

OSIER project – Exhaustive accessibility and usability guidelines

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1. Introduction	2
1.1 Basic accessibility principles	2
1.2 Who are the users?	2
1.3 References	3
2. Word processor documents	3
2.1 Use of styles	4
2.2 Textboxes, background images and colours	4
2.3 Tables and graphics	4
2.4 File formats and viewing software	5
2.5 References	5
3. Portable Document Format (PDF) documents	5
3.1 Searchable PDF documents	6
3.2 'Flat' PDF files	6
3.3 User configuration	6
3.4 Browser issues	6
3.5 References	7
4. Presentations	7
4.1 Accessibility and usability issues	7
4.1.1 Technical issues and how to minimise them	8
4.1.2 Usability issues and how to minimise them	8
4.2 Enhancing accessibility and usability of presentations	8
4.3 Corporate presentation/slide formats	9
4.4 Exporting presentations	9
4.4.1 Handouts	9
4.4.2 HTML files	9
4.4.3 PDF	10
4.4.4 Stand-alone players	10
4.5 File formats and compatibility	10
4.6 References	10
5. Spreadsheets	11
5.1 Good practice	11
5.1.1 Using titles	11
5.1.2 Accessible text	11
5.1.3 Formulae	11
5.1.4 Graphics	12
5.1.5 Organizing your workbook	12
5.2 Catering for screenreader users	12
5.3 Catering for dyslexic users	12
5.4 File formats and compatibility	12
5.5 References	13

[Click on the page number to jump to the section]

1. Introduction

This document outlines a series of recommendations for the production of accessible resources. It sets out the basic features of documents, presentations and spreadsheets that will enable resources files to be used by a wide variety of users, including those with learning impairments. It is an exhaustive treatment, supported by referenced research, and the project acknowledges that it will not be practical to follow these suggestions in all cases. A shorter checklist of project standards is also available.

1.1 Basic accessibility principles

The aim is to construct files that make them easy for any user, irrespective of any impairment so far as is possible. The approach combines good practice in clear layout and design with some very simple technical measures that make the file easy to repurpose and compatible with various assistive technologies. Although accessibility is commonly thought of in relation to specific groups of users, and in particular those with visual impairment who use tools such as screen-readers, it is much more about creating files that are optimal for all users, including those without impairment.

Not all files can be made accessible to each and every user – you may not be able to “treat all users equally by treating them the same”. Under these circumstances, alternative versions of the same file will offer the greatest accessibility whilst not bringing the resource to a ‘lowest common denominator’. An example would be providing a text transcript of a podcast, for users who are deaf or have impaired hearing.

1.2 Who are the users?

In the context of the OSIER project, we need to take account of the needs of various groups. In particular, we try to provide specific assistance for the following:

Users	Special requirements
Blind or with severe visual impairment	<ul style="list-style-type: none">• Compatibility of file with screen-reading software or Braille reader• Ability to increase text size• Ability to change colour scheme and/or enhance contrast• Alternatives for graphical objects
Colour vision deficiency ('colour blindness')	<ul style="list-style-type: none">• Clear graphical elements, ideally still 'readable' as equivalent greyscale images• Appropriate text and background colour combinations
Deaf or with impaired hearing	<ul style="list-style-type: none">• Text equivalent for audio material (where possible)
Dyslexia and other cognitive impairment, including autism	<ul style="list-style-type: none">• Ability to change colour scheme and/or change contrast• Simplicity and consistency of layout• Compatibility of file with screen-reading software

Note that some of the adjustments referred to in this table are concerned with enabling the use of software that converts text into a format that can be accessed more easily by the user – as synthetic speech or Braille. Modern versions of these types of software cope much better with different file types, but still require specific measures if they are to work effectively. The website of the Royal National Institute of Blind People (RNIB) provides more information (see references).

