

Accessibility and Usability Guidelines for Websites



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“The power of the Web is in its *universality*. *Access by everyone* regardless of disability is an essential aspect.”

Tim Bernes – Lee, Web inventor und director of W3C

1. Introduction

2003 was the year of people with handicaps. The subject accessibility und user friendliness of internet pages has been occurring since then more and more frequently in day to day web-life. Understanding precisely what it is both in technical, legal and sociological perspective, how to put accessibility into practice is the purpose of this guide on the following pages.

First of all people are addressed who have done a few steps in the Internet already. We are talking about webmasters, programmers, project-managers and decision takers in web-projects. Sooner or later they will all get in touch with the issue accessibility. Presumably rather sooner!

In the beginning however *usability* is being dealt with. Not only on first sight both subject areas within the practice guide have a lot in common. Accessibility can be understood as a subset of usability. All areas touching accessibility are therefore also indirectly relevant for usability.

This practice guide starts with definitions of terms and introductory reflection on sense and purpose of the matter, touches legal backgrounds and later pays attention to technical backgrounds of accessibility. In the area of technology peculiarities are paid attention to web designers have to consider if their works are meant to be useful for people with eyesight problems and persons with other handicaps.

At the end some critical techniques and ambivalent appearing “accessible features” are introduced. One cannot always classify something without doubt as accessible or not. Unfortunately and without justification this has led to wrong understanding of accessible lay-out and in consequence it was laughed about and not taken for very serious. Often in these cases differentiating project oriented thinking is required.

Due to its small volume this practice guideline is suitable only for an introductory survey on both subject matters however for a complete professional creation of an accessible website continuing literature is necessary requirement. You will find a couple of helpful links and selected literature.

The appendix contains a “checklist accessible” for a first examination of your pages concerning accessibility.

2. Definitions of terms

Accessibility defines and describes a section of usability. A generally valid definition of the term accessibility is not existing till now as we can see not at last in a difficult standardization process.

In the following the term accessibility is used in sense of description for design guidelines of web based IKT systems, allowing a largely accessible possibility for all users. In focus are handicapped people who want to use the internet unreduced. Barriers making it handicapped users harder or completely impossible to use web contents shall be completely removed.

Accessibility also means that it shall be possible with any Web Browsing Technology to use Internet offers completely and to interact with the Internet page.

3. Usability

As briefly mentioned accessibility is a section of a web-page’s usability. Therefore usability is looked at in general and core elements are looked at to begin with. Based on that we’ll be stepping in the subject accessibility. The ISO-Norm 9241-11 defines usability as:

“the extend of possible product usage by certain users in a given usage context in order to reach given aims effectively, efficiently and satisfactory.”

What exactly is behind this definition?

The term “certain users” determines the target group of the web-page, whether they are experienced users or less experienced is an important issue when designing a web-page. This also counts for “usage context”. Is the web-page e.g. an offer which should be well legible on PDA’s because it generates added value? “Effective” is related to efficiency of the page. Does the user find the requested results? Linked to this is “efficient”, which effort needs to be done to receive requested information and is it worth the effort?

Obviously this definition always has to be interpreted by situation and product specific. The user group requesting information on the subject AJAX certainly has different requirements on the page than a user group of a page on cooking recipes.

Certain behaviour of users however is strongly similar and should be considered by all means.

It was found out in different studies that the average duration of 10 seconds of a user on a page is not very long. In this time all relevant elements and functions of a page need to be transported to the user. He must gain the impression that all the requested information can be found on this page. If this is successful also contents will be looked at on usability. Consequently two aspects on page are central issue. On one side delivering requested contents on the other side offering functions so the user can do further steps.

3.1. *Expectation and design*

In way one has always assumed and it is really like this, that there are rules for the design of web-pages. These rules are nowhere firmly anchored and thus rather norms which have crystallized on examples of Amazon, google, ebay and others. They are of great importance and can decisively influence success or failure of a page.

The following results mainly derive from the Atkisson study:

In Heidi Atkisson’s study different elements of a web-page were investigated and frequency and positioning put into context.

