Guidelines on preparing accessible content for repositories

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Guidelines on accessible documents

1. Introduction

Why is it important to prepare documents in an accessible way?

1) Compliance with statutory provisions ([Barrierefreiheit für Repositorien. Ein Überblick über technische und rechtliche Voraussetzungen](#) (accessibility of repositories; an overview of technical and legal prerequisites), p. 262)
2) Social responsibility
3) Economic interests (findable in search engines, machine readability → FAIR principles)

In their publication "Barrierefreie PDF-Dokumente erstellen" (creating accessible PDF files) (2019), Klaas Posselt and Dirk Frölich state that a major characteristic of highly accessible documents is that they can be used by anybody without limitations, regardless of any impairment of the users. However, they note that there is no digital format that is 100 % accessible and has no deficits. Readers have different needs and also the contents are very diverse. What is essential is that the contents can be used with every program. (Posselt/Frölich, 2019, 63)

To make your object more accessible, we recommend the following steps for different documents:

2. Word

2.1. Use styles and follow a headline structure

Styles create a uniform pattern. This allows screen reading programs on the computer to distinguish between headlines and body text.

The headline structure should follow a logical sequence.

2.2. Create directories automatically

To create directories and references, use the automatic directories and interactive references in Word. The following directories and references are available in Word:

- Table of contents
- Table of figures
- List of tables
- Index
- Footnotes/endnotes
- Cross-references

2.3. Determine document properties

Document properties enable people using a screen reader to find and allocate files easier on their PC. For example, you can add a document title, details about the author or comments to a file. This allows the screen reader to identify the type of file without having to open it.

Also search engines use this information.

When converting a Word file into a PDF file, the document properties are transferred.

2.4. Select and define the correct document language

To enable screen readers to read out computer programs in a comprehensible way, it is essential to select the correct document language. You can also assign individual words or longer passages to another language. Words in a foreign language, especially longer passages, quotes, etc. should be assigned to the relevant language. This enables screen readers to read them out in the correct sound pattern of the relevant language. Otherwise, the text may be incomprehensible.

2.5. Insert hyperlinks

Most screen readers are programmed to read out a common link letter by letter ("W" - "W" - "W" ...). Therefore, you should add an alternative text to be displayed instead of the hyperlink. By right-clicking the hyperlink, a menu appears in which you can select "Edit hyperlink". Here, you can insert a "text to display". Enter the text you would like to be displayed and confirm by clicking "OK". Now, instead of the complete hyperlink, the alternative text is displayed in the text. The alternative text should be brief and meaningful.

2.6. Create bookmarks and use them as link destination

In the "Hyperlink" dialog window, you can create bookmarks. These bookmarks can be used within a document for hyperlinks.

2.7. Adjust line spacing to the font size

The standard font size should be at least 12 point.

Ideal line spacing is 120 % of the font size. If the lines are very long, the line spacing should be slightly larger.

2.8. Use simple fonts

Similar to poor contrast, some fonts pose a problem for people with visual impairments. Therefore, you should use simple fonts (e.g. Arial, etc.).

Avoid using very fine or bold font weights as well as very narrow or wide font widths.

2.9. Use strong contrasts

Strong contrasts within a document are essential for people with a visual impairment. Therefore, using black-and-white contrasts or similar contrasts is recommended.

2.10. Do not use colours as the only means to convey information

Colours should not be used as the only means to convey information. Persons who have difficulties detecting colours may not be able to distinguish between different contents.

Since many people suffer from red-green colour blindness, we recommend not using this colour combination. This also applies to complementary colours (and to the combinations blue-orange and yellow-purple) as they might cause a flicker effect.

2.11. Do not use the space character for indentations and breaks

Avoid using the space character for indentations of text elements, since screen readers might read out every space character individually ("Space", "Space", "Space", ...). Instead, use the tab key. To add a page break, use the key combination "Strg" + "Enter" (or: CTRL + Enter).

2.12. Use lists to group information

The best options for creating lists are bulleted lists and numbered lists. Lists formatted as bulleted or numbered lists in Word are also recognised as such when converting the text file into a PDF file. This enables assistive technologies, such as screen readers, to correctly read out lists both in Word and PDF files.