1.3 References

[All web pages and documents accessed on 13 April 2011]

BDA (British Dyslexia Association) homepage <http://www.bdadyslexia.org.uk/>

BUPA (British United Provident Association) Colour blindness information <http://www.bupa.co.uk/individuals/health-information/directory/c/colour-blindness>

JISC - Sim-Dis - 'a view into the unknown' - a collection of computer based artifacts that simulate aspects of disability http://www.jisctechdis.ac.uk/techdis/pages/detail/online_resources/SimDis

ReadRegular – simulations of distracting text effects seen by some dyslexic people <http://www.readregular.com/english/dyslexia.html>

RNIB (Royal National Institute of Blind People) homepage <http://www.rnib.org.uk>

RNIB Web Access Centre – provides guidance on web accessibility and assistive technologies http://www.rnib.org.uk/professionals/webaccessibility/Pages/web_accessibility.aspx

RNID (Royal National Institute for Deaf People) Information on deafness and hearing loss http://www.rnid.org.uk/information_resources/aboutdeafness/

Snook colour contrast checker http://snook.ca/technical/colour_contrast/colour.html

Vischeck simulations of colour vision deficiency <http://www.vischeck.com/vischeck/>

WebAim colour contrast checker <http://webaim.org/resources/contrastchecker/>

2. Word processor documents

Text documents prepared using word processor software such as Microsoft Word are the simplest type of resource available through the OSIER project. To be accessible for as many users as possible, they should:

- Be able to be re-formatted to change font size and colours
- Use heading styles, with a hyperlinked table of contents for longer documents
- Be laid out clearly and consistently, including
 - Use of non-serif font
 - Avoid use of italic text
 - Hierarchical titles for sections and sub-sections
 - Consistent use of list and heading styles

- Left justified
- Use of header and footer to provide non-text information
- Minimum use of footnotes
- Avoid the use of textboxes
- Avoid the use of background images and colours
- Avoid the use of footnotes
- Provide a title or alternate text for images
- Provide column titles for tables

The following notes refer predominantly to Microsoft Word (available for Windows and Mac), but apply equally to other word processors, such as Open Office (for Windows, Mac and Linux), NeoOffice (for Mac only) and Pages (for Mac only).

2.1 Use of styles

Many people preparing a document using a word processor will select a font and its size and colour from drop-down menus in the toolbar each time that they want to change the appearance of text. However, the software also includes 'styles', that contain a number of preset formats. These have the immediate advantage that the same style is applied consistently throughout. In the context of headings, it enables the document author to create a searchable table of contents.

2.2 Textboxes, background images and colours

Many features available in word processors provide obstacles to accessibility. In particular, anything that 'floats' such as a textbox may interfere with assistive technologies such as screen-reading software.

Background images such as watermarks, and background colours, may make the text difficult for dyslexic readers to read.

2.3 Tables and graphics

Tables in word processor documents can be read by modern screen-reading software. If it is possible to use the word processor to identify the column and row headings, this will make the table much easier for the screenreader user to read. Older versions of word processor software may not allow the author to add column or row headings.

Graphics are commonly incorporated into documents. Screen-reading software will not interpret an embedded graphic, but modern word processor software allows the author to add a text description that is legible using a screenreader. If your word processor does not offer this facility, you should ensure that the graphic has a descriptive title adjacent to it in the text. Graphics should not be used to present textual information.

Avoid wrapping text around graphics – this may make it impossible for screenreaders to function properly. Similarly, avoid graphics that are used simply for decoration.

Large graphics files can sometimes result in excessively large file size in word processor documents, making the document difficult to download. This is especially the case where very large image files, for instance from digital cameras, are brought into a document at their native resolution and then reduced in size within the word

processor. If large files are to be incorporated, they should be reduced in (pixel) size using image processing software first.

2.4 File formats and viewing software

Not all word processor files types can be opened by any word processor application. Microsoft Word typically opens only files with .doc and .docx extensions. The latter are not backwards-compatible with earlier versions of Word.