It showed out that 97% of all Internet pages have global navigation. The positioning of this global navigation is in 87% of examined pages on top in the middle of the page. 11% of the web-pages place the global navigation on the left and 12% have them in a drop-down menu. The continuing links into second and third level, also called local navigation, are surprisingly for their main part directly placed in the contents of the page and not as supposed on the left navigation bar with just 30%. HTML is preferably used for this local navigation and no graphics as mostly the case in global navigation.

The breadcrumb menu is a horizontal list showing directly the navigation path of the user. This path giving is in most of the cases centrally positioned above the contents area. The spreading if the menu is 66%.

3.2. *Understanding*

An important factor of usability is the understanding of web contents. A big problem area are therefore wide spread Anglicism resulting from the Anglo-Saxon origin of the Internet culture. This area of usability is also called “wording”.

Many English terms are only understood by a part of the user whilst the rest of them feels excluded. However terms like home or sitemap are quickly translated by understandable terms into mother tongue and most of the users prefer terms from their mother tongue as different studies show.

Particularly in navigation clear and unambiguous headlines should be chosen. A temporary analysis of the user group and their preferences in this area is an important success factor for commercial pages.

3.3. *Heuristics for Evaluation*

Heuristics are a means of examination and evaluation of websites. The here mentioned heuristics are not a replacement for consuming user test or experts' evaluations but they offer rough guidelines on usability of a website. The following heuristics are taken from the book “Homepage-Usability” from Nielsen (2002) a leading personality in usability research. Altogether the book contains more than 100 guidelines, thus this selection only offers a small view:

- Communicate the purpose of the website. A striking placement of logo and emphasis on the use of website belong to it.
- Offer information on your company or organisation. This information can be filed in sections like “who we are” or “press” but also in contact and data protection sections.
- Mind the site’s content. A user like language should be used; redundancies and marketing slogans should be avoided.
- Allow access on old contents in offering an archive.
- Pay attention to links. Avoid “more” or “here” links, on the other side enable direct access on important functions and pay attention to links covering browser functionality (as “start page”, “add to favourites”).
- Pay attention to the navigation. It should be eye-striking and sorted by similarities. Additionally one should not be linked to pages you are just visiting.
- Take care of the search. The point includes offering the visitor a search mask wide enough and per default searching the whole website.
- Watch the design. This contains e.g. a limited number of different font formatting but also the most important side elements are displayed “above the fold,” ideally in flexible layout.
- Pay attention to graphics and animations. Graphics should display contents and not only decorate. If helpful they should be labelled and animations should in any case not be used for central side elements like logo or tagline.
- Avoid “Splash-screens,” guide pages and pop-ups.
- Avoid welcome greetings as long as you can’t address the user personally again.

4. Accessibility

The term accessibility is very comprehensive and means unrestricted accessibility e.g. of houses, public transport or web-pages for all people. Complete accessibility is normally hardly to achieve. Language barriers e.g. cannot always be solved.

In Germany there is the law of equality defining accessibility in § 4 as follows:

Free of barriers are structural and other facilities, means of transport, technical basic commodities, information processing systems, acoustic and visual information sources and communication equipment and other formed areas, if they are accessible and can be used without particular complication and generally without external help by handicapped people.”

In this guideline the term accessibility is limited to application in the web area. Synonym to accessibility the term “accessibility” is used.

4.1. **Why accessibility?**

On the first view it may sound exaggerated to optimise or conceive websites for such a small population group like e.g. partially sighted. Regardless the fact that such opinion is discriminating it is also wrong. There are more handicapped people than we think, in the EU approximately 38 mil. people with different handicaps. Estimated 4 to 8 % of the male population are affected by “red-green blindness” Particularly for handicapped people it is important to be able to take part in social life. The internet offers good opportunity to do so.

In the meantime is it compulsory by law in the area of e-Government and administration in many countries to create websites free of barrier. The private industry too can show social responsibility with barrier free designed websites. Finally a barrier- free website accessible for all users of the internet is easier to handle. Further technical advantages like

better indication by search engines like Google and independence from devices are also highly relevant.

5. Forms of handicaps

Before paying attention to technical details and requirements of a barrier free page it is important to know the different forms of handicaps to comprehend needs and problems linked to them

At this stage of course cannot be dealt with all possible forms of handicaps. This is why the following groupings are simultaneously strongly simplifying.