2.13. Insert tables containing proper text – no images or illustrations

To allow screen readers to access the content of a table, you should never insert tables as an image/illustration but rather as a table containing proper text. In addition, tables must contain a header line to provide orientation for the screen reader. To insert a header, select the first line of the table. In the "Layout" ribbon, activate "Repeat header rows". Furthermore, the table should not contain any merged or empty cells (see 4.8. No empty cells) as this might mess up the reading order of screen readers. For comprehensive or complex diagrams, we recommend publishing the underlying data table and referring to it in the alt text.

2.14. Add alt text to illustrations and images

Persons with a visual impairment are not able to perceive illustrations within a text. Therefore, it is especially crucial to add alternative text to these illustrations. Right-click the illustration. A menu will appear in which you can select "Insert caption". Enter the alt text and click "OK".

Select the "In Line With Text" break for images inserted into the text. To do so, right-click the image and select "Text Wrapping" – "In Line With Text". Avoid using nested images that are inserted into text frames.

Add alt texts to the images, describing what the image depicts (screen reader software is able to read out alt texts). To add alt text, right-click the image and select "Edit Alt Text".

For images, charts and graphics (in short: illustrations), it is important to distinguish between images, infographics and embellishments. Depending on the type of illustration, you have to choose an appropriate alt text. For illustrations not containing any alt text, screen readers read out their file name. Therefore, all images must contain an alt text. Text alternatives should be formulated in a brief and unambiguous way.

The image text should specify the description of the image and the copyright.

2.15. Disable the "Track Changes" function

In the "Review" tab, under "Track Changes" select "Lock Tracking".

2.16. Check accessibility

Click "Check Accessibility" to check the document for deficiencies regarding accessibility.

2.17. Related links about Word documents

- [User guide for creating accessible Word and PowerPoint documents](#) (in German)
- [User guide for preparing accessible final reports in Microsoft Word](#) (PDF, in German)
- [User guide for accessibility in Word 2010 documents](#) (PDF, in German)
- [User guide for preparing accessible documents](#) (PDF, in German)

3. PDF

"Accessible PDF files are a by-product of well-planned publication processes" (Posselt/Frölich, p.75). 95 % of all requirements are relatively easy to implement. (Posselt/Frölich, p.127).

The level of accessibility of PDF files varies between easy to read and unusable. A PDF is solely a container for contents. For example, it may also contain just an illustration. PDF/UA is an ISO standard for accessible PDF technology (see International Organization for Standardization (ISO) 2014).

3.1. Use the "Save as PDF" function

To create a PDF file from a Word file, please do NOT use the print function. Although the print function allows you to create a PDF file, this PDF file does not contain the tags that are essential for screen readers – the so-called XML structure. Instead, use the "Save as PDF" function which is an integrated feature in the latest versions of Word. Tick the options "Document structure tags for accessibility" as well as "Document properties" and "Create bookmarks using headings".

3.2. Use Adobe Acrobat

Alternatively, we recommend using Adobe Acrobat. Acrobat enables you to achieve the best results in terms of accessibility if you use the tool correctly – here too, you have to select the relevant options when exporting a file.

3.3. Prepare a text as a basis for a PDF

It is essential that you structure your text properly, i.e. by making headings and other important elements easily identifiable, as screen readers will read out the text from top to bottom. Only the person creating the text (and not the computer) can establish the structure of the text.

3.4. Checklist for accessible PDF files

1. All relevant contents have tags.
2. The metadata of the PDF file specify the title of the publication, and not the file name.
3. The language is defined.
4. All content elements (e.g. lists, tables, images) have a tag with the correct description. Headings are marked as such.
5. The tags are in the correct order.
6. Text is entered as text and not as an image.
7. The fonts used are correctly encoded. If a character is recognisable, for example, it must also be output as such. This also applies to symbol fonts.
8. Images, illustrations, icons, etc. have an alt text.
9. Only relevant contents are output. Background images and repeated text elements in headers and footers are not output.
10. The security settings of the file allow access to the information in the file. (see Posselt/Frölich, p.70-74)

3.5. Basic requirements for accessible PDF files

1. The content elements must be marked according to their role/meaning. (Semantics) (e.g. heading, list, table, image) You can use pre-defined markup options (PDF tags) which allow you to structure your documents.
2. For lists, tables and hyperlinks, we recommend using the relevant program functions.
3. Headings, quotes, body text should be formatted using paragraph styles.
4. Pay attention to a logical sequence of contents and/or reading order.
5. The structure should be based on semantic aspects and not on design features.
6. Only use tables if they are important to convey meaning. Do not use tables for layout purposes. Do not convert tables into image files.
7. Labelling of illustrations, tables, lists and formulas increases usability.
8. Forms should not only be recognisable as such visually, but should also be digitally accessible. For example, it must be possible to access form fields using only the keyboard.