The other applications mentioned in the introduction (Open Office, NeoOffice, Pages) will open .doc and .docx files, and will also export in these formats. Their native file formats cannot be opened using Word.

Word processor files accessed on a website, especially Microsoft Word, may be opened within a plug-in within the browser rather than in the word processor application. This is a particular issue with Microsoft Internet Explorer. Features that make files accessible when opened in the word processor may not be included in the browser plug-in.

2.5 References

[All web pages and documents accessed on 13 April 2011]

Office of Disability Issues (2010) Creating accessible Microsoft Word documents: the essentials you need to know. Downloaded from <http://odi.dwp.gov.uk/common/publications-index.php> (go to P in the index)

RNIB page on accessible Word documents for visually-impaired users: http://www.rnib.org.uk/professionals/accessibleinformation/electronicdocuments/fileformats/Pages/word_documents.aspx

TechDis guidelines: <http://www.jisctechdis.ac.uk/techdis/resources/detail/resources/AE2-2003> (Word 2003) and <http://www.jisctechdis.ac.uk/techdis/resources/detail/resources/AE2-2007> (Word 2007)

University of Washington notes on Word accessibility <http://www.washington.edu/accessit/articles?266>

WebAim guidelines <http://webaim.org/techniques/word/>

3. Portable Document Format (PDF) documents

Typically, documents prepared as the Adobe PDF files are considered inaccessible. They are used commonly because their appearance remains the same irrespective of where they are opened, and this consistency is valued where it is important that a document should always look the same and cannot be altered by readers.

In reality, PDF files can be made accessible, and modern screenreaders will be able to access PDFs that have been formatted correctly. Although the full scope of formatting can only be achieved using PDF authoring software such as Adobe

Acrobat (not the free PDF reader), modern word processor software will export documents as PDF files that offer an acceptable degree of accessibility.

The main features of accessible PDFs are similar to those for word processor documents. If a PDF is created from an accessible word processor document, export settings are needed that will retain accessible features derived from the use of headings and styles.

In addition to layout and design features identified for word processor documents, to conform to the OSIER projects standards, PDF files should:

- Have properly styled heading levels
- Have been saved as ‘tagged PDF’
- Have alternative text added to any images

3.1 Searchable PDF documents

PDF files that contain properly styled heading levels and have been saved as tagged files will have a hyperlinked list of contents when opened in a PDF viewer such as Adobe Acrobat Reader or Apple Preview. This means that a screenreader user can navigate easily from section to section, and that the PDF will open at the section that was being read when the file was last opened.

3.2 ‘Flat’ PDF files

Old format PDFs and those generated from some software are essentially digital photocopies and are not accessible to screen-reading software as they are essentially image files rather than text documents. An optical character reader (OCR) application may produce an acceptable text version of such a file, and some modern screen-reading software incorporates OCR. However, these files are not considered accessible.

3.3 User configuration

PDF files cannot normally be reconfigured by readers. This limits the scope for customizing the document to suit the user’s needs, for instance changing text colour or font size.

Some PDF files contain user-controlled elements, such as data-entry windows or check boxes in PDF forms. These may raise separate accessibility issues.

3.4 Browser issues

Microsoft Internet Explorer may open PDF files using a plug-in within the browser rather than a fully-featured PDF reader. The plug-in may not support accessibility features.

3.5 References

[All web pages and documents accessed 13 April 2011]

AbilityNet conversion of documents to accessible PDFs

<http://www.abilitynet.org.uk/accessibledocs>

Adobe document on Acrobat 9 accessibility (follow link to document at bottom of the page) <http://www.adobe.com/accessibility/products/acrobat/training.html>

BBC Guidelines

http://www.bbc.co.uk/guidelines/futuremedia/accessibility/accessible_pdf.shtml

RNIB page on PDF accessibility for visually-impaired users

<http://www.rnib.org.uk/professionals/accessibleinformation/electronicdocuments/fileformats/Pages/pdf.aspx>

University of Washington guidelines <http://www.washington.edu/accessit/articles?2>

WebAim page on PDF accessibility <http://webaim.org/techniques/acrobat/>

4. Presentations

Presentations, such as those prepared in Microsoft PowerPoint, are also common resources in the OSIER project. They comprise a series of slides, each of which contains a number of elements that can be accessible, such as text, and some that will not be accessible for some users, such as graphics, simple animations and embedded media.