5.1. *Blind people*

With technical aid blind people have been able to use the internet since long. Missing visual possibilities are replaced by other senses i.e. sense of touch and hearing. To make the transformation possible a screen-reader is necessary. The screen-reader then is processing the text source of the page. Already now it should be clear how important a clean text source conform to standard is.

The Brailleline touches on the tactile sense and is normally used by people who are blind by birth. It is a hardware consisting of 80 lines and these again of several metal pins showing the Braille letters. Function keys like scroll and keys simulating a mouse are integrated too.

The voice response however is rather used by people who went blind only later and who can rather rely on their senses. The software for voice response is very flexible, e.g. different voices can be chosen, speed of speech can be chosen and one can adjust what shall be read out.

Due to missing visual possibilities it is of very importance that one can remember the headlines or menu items which are read out or transmitted per Brailleline. A menu with 20 options in this case doesn't help very much. A clear and understandable structure of the page allows to skip single text sections with corresponding headlines.

5.2. *Partially sighted people*

Partially sighted people cannot compensate anymore missing eyesight with technical aid. Partially sighted persons are mostly older due to often decreasing eyesight in age. Often contrasts and colours cannot be distinguished properly or the eyesight is strongly impaired.

Screen magnifiers integrated in the operating system are often used by the group of people concerned. This way a part of the page is enlarged the general survey however gets lost. Thus a well structured and built up website is desirable and helpful.

5.3. *Hearing-impaired and deaf people*

On first sight hearing damage may not have strong effects on the use of the internet because it is primarily a visual media. The missing hearing however can have resultant effects. As part of it the general contact with writing and language. An early arisen deafness might have had consequences on the acquirement of language. Hence complicated texts and long sentences often cause barriers for hearing-impaired people.

5.4. *Other forms of handicaps*

E.g. people with cognitive disorder or impairment of motor functions. People with cognitive disorder speak of themselves as “people with learning disability.” Normally it’s difficult for these people to understand complex matters.

Persons with missing limbs or persons with spasms or joint disease can equally suffer from impairment of motor functions and many others in different forms.

They often have a problem to use the mouse or keyboard and need substitute device like large field keyboard.

As navigation becomes more difficult the structure of a website should be clear to avoid wrong clicks and unnecessary navigation.

6. Laws, directives and regulations on accessibility

On the issue accessibility both statutes and directives and regulations are existing partly in relation to each other. The validity of statutes in the respective country and their reference to regulations needs to be evaluated beforehand. In this chapter the jurisdiction in Germany is briefly introduced.

6.1. *The legal situation in the EU*

Article 13 of the treaty on the foundation of the European Union (1999) is dealing with discriminations of all kinds. It was extended in 2000 by a “message of the Commission to the Council, the European Parliament, the Committee for Economic and Social Affairs and the Committee of the Regions.” Central issue is accessibility for people with handicaps and new strategies to reduce barriers for handicapped people. 2002 the action plan “eEurope2002” was passed by the European Council summarizing important aims and measures on the subject accessibility under the headline e-accessibility as follows:

“To ensure a possibly wide access for the whole population to information technologies is one of the main points of the action plan e-Europe 2002. It is especially about the integration of the handicapped and all people, who are not in the position to take advantage of the information society. The action plan recommends the following concrete measures:

- more effective coordination of strategies to avoid “informal marking off” on European level;
- establishing norms guaranteeing “design for all” to improve possibility for employment and social embedding of persons with special needs;
- Takeover WAI guidelines (“Web Accessibility Initiative”) for public websites.”

The action plan 2005 of the initiative e-Europe had no longer set for main emphasis on accessibility. It’ scheduled for main emphasis only in the 2010 initiative;

Here an information society is demanded including all people, offering high quality public services and contributing to lifestyle.

The EU- minister conference in Riga 2006 on invitation of the Latvian Government concentrated on this third main focus of the i2010 initiative. The minister declaration of Riga was signed unanimously by 34 European countries, the European parliament, candidate countries and EFTA-/EWR countries.

You will find the notification of the commission to the council, the European parliament, the committee for economic and social affairs and committee of the regions in German language here;

http://www.barrierekompass.de/downloads/eu_text.pdf

6.2. German law of equality for handicapped people (BGG)

The law of equality for handicapped people (BGG) was passed 27.4.2002 and forms the basis for the BITV, which is directly dealing with barrier free design of internet pages and will be dealt with later.

