words, sentence and paragraphs.

Six : Accessible issues for other media types

Providing accessible media (e.g. video and audio files), accessible documents formats (e.g. PowerPoint and PDF document files).

Seven : Help, searches, errors and documentation

Contextual help, dealing with errors and other useful documentation.

It is an invaluable exercise to run through one of these and get a good idea of what you need to do.

Drawing up a plan

After you have assessed your site, you need to draw up a plan. Your department or college (or other group) needs to be made aware of the problems you have found - setting them down may seem scary but will help to clarify what needs to be addressed, both for you and for your management. You may be able to undertake some remedial work immediately but plan on updating your pages over time, possibly by redesigning your site. **Immediate** remedial actions may be:

- ensuring all your pages are valid mark-up with a DTD (Run them through a validator (<http://validator.w3.org/>). Correct any problems that the validator detects, or put them through HTML Tidy to do this for you (<http://tidy.sourceforge.net/>)
- make sure all images have alt text (null alt text if images are purely decorative)

Achieving accessibility with pre-existing pages: blanket assessments

In the next section we can look at the tools and testing to check accessibility on individual pages. Before that there are some blanket assessments you can make for all of your pages (these are similar to things that would be thrown up if you did a site assessment).

- **First**, follow the advice in the previous section and make sure your pages are all valid, and all images have alt text or null alt text.

The priorities for **overall organisation and planning**, ranging in importance, **P1** is most important, **P3** least, are as follows:

- **P1/P2:** Review your information structure to make sure it is logical, using a range of headings, paragraphs, lists, and consistent appearance, so that even without a functioning stylesheet the information is comprehensible. Aim to use style sheets if possible, but never compromise your information structure for the sake of appearance.
- **P1:** none of your information or text should be colour-dependent
- **P1:** replace any flickering or blinking graphics with static ones
- **P1:** if using dynamic content such as applets or javascript, ensure the page is fully usable without the dynamic content turned on, if not, give an alternative
- **P1:** provide captions and/or auditory descriptions of any multimedia events

- **P2:** Sensible ordering of information in tables when read line by line
- **P2:** avoid pop-ups and windows spawning (unless you indicate this will happen)
- **P2:** ensure link text makes clear what the target is about

Achieving accessibility with individual pages

This testing regime works well with groups of related pages ('families' of pages) that use the same template. Use an HTML editor with a good batch search and replace function to help, and these jobs can be done quite quickly.

Don't overwhelm yourself by thinking you have to do everything at once.

Pre-test objectives

Next, the following are easy points to sort out, ranging in importance, **P1** is most important, **P3** least. Run through the page and check the following:

- **P1/P2:** alt text for all meaningful graphics and blank alt text ("") for decorations - size all graphics by width and height for speedier downloading and don't use a graphic if you can use mark-up to achieve aim
- **P1:** summarize or use "longdesc" attribute for charts and graphics. Standard for a description link not using longdesc is [D] by the graphic, linked to description page.
- **P1:** all frames should be titled. Use "noframes" attribute in framed information sets to allow access to information
- **P1:** identify the natural language of the text, by adding at the top of the file (for xhtml)
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
- **P1:** if using image maps, use client-side maps and add text for hotspots - better to find a text-based alternative if possible
- **P3:** summaries in the table tags to describe the use of the table, for instance
summary="breadcrumb navigation"

Testing your pages

Now you have finished some preliminary fixing up, check your pages against **two** of:

- **Bobby** (<http://bobby.watchfire.com/>)
- **WAVE** (<http://www.wave.webaim.org/index.jsp>), particularly good for seeing the logical structure of pages
- **APrompt** (<http://aprompt.snow.utoronto.ca/>), a good tool that does automatic fixing but needs to be downloaded and only available for Windows

to see what you have missed and correct it - aim, if possible, to achieve AA compliance.

It is important to remember that accessibility tools can only partially check accessibility through automation. Of the combined 65 checkpoints in WCAG 1.0 Priority 1 through Priority 3, only nineteen can be partially evaluated automatically. The real key is to learn and understand the Web accessibility standards rather than relying on a tool to determine if a page is accessible or not.