9. Alt text for images should be concise and objective and also describe the context.
10. The language used is specified.
11. If possible, use easy-to-read language. Avoid using abbreviations, hyphenations, complex phrases and very long sentences.
12. Make sure the document has sufficient contrast.

3.6. PDF/UA

PDF/UA (Universal Accessibility) was established as a standard for accessible PDF files. It does not contain any new functions, but makes some aspects mandatory. For example, relevant contents must have a PDF tag and texts, tables, images and illustrations are subject to specific requirements. The objective is to make any content accessible.

Tools such as PAC 3 and PAVE are available to check documents for PDF/UA. PAC 3, the PDF Accessibility Checker PAC, is a freeware, developed by the Swiss foundation "Access for all". PAC checks 107 criteria for accessible PDF in accordance with the PDF/UA standard. The check is based on the [Matterhorn Protocol](#) which contains guidelines for software developers and document testers to create fully accessible PDF files that conform with the PDF/UA standard.

PAVE is a free web application developed by the ICT-Accessibility Lab of the ZHAW School of Engineering. It checks PDF/UA files for accessibility in four steps.

Download PAC: [PDF Accessibility Checker](#)

Web application PAVE: [PAVE](#)

3.7. Related links about PDF documents

- [Recommendations for accessible repositories](#) (in German)
- [What is an accessible PDF?](#) (in German)

4. Excel

Screen readers read out Excel files cell by cell and line by line. Therefore, quickly grasping an Excel table at first glance is not possible. Thus, make sure to organise Excel tables as simple as possible and avoid formatting. Label the columns with relevant headers that demonstrate the general context of the table.

To make Excel files better readable for blind persons and/or for screen readers, please observe the following recommendations:

4.1. Use column headers

Add a column header in the first cell of each column.

4.2. Use sufficient contrast with accessible text colour

Strong contrast between text and background (e.g. black on white) is easier to read for persons with a visual impairment.

4.3. Remove empty worksheets

Screen readers jump from one worksheet to the next. If the worksheets are empty, this takes unnecessary time.

4.4. Name all worksheets

Screen readers read out the title of the worksheet, thus providing an overview of the content.

4.5. One table per worksheet

Screen readers read out tables line by line. Several tables in one worksheet are confusing and the user loses orientation.

4.6. Simple table structure

The simpler the table structure, the easier screen readers can read the table and the better the overview (do not merge or nest cells).

4.7. Wrap text in tables

In case of long texts, screen readers simply discontinue reading at the end of the cell. By enabling text wrap in cells, the entire text remains within the cell and can be output by the screen reader.

4.8. No empty cells

Enter the text "no data" in empty cells. This text can be hidden (white on white). In this case, screen readers output "no data" instead of "empty", which would have an irritating effect.

4.9. Write an introduction in cell A1

Write a brief text in the beginning, specifying what the table is about.

4.10. Always keep cell A1 active when saving

Screen readers start reading in the active cell. Therefore, place the cursor in the first cell to ensure that this is where the screen reader starts reading when the table is opened.

4.11. Write "End of worksheet" in cell Ax

Provide orientation by specifying the end of the table. Otherwise, the screen reader will continue outputting empty cells.

4.12. Avoid comments

Please do not use the comment function as screen readers are not able to read out comments.

4.13. Add alt text for visual objects

For example, in Windows, right-click the object and click "Format Object". Then, enter a description of the object (e.g. illustration) under "Alt Text" (also see section 5 Images and illustrations).

4.14. Related links about Excel documents

- Make your Excel documents accessible to people with disabilities
- Microsoft Office Accessible Excel template sampler
- Guideline on creating accessible documents using Microsoft Excel (by the University of Kassel) (in German)

5. Images and illustrations

5.1. General information

Images and/or illustrations fulfil different purposes in documents: On the one hand, they are embellishments that make the text more appealing and, on the other hand, they can emphasise or stress content and visually support the readability of passages.