Presentation software offers wide scope for both the preparation of resources and for the way that they can be used. Crucially for a project concerned with the sharing of resources, presentations need to be released through OSIER either as wholly self-contained (stand-alone) entities, or with associated materials such as narrative files that provide supporting information that allows the user to make effective use of the presentation.

Microsoft PowerPoint is probably the best-known presentation software. Other products that are used widely are Open Office (for Windows, Mac and Linux), NeoOffice (for Mac only) and Keynote (for Mac only).

Prezi is a presentation software that arranges objects on a stage, rather than as a linear series of slides. Whilst this works effectively for some presenters, it is unlikely to be a usable resource for learners.

4.1 Accessibility and usability issues

Because of the very flexible structure of a presentation file, and the range of components that can be included, preparing accessible and usable presentations is difficult. The issues can be divided into those that present technical problems, especially for assistive technologies such as screen reading software, and more general usability issues.

4.1.1 Technical issues and how to minimise them

The two major technical problems with presentations are that:

- Part of the information on a slide derives from the layout and the spatial relationships between elements. Any technology employed to ‘read’ the slide may be able to interpret individual elements, but their sequence may not be obvious. Standard slide layouts, that render text in a predictable layout and with a ‘readable’ hierarchy of headings and text, offer significant improvement.
- Much of the content of the slides in a presentation may be graphical – indeed if this isn’t the case then there is probably a case for using other software to present the information. Some presentation software may allow the addition of descriptive text to graphical elements. If this is not available, the graphical element can be associated with an explanatory text field on the slide, or text in the notes field associated with the slide.

As with text documents, the inclusion of redundant graphics should be avoided if the slides are to be accessible. Graphical transformations of text (‘word art’) are not technically accessible, nor are template objects such as tables or other specialist objects such organization structure charts.

4.1.2 Usability issues and how to minimise them

There is a classic caricature of the PowerPoint presentation that includes every feature and effect. The result is not only unusable (or in some cases unviewable) – it is an archetypal case of where the technology usurps its purpose. Releasing a presentation as a self-contained resource places additional usability constraints. The following questions are important:

- Can the presentation be used on its own, or is it only effective when accompanied by a live presenter (typically the author)? If the author is not present, can their input be replicated by using notes on each slide, or by a separate transcript or guide?
- Is there consistency in style throughout the presentation? In particular:
 - Is the slide design as consistent as it could be? Are slide backgrounds used?
 - Does the presentation use standard slide layouts?
- Does the layout and colour scheme present difficulties for some users? Many presentations that are prepared for use in lecture theatres need to be modified if they are going to be usable as free-standing resources.
- Is the information content of each slide reasonable? Use more slides rather than filling each to bursting point, and always avoid text that trespasses onto other elements.

4.2 Enhancing accessibility and usability of presentations

Good design principles allow the author of a presentation to make it usable for a wide audience. In many cases, following these principles will not only enhance accessibility, but will make the presentation more useful and attractive for everyone. Typically a usable presentation will:

- Use standard slide layouts and backgrounds to enhance consistency
- Use colour schemes and layouts that favour users with visual or cognitive impairments
- Keep the content on each slide to a usable level
- Avoid distracting animations and transitions
- Avoid embedded media, or provide alternatives
- Use graphics only to convey information, with alternative text content on the slide or in the slide notes
- Use the slide notes effectively to complement the slide contents and to ensure that each slide is easily understood

4.3 Corporate presentation/slide formats

Many resources produced originally for ‘classroom’ teaching in higher education have been generated using templates supplied by the author’s institution. The design of these templates is likely to have been driven more by the institution’s wish to project its corporate identity than to make it easy for all users to access – the two are not mutually exclusive but it often ends up that way.