The Opera browser is very useful for performing a battery of tests on pages - there is a worksheet available at <http://www.webaim.org/techniques/articles/opera>. The web developer toolbar also allows instant testing of some of these elements.

You can claim compliance on the pages using the given phrases (see <http://www.w3.org/WAI/WCAG1AA-Conformance>), making it clear whether the claim is for that page or for a range of pages.

Example test

Testing the page <http://www.adc-theatre.cam.ac.uk/> with Bobby, reports the following specific problems:

P1:

This page does not meet the requirements for Bobby A Approved status. Below is a list of 1 Priority 1 accessibility error(s) found:

1 Provide alternative text for all images. (14 instances)

Lines 35, 50, 54, 65, 73, 77, 86, 92, 93, 105, 106, 115, 116, 118

P2:

This page does not meet the requirements for Bobby AA Approved status. Below is a list of 4 Priority 2 accessibility error(s) found:

1. Use relative sizing and positioning (% values) rather than absolute (pixels). (7 instances) Lines 26, 31, 36, 39, 115, 116, 117

2. Create link phrases that make sense when read out of context. (1 instance) Line 46

3. Make sure event handlers do not require use of a mouse. (3 instances) Line 103

4. Do not use the same link phrase more than once when the links point to different URLs. (2 instances) Line 103

P3:

This page does not meet the requirements for Bobby AAA Approved status. Below is a list of 3 Priority 3 accessibility error(s) found:

1. Provide a summary for tables. (3 instances) Lines 46, 69, 24

2. Identify the language of the text. (1 instance) Line 3

3. Separate adjacent links with more than whitespace. (4 instances) Line 40

In addition, the following user checks for P1 may be relevant:

User checks are triggered by something specific on the page; however, you need to determine manually whether they apply and, if applicable, whether your page meets the requirements. Bobby A Approval requires that all user checks pass. Even if your page does conform to these guidelines they appear in the report. Please review these 7 item(s):

1. If you can't make a page accessible, construct an alternate accessible version.
2. Provide alternative content for each SCRIPT that conveys important information or functionality.
3. If style sheets are ignored or unsupported, are pages still readable and usable?
4. If you use color to convey information, make sure the information is also represented another way. (17 instances)
Lines 28, 29, 35, 50, 54, 65, 73, 77, 86, 92, 93, 105, 106, 115, 116, 118
5. If this is a data table (not used for layout only), identify headers for the table rows and columns. (3 instances)
Lines 46, 69, 24
6. If an image conveys important information beyond what is in its alternative text, provide an extended description. (14 instances)
Lines 28, 29, 35, 50, 54, 65, 73, 77, 86, 106, 115, 116, 118
7. If a table has two or more rows or columns that serve as headers, use structural markup to identify their hierarchy and relationship. (3 instances)
Lines 46, 69, 24 Outcome

As long as you add alt text where suggested and these P1 user checks are OK, the page would pass as level A, without any further changes.

To get to Level AA, the P2 items listed above would need to be tackled. Fixing points 2 and looking at point 4 would be fairly easy, but addressing point 1 would entail changing the basis for sizing and the page may have to be redesigned before that could take place, and changing point 3 would change the functionality of the page.

How to try and achieve accessibility with new pages

For new pages or starting a new server, you can have the luxury of starting off with an accessible template and a stylesheet that does the mark-up work for you.

Using a good, up-to-date html editor will help you a lot. Several ([HTML-Kit](http://www.chami.com/html-kit/) for Windows [http://www.chami.com/html-kit/], and [BBEdit](http://www.barebones.com/) for Macs [http://www.barebones.com/]) have integrated versions of Tidy and validators, and the editor will allow you to use templates and batch-correct mark-up more easily than can be done by hand. The way the editor works will also cue you to use attributes you may well not remember, like table summaries. Both of these html editors are code based - graphical editors can be set up to produce more standards-compliant, accessible html but most don't do so by default (for setting up Dreamweaver 4, see <http://www.alistapart.com/stories/tools/>; guidance with Dreamweaver MX, see <http://www.macromedia.com/macromedia/accessibility/mx/dw/>).

If you are starting to use Flash, or preparing new material, Macromedia gives guidance on how to produce accessible content - see <http://www.macromedia.com/macromedia/accessibility/features/flash/>.