5.2. Selecting images

If you would like to embed images or illustrations in a text, it is essential to ensure that the motifs are easily recognisable and that the background is calm and high in contrast. People with a learning disability may be sensitive to stimuli, such as bright colours, so please avoid using them. Moving or blinking images and illustrations are not suitable for accessible documents as well. In addition, you should consider that text placed on images is not easily readable and should thus be avoided.

5.3. Provide alt texts

To make images and illustrations accessible, you have to determine whether they fulfil a purely decorative purpose or whether they convey additional information relevant to the text. In general, you should assume that informative images and graphics are essential for understanding the text. Therefore, they need a descriptive alt text to allow screen readers to access these contents. Furthermore, it is possible to describe images in the context. The more information you provide in the context, the shorter the text alternative can be.

Important information about writing alt texts

5.3.1. Exact description of the content and purpose of the image

- Alt text should be formulated as objectively as possible, unless the author intends to trigger an emotional reaction in the reader.
- Use consistent language when writing alt texts.

5.3.2. Alt texts should be brief and meaningful

- The alt text should contain sufficient detailed information that correctly describes the image, but should contain no further details. The reader should merely be able to grasp why the image is included in the document.

5.3.3. Orthography and punctuation

- Screen readers read out alt text exactly the way it is. Therefore, they also read out spelling and punctuation errors. As programs such as Microsoft Word do not automatically check alt text for spelling or grammar, the author of the text has to check the alt texts thoroughly. In particular, missing or incorrect punctuation can distort the content of the alt text or make it difficult to understand.

5.3.4. Text contained in images must be included in the alt text

- Screen readers are not able to identify text contained in images. Therefore, you have to include text contained in images in the alt text if it is relevant to the content or context of the image.

5.3.5. Do not rely on quality control tools

- Microsoft Word and Adobe Acrobat contain quality control tools that check documents for accessibility. These tools are able to detect alt text, but they are not able to check the quality of the alt texts. Therefore, we recommend asking another person to check the alt texts.

5.3.6. Alt texts are also relevant for search engines

- Alt texts are not only useful for screen reading programs by describing images and making their content accessible. Also search engines use the text to grasp the content and context of an image.

5.4. Photos

If you use photos in a document, you additionally have to consider the following aspects:

- If the photos show persons, the persons depicted should be identified by name, if possible.
- Visually discernible situations and actions have to be described in the alt text.
- It might be relevant to describe the situation in which the photo was taken in the alt text.
- If the photo aims at triggering certain emotions, the alt text should explicitly specify this.

5.5. Infographics and other complex illustrations

Diagrams, illustrations and tables often illustrate complex data and information. Therefore, they are difficult to describe in alt texts. Instead of an explanatory alt text, they may be easier to understand if you merely specify the title of the illustration and mention that the text contains information about the content and interpretation of the illustration.

However, when using infographics and other complex illustrations, please consider that the image type must be specified in any case. For example, bar diagram, organisational chart, etc.

5.6. Font graphics

Alt text for font graphics, posters or, for example, book covers should contain the depicted text as comprehensively as possible. In addition, visual elements of the illustration or font might be relevant and should thus also be mentioned in the alt text.

5.7. Inserting alt texts in Microsoft Word or InDesign

Depending on the software used, inserting alt text works differently.

Microsoft Word:

- In Microsoft Word, right-click the image and click the menu item "Insert caption" to insert alt text. On the right side of the screen, a field appears in which you can enter the alt text.

InDesign:

- Depending on the purpose, illustrations are defined as "simple images" or have to be assigned alt texts. You can enter alt text in the menu item "Object".
- To ensure that screen readers read out the document in the correct order, you can anchor images and their alt text in the desired positions in InDesign by defining anchors.