Common failings of corporate templates include:

- Poor layout, often losing significant ‘slide-space’ through graphical framing
- Colour schemes that create accessibility issues
- Distracting logos and straplines

If one or more of these issues causes significant problems, it is worth considering replacing the slide template with a simple coloured background. Institutional badging can be added as an additional slide, or reinstated in a less intrusive fashion on each slide.

4.4 Exporting presentations

Presentation files are typically designed to play in presentation software. Some web browsers may have plug-ins for presentations, and there are also free downloadable players for some presentation software. Accessibility features built into some modern presentation software may not work in plug-ins or players, or if the file is viewed in different software from that in which it was written.

Many authors routinely convert their presentation files into alternative formats. Some of these overcome accessibility issues, although in some cases they may raise new problems.

4.4.1 Handouts

It is common practice to export presentation files as handouts. These are printable files that can be prepared in a variety of layouts that can include slide notes.

4.4.2 HTML files

Presentation software may allow the author to export the presentation as an HTML file. This creates a series of web pages within a player that allows the user to scroll through the slide set. Each slide is converted into a flat image, so that all accessible

text is lost. The HTML produced by the presentation software may also raise accessibility issues in its own right.

4.4.3 PDF

Presentations can often be exported as PDF files, and these are often used as web downloads. The accessibility of these is variable.

4.4.4 Stand-alone players

A presentation may be exported as a stand-alone (or projector) file. These are designed to work independent of the presentation software, by bundling a player in with the presentation. Any accessibility feature built into the presentation should survive, but the file size is very large, making download difficult. Stand-alone players do not require separate software to play, but are specific to an operating system.

4.5 File formats and compatibility

Not all presentation file types can be opened by any presentation application. Microsoft PowerPoint typically opens only files with .ppt and .pptx extensions. The latter are not backwards-compatible with earlier versions of PowerPoint.

The other applications mentioned in the introduction (Open Office, NeoOffice, Keynote) will open .ppt and .pptx files, and will also export in these formats. Their native file formats cannot be opened using PowerPoint.

4.6 References

[All web pages and documents accessed 13 April 2011]

Open University 'Making your teaching inclusive'

<http://www.open.ac.uk/inclusiveteaching/pages/inclusive-teaching/accessibility-and-powerpoint.php>

RNIB page on accessible PowerPoint for visually-impaired users:

<http://www.rnib.org.uk/professionals/accessibleinformation/electronicdocuments/fileformats/Pages/powerpoint.aspx>

Skills for Access <http://www.skillsforaccess.org.uk/multimedia.php?id=82>

TechDis guidelines:

<http://www.jisctechdis.ac.uk/techdis/resources/detail/resources/AE3-2003> (PP2003)
and <http://www.jisctechdis.ac.uk/techdis/resources/detail/resources/AE3-2007>
(PP2007)

WebAim guidelines <http://webaim.org/techniques/powerpoint/>

5. Spreadsheets

At first sight, it is hard to imagine spreadsheets being accessible to all users. If a spreadsheet is being used simply to transmit data, you should find another format. However, accessibility can be enhanced by:

- Using titles and using ‘freeze panes’ to ensure title visibility when scrolling
- Selecting accessible fonts and font sizes
- Calculating formulae in easy stages, rather than as a single huge calculation
- Avoiding ‘floating’ graphics, and placing charts on separate worksheets
- Using worksheets to organize the workbook, and providing an index

Microsoft Excel is probably the best-known spreadsheet software. Other products that are used widely are Open Office (for Windows, Mac and Linux), NeoOffice (for Mac only) and Numbers (for Mac only).