Design of pages

- You must ensure that web designers are made aware of all the requirements for accessibility by giving them your local guidelines (see later). Very few web designers know about accessibility and those who do very rarely know fully what should be done.
- Create a set of templates so that the pages have consistency of layout and local navigation.
- Avoid setting absolute font faces, font sizes or measurements on web pages. Use Cascading style sheets (CSS) and best practice to allow users to render information in a way that suits any special requirements they have in a browser independent manner. For all of the more recent browsers, the user can control the CSS that their browser uses and so create their own stylesheet that fulfils their requirements.
- Make no assumptions about the fonts available to a user, always give a list, ending in either serif or sans serif.

Design of information

- Structure your information in a way that creates a logical navigation system.
- Information should be written so that it can be read as chunks or blocks of continuous prose
- The comprehensibility of the information should always be considered above the layout of the web pages.
- When using tables for layout purposes, bear in mind that they are read row-by-row (linearised) when rendered by most speaking or line mode browsers. Ensure your layout makes sense when read in this way.
- Minimise use of graphics - those that are used should be optimised and compressed and should have their dimensions included so the download time for the page is as short as possible. All graphics must have an ALT tag to describe the picture - this may be empty for gratuitous decoration but should still be there.
- Minimise the amount of movement on the page. Moving or flashing graphics are distracting to all users but especially difficult for those who are visually impaired.
- To be safe, use only colours from the 216 'web safe' colour palette. If you set a colour for one out of background, text or link colours, you will need to set them all. Bear in mind that many visually impaired people can see high-contrasts better than shades of colour. Information about colours accessible to the colour blind can be found at <http://www.visibone.com/colorblind/> or <http://innovate.bt.com/ideas/whitepapers?doc=42266>
- If you use frames in your website, make sure you have a fully functioning noframes version giving access to all the information. Users of access technologies usually cannot use frame-based sites at all, so telling them to upgrade their browser is annoying.

Local Guidelines

Ensure that you have an adequate set of guidelines or recommendations for your server and/or other server managers on your site. Existing and new information providers should be supplied with the guidelines to help them understand the issues behind accessibility problems and these guidelines **must** be distributed to any web designers you employ or consider employing. They can be based on the guidelines available on <http://web-support.csx.cam.ac.uk/access/modelguidelines.pdf>, which have been used when commissioning web design for central servers.

Common Problems

- Alt text - remember to add empty alt text tags for gratuitous graphics
- Identify the language of the text in the <html> tag
- Table summary - easy to add and will help you when looking at the code for the page as it describes what the table is for

Difficult Problems

Updating a pre-existing page to make it more accessible can throw up problems that may be difficult to solve. Typically, the following Bobby complaints can be tricky:

1. Use relative sizing and positioning (% values) rather than absolute (pixels).
2. Do not use the same link phrase more than once when the links point to different URLs.
3. Separate adjacent links with more than whitespace.

Explanations and Solutions

1. In a page where fixed widths have been incorporated it may not be easy just to remove them and keep the page looking roughly the same. When using tables for positioning graphics, you may be able to remove the fixed width from the table mark-up and not see any change - the width of the graphic in the tag is allowed (in fact, encouraged).
2. The example we have of this being problematic but now fixed is on <http://www.cam.ac.uk/cs/docs/nls.html>. We used to have the link text "PDF file" for each of the documents, but now have changed to "<doc no> as PDF file" so that each of the link texts is different.
3. On the home page, some of the links on the right side of the page were only separated by paragraphs or breaks. The page has been redesigned so the links are now a list but are marked up with CSS that makes them look just the same as they were before - logically list items are separated by the bullet or number even if the styling visually removes it.

Future development of sites

The accessibility regulations, at least in their draft state, allow for institutions to have a schedule for making pages accessible, so don't worry if you have encountered problems that are hard to solve. The important thing is to have a grasp of what the problems are, and if you have problems with accessibility in important areas (such as teaching materials and course information), give contact information and be willing to offer solutions to those who come forward with a problem.