5.8. Related links about images and illustrations

- Klaas Posselt, Dirk Frölich, Barrierefreie PDF-Dokumente erstellen, Das Praxishandbuch für den Arbeitsalltag, 2019, 1st edition (creating accessible PDF documents; a practical handbook for professional life, in German)
- Sarah Sophie Kitza, Gestaltung von Alternativtexten – eine empirische Studie aus Nutzerinnen- und Nutzersicht, 2015: Writing alt texts – an empirical study from a user perspective (barrierefreies-webdesign.de) (in German)
- Guideline on creating accessible documents (th-koeln.de) (in German)
- How to create accessible PDF documents (tu-freiberg.de) (in German)
- Checklist for accessible PDF and Office documents | accessibility | training, supervision and tests (netz-barrierefrei.de) (in German)
- Illustrations as informative images – decision flow chart for alt texts – [barrierefreies-webdesign.de] (in German)
- Accessible documents in InDesign - friendly training (in German)
- Alt text for images is important for accessibility and SEO (techsmith.de) (in German)

6. Videos

Multimedia elements enable you to present content in an interesting, interactive and concise way. By following some basic rules, you are able to design accessible multimedia content that can be used by a wide audience.

6.1. General information

To create accessible videos, it is worth investing in professional video equipment. Recordings made on a laptop/notebook or mobile phone cannot guarantee the highest possible video and audio quality. If you have to use a mobile phone or comparable device, do not use any filters as they may be counterproductive in terms of image sharpness and colours. Pay attention to sufficient contrast to achieve clear images.

6.2. Lighting

Even and consistent lighting also increases video definition and helps viewers to distinguish what they are seeing more easily.

Bear in mind that natural light, weather conditions or unsuitable artificial light can produce shadows. Play it safe by using powerful lights and avoiding sources of natural light.

Nowadays, lamps are often sold in so-called studio sets, which makes the decision much easier.

Please note that flash effects can cause epileptic seizures. Avoid using flashes that go off more than three times per second.

6.3. Actors

Persons talking in a video should face the camera. Their face should be sharp, rich in contrast and well-illuminated. If the person talking uses gestures to convey meaning, the entire body should be clearly visible. This allows the viewers to follow the facial expressions, lip movements and gestures of the person talking.

6.4. Setting

Avoid changing the location too often during filming. It should be obvious where you are and who is currently talking.

6.5. Audio and language

You should not convey too much information at once through the audio. When playing loud music, there should not be a narration at the same time. During dialogues, avoid loud noises in the background. Several persons should not be talking at the same time. All persons talking should be equally loud.

Prepare a script for the audio sequence when planning the video. This allows you to plan passages that promote accessibility or to visualise the sequence. For lectures, you can schedule time to verbally describe visual contents, such as the slides. Schedule enough time for these verbalisations.

If it is not possible to verbally describe the contents during the scene, you should offer other options to the audience. For example, you can provide an audio description, subtitles or captions. You can insert the audio descriptions during pauses in the dialogue or, if necessary, also while the persons in the video are talking. Note that you have to consider the length of the audio description when

planning the scenes. Schedule enough buffer time to ensure that the audio description and the scene fit together and make sure that the pauses are not too long to avoid the audience losing interest.

If you provide subtitles or captions to the audience, you also need to schedule time for these. Subtitles are translations for an audience that does not speak the language of the medium. Captions, on the other hand, are a transcript of spoken content in the video. They are usually in the language of the original medium. Captions can be open or closed. Open captions are embedded in the video and cannot be disabled. Closed captions, on the other hand, can be enabled and disabled as needed.

You can also provide the audience with text transcripts or contract a sign language interpreter. When planning your video, consider that you need a separate video frame for the sign language interpretation. The sign language video should not cover any important contents on the screen.

6.7. Subtitles/captions/descriptions/sign language

Subtitles and captions have to be easily readable. The readability depends on the font, font size, contrast settings and the background. Subtitles and captions should always appear in the same place on the screen (to avoid the audience having to search for them). They should be visible long enough so that everybody can read them.

You are on the safe side if you use audio descriptions that can be disabled and closed captions to ensure that persons who are bothered by them can disable them.

6.6. Plain and easy-to-read language

Easy-to-read language is targeted at people with learning disabilities and, thus, at a clearly defined target audience. Easy-to-read language is often complemented by easily comprehensible illustrations and does usually not convey complex information. There is a fixed set of rules for the use of easy-to-read language. These rules formalise the review process, formatting, the vocabulary used and further characteristics of easy-to-read language.