5.1 Good practice

The suggestions in this section may not be possible with all spreadsheet software, and not all assistive technology will work effectively with spreadsheets.

5.1.1 Using titles

Using the top row of cells and the left-hand column or cells as titles of columns and rows respectively enhances the navigability of the spreadsheet for modern screen reading software.

If you have a data table that requires scrolling to view (and consider user change to text size or screen magnification), use freeze pane to ensure that titles are always visible.

5.1.2 Accessible text

As with all text documents, a clear sans-serif font should be used. Italic and underline should be avoided. Typically, spreadsheets employ small default font size. You can either increase the font size to enhance readability, or ensure that the layout of your worksheets functions effectively if the user increases the magnification.

Some users may wish to change the colour of text, background and cell borders. Ideally, you should avoid using colour to convey information – this will not register on screen reading software and might be lost if the user changes the colour scheme. Conditional formatting overrules user colour choice.

5.1.3 Formulae

Because formulae in spreadsheets are relatively crude expressions, they can be difficult to understand. If you need to perform a complex calculation, it is often worthwhile breaking this into a series of sub-calculations, with clear explanation of

what each means and how the final result is achieved. This is often good practice in any case, helping all users to understand what is going on.

5.1.4 Graphics

Spreadsheets usually offer the option to include charts and other objects within the worksheet where they are generated or in a separate worksheet. The latter option is preferable – ‘floating’ objects on a worksheet may be interrupt the flow for screenreaders. Some spreadsheets save a new graph as an object in the current worksheet by default – you will need to move it to a new worksheet as a separate operation.

5.1.5 Organizing your workbook

Keep to one data table on a single worksheet. If you have several worksheets in the workbook (spreadsheet), consider building a table of contents on the entry page and hyperlink entries to the top cell (A1) in individual worksheets.

Avoid merging cells. This interrupts the structure of the worksheet.

5.2 Catering for screenreader users

Modern screen-reading software can navigate through spreadsheets. To help users, you should provide clear navigation. An index to all worksheets, that hyperlinks to the title of the worksheet, helps screenreader users navigate around a complex workbook. Titles provide clear structure within a worksheet.

Screenreader usability is reduced by floating elements within a worksheet, such as a graph. If large blocks of text are used on a worksheet, these should be broken into logical subsets in adjacent cells if possible, or alternatively the entire text can be pasted from a word processor into a single cell to provide an screenreader-accessible alternative.

5.3 Catering for dyslexic users

Provided that a suitable font (non-serif) has been used, dyslexic users have the option to improve the readability of a spreadsheet by making global changes to font-, background- and border- colours. Large data tables pose problems, and titles and other navigation aids should be clearly visible. Simplicity and consistency of layout, and clear navigation, will be helpful and will aid all users.

5.4 File formats and compatibility

Not all spreadsheet files types can be opened by any spreadsheet application. Microsoft Excel typically opens only files with .xls and .xlsx extensions, although some other formats are supported. The .xlsx format is not backwards-compatible with earlier versions of Excel.

The other applications mentioned in the introduction (Open Office, NeoOffice, Numbers) will open .ppt and .pptx files, and will also export in these formats. Their native file formats cannot be opened using Excel.

5.5 References

[All web pages and documents accessed 13 April 2011]

RNIB page on spreadsheets in general

<http://www.rnib.org.uk/professionals/accessibleinformation/electronicdocuments/spreadsheets/Pages/spreadsheets.aspx>

RNIB page on Excel in particular

<http://www.rnib.org.uk/professionals/accessibleinformation/electronicdocuments/fileformats/Pages/excel.aspx>

This resource has been released as part of the OSIER project, which is promoting the use of resources to support the training of practitioners in Education for Sustainable Development and Global Citizenship within the curricula of all of the home nations of the United Kingdom. You can find out more about the project on the 'About' page of the project repository site.

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