E-learning materials and accessibility

Many e-learning materials are web pages that can be assessed with the methods described above, however some incorporate multimedia features and use VLE software that will fall outside these guidelines and the issues are too great to discuss here. There are workarounds and different approaches but most of the commercial products are far from accessible. Some of the open source products have addressed the problems more thoroughly. See:

- <http://www.rsc-wm.ac.uk/?/Subjectareas/Curriculum/access/vleaccess>
- <http://www.techdis.ac.uk/resources/VLE001.html>
- Return to SENDA? Implementing accessibility for disabled students in virtual learning environments in UK FE and HE - <http://www.saradunn.net/VLEproject/index.html>

There is an excellent ten-module tutorial from Access eLearning

(<http://www.accesslearning.net/index.cfm>) that covers the above and also fills in some gaps that are particular to distance learning - the contents are shown below:

1. Accessibility Issues of Disabilities in Distance Education
2. Planning for Accessibility in Distance Education
3. Making Powerpoint Slides Accessible
4. Making Video Accessible
5. Making Flash Accessible
6. Making Word Documents Accessible
7. Making Excel Documents Accessible
8. Making PDF Documents Accessible
9. Making Common HTML Elements Accessible
10. Making Advanced HTML Elements Accessible

You need to register for the course but it is free of charge and allows you to complete it a little at a time.

JAWS screen reader

The Computing Service has available a PC running Windows 2000 along with JAWS and ScanSoft's Dragon NaturallySpeaking voice recognition package, allowing full spoken input and output. Jaws can be tried out with your web pages and a manual is available in braille. Basic training is available through the use of audio tapes. To book the machine for the audio course or for a trial of JAWS, please contact reception@ucs.cam.ac.uk or phone 34600.

If you feel that having a version of JAWS yourself would be useful, a 60-day test version is available for £50 plus £6.50 carriage plus VAT- see <http://www.sightandsound.co.uk/> from which more information about JAWS is available

Further information, tools and help

- TechDis <http://www.techdis.ac.uk/> particularly references and resources at http://www.techdis.ac.uk/seven/references_resources.html
- Sit Back and Relax: A Guide to Producing Readable, Accessible Onscreen Text - <http://www.techdis.ac.uk/ebooks/Home.htm> with full report at <http://www.techdis.ac.uk/ebooks/Techdis%20report.htm>
- SNOW: <http://snow.utoronto.ca/access/index.html> particularly useful for information about accessibility of courseware (some links out of date though)
- WebAim: Techniques and Concepts for accessibility - <http://www.webaim.org/techniques/> (Powerpoint information is referred to again below, but this page gives access to wider information about accessibility problems, particularly captioning multimedia content, and how to deal with them.) Webaim have published a review of free accessibility tools available online - <http://www.webaim.org/techniques/articles/freetools/>
- ATutor: Synopsis of accessible authoring information - <http://www.atutor.ca/atutor/docs/accessibility.php>
- Web-safe colour palette - <http://www.visibone.com/>
- Curb cut learning (from the Institute for Community Inclusion) keeps an up-to-date log of issues and solutions for Accessibility, Universal Design and Distance Education - <http://www.communityinclusion.org/curbcut/>
- Colourblindness charts and further information - <http://www.visibone.com/colorblind/> and <http://more.btexact.com/people/rigden/colours/>
- Macromedia's accessibility pages with solutions for Flash, Fireworks, Dreamweaver, ColdFusion, Contribute, Breeze, Director/Shockwave and Authorware. (<http://www.macromedia.com/macromedia/accessibility/>). Also tweaking Dreamweaver 4 to produce valid XHTML (see <http://www.alistapart.com/stories/tools/>)
- Adobe Acrobat: 'How to create accessible PDFs' see http://www.adobe.com/products/acrobat/access_booklet.html and General information on web accessibility and Acrobat - <http://www.adobe.com/products/acrobat/solutionsacc.html>
- Powerpoint: Creating accessible Powerpoint slides <http://www.webaim.org/techniques/powerpoint/> and <http://www.macromedia.com/macromedia/accessibility/features/breeze/building.html>
- Screen reader simulation: WebAim screen reader simulation needs Shockwave8 plug-in for simulation to work properly. <http://www.webaim.org/simulations/screenreader>
- Browser compatibility: <http://www.anybrowser.com/>
- This document and other accessibility issues: <http://web-support.csx.cam.ac.uk/>