The target audience of easy-to-read language comprises the general public and people who have difficulties understanding complex texts. Plain language, in contrast, does not have a fixed set of rules. It may also be used to convey complex contents and allows for a relatively wide range of vocabulary. Difficult terms and complex contents must be explained in a comprehensible way. Therefore, texts using plain language are sometimes much longer than conventional texts.

If possible, use plain language for multimedia contents.

6.8. Providing videos

If you have decided to produce an accessible video, also consider how you can make the video available in an accessible way. If the contents should be downloadable, provide them in a common and, thus, accessible format (e.g. MP4, OGG, MPEG, AVI).

If you embed the video, for example, on a website, make sure that you use an accessible media player. Accessible media players can be operated via the keyboard and contain large and easily recognisable controls. Subtitles, closed captions and audio descriptions can be embedded and can be disabled and enabled. It is possible to zoom in and out of the video and adjust colour contrast.

6.9. Related links about video and multimedia

- WAI Checklists for Audio and Video
- Audio Content and Video Content | Web Accessibility Initiative (WAI) | W3C
- Barrierefreie Audio- und Video-Informationen; Barrierefreie Vorträge und Veranstaltungen (accessible audio and video information; accessible lectures and events)
- Able Player | Fully accessible cross-browser HTML5 media player.
- Able Player Video Demo #5: Video player with interactive transcript, subtitles, and chapters
- Anleitung: So wird eine Audiodeskription erstellt | Barrierefreiheit | Schulung, Begleitung und Tests (user guide: how to create an audio description, in German)
- Creating subtitles – Aegisub – Studytools (in German)
- Creating accessible audio and video contents (in German)
- Accessible audio and video contents • Content management • Center für Digitale Systeme (in German)
- Subtitles and audio description – multimedia helps [barrierefreies-webdesign.de] (in German)
- User guide for accessible online videos (in German)
- Accessibility – University of Innsbruck (in German)
- Video and audio | documentation template 3.0 | University of Stuttgart (in German)
- Creating accessible online videos (in German)
- Differences between plain language and easy-to-read language (in German)

7. Audio files

7.1. The right equipment and location

Using the best equipment is essential when creating accessible audio files. This includes the microphone and recording device as well as the software you use. If you use a tripod, you can move your hands freely. A pop filter helps to maintain sound quality in case of consonants that are pronounced very hard.

Avoid disturbing noises during recording. These might be caused by hard flooring, the operating sounds of electrical appliances, reverberations and other factors. Check the acoustics in the relevant room before recording.

Position the microphone correctly. The microphone should be positioned below the chin and at least at a 15 cm-distance from the speaker. Do not lean over the microphone when talking. Obtain information in advance what recording volume you should configure in the software.

7.2. Audio quality

Any sounds in the background (music, etc.) should be quieter than the primary audio track.

Different audio tracks should be easily distinguishable. A difference of 20 decibel in the volume should suffice. Nevertheless, we recommend trying to avoid disturbing background noises to ensure that the audience is not distracted or irritated.

The persons in the video should talk one after the other and at the same volume. In addition, they should speak clearly and take breaks. In particular before a change of topic, it is important to take a break. Gestures and facial expressions can support the content.

You can help your audience by providing alternatives comparable to the audio track, such as transcripts, captions or subtitles. Here as well, we recommend using plain language.

Do not forget that the persons talking can additionally provide verbal information. For example, they can describe sensory characteristics or features or accompany activities (for example, by describing their environment or by verbalising key combinations, such as for sharing the screen, during video conferences or seminars).

7.3. Related links about audio

- [Recommendations for accessible repositories](#) (in German)
- [Planning Audio and Video Media | Web Accessibility Initiative (WAI) | W3C](#)
- [Accessible communication – number 4: accessible audio and video information](#) (in German)
- [Creating accessible audio and video contents](#) (in German)
- [Accessible audio and video contents • Content management • Center für Digitale Systeme](#) (in German)
- Jeitler, Andreas; Mark Wassermann [Empfehlungen für barrierefreie Repositorien](#) (recommendations for accessible repositories, in German)
- Klaas Posselt, Dirk Frölich, Barrierefreie PDF-Dokumente erstellen, Das Praxishandbuch für den Arbeitsalltag, 2019, 1st edition (creating accessible PDF documents; a practical handbook for professional life, in German)
- [Tips on recording professional voice-over tracks](#) (in German)