The aims of the law are fixed in § 1 BGG:

“Aim of the law is to abolish and prevent disadvantaging of handicapped people and to ensure with equal rights the participation of handicapped people in life in society and to enable them to lead a self-determined life at the same time taking into account special needs.”

§ 4 BGG is telling how to understand accessibility:

“free of barrier are structural and other facilities, means of transport, technical basic commodities, systems of information processing,...in case they are accessible and usable for handicapped people in “common usual way”, without particular complication and generally without help from outside.”

The law of equality for handicapped people is obviously held generally and touches many areas in daily life not just information technology. One central statement is that handicapped people can have access “in common usual way,” i.e. no special solutions shall be created. This is related to often alternatively appearing text versions not in correspondence to the regulation.

§ 11 Barrier free information technology

(1) 1 Bearer of public power in sense of article 7 paragraph 1, clause 1, design their web appearance and offers and graphic program surface accordant clause 2 and respective directive to be issued gradually technically in a way they can be used by handicapped people generally and unlimited. The Ministry of the Interior determines in agreement with the Ministry for Labour and Social Affairs by ordinance and not in need of the agreement of the Federal Council in stipulation of technical, financial and administrative possibilities.

1. the groups of handicapped persons to be included in the regulation’s area of validity,
2. the technical standards to be applied and time of their binding application.
developing areas and types of official information.

(2) The federal government is working towards the aim that commercial suppliers of websites and of graphic program surfaces displayed by means of information technology design their products by target-setting accordant to § 5 according to technical standards corresponding to paragraph 1.

6.3. The BITV – Legislation in Germany

The BITV (Accessible information technology regulation) governs the realisation of §11 BGG for accessible information technology and consists of 3 parts:

- The regulation itself (with general specification on area of application, target group, terms)
- Enclosure 1 (with concrete requirements and conditions for accessibility)

- Enclosure 2 (Glossary)

Important general regulations of the BITV

- § 1 states the applicability of the BITV. The regulation is valid for in the first clause § 7 BGG stated facilities of the federation: authorities, health insurances and other bodies, foundations and public institutions. Internet appearances and public accessible graphic program surface shall be accessible.
- § 2 is saying who are the groups of handicapped people to have access to internet appearances.
- § 3 defines the requirements web offers have to fulfil according to BITV. The article refers to the enclosure of the regulation where requirements and conditions are listed.
- § 4 concerns the periods for realisation of the regulation. Meanwhile they are all expired. Since early 2006 all web-offers of the federal administration have to fulfil the regulation.
- § 5 is saying that the regulation shall be revised regularly every 3 years under consideration of technical developments.

6.4. BITV Requirements:

Contents of requirements:

1. For any audio-or visual content suitable equivalent contents has to be provided fulfilling the same purpose or the same function as the original content.
2. Texts and graphics must be understandable also when they are supplied without colour.

3. Mark-up languages (specially HTML) and style sheets (CSS) have to be used according to their specifications and formal definitions.
4. Language peculiarities like change of language or abbreviations have to be made recognisable.
5. Spread sheets have to be described by means of the foreseen elements of the mark-up language normally only in use for displaying spread sheet data.
6. Internet offers also need to be usable if the user agent does not support newer technologies or they are deactivated.
7. Time controlled content changes have to be controllable by the user.
8. Direct accessibility of user interfaces in the internet offers must be ensured.
9. Internet offers are to be designed in a way that functions can be used independent from input device or out device.
10. The usability of older assisting technologies and browsers not state of the art has to be ensured as long as the resulting effort is not disproportionate.
11. Technologies necessary for the provision of internet offers shall be public accessible and completely documented, e.g. the technologies developed by the World Wide Web consortium.
12. The user has to be provided with information on context and orientation.
13. Navigation mechanisms have to be designed transparently and conclusively.
14. The general understanding of contents on offer has to be supported by appropriate measures.

These requirements are again subject to conditions which cannot be listed here due to lack of space.

You will find them on:

<http://www.gesetze-iminternet.de/bitv/BJNR265400002.html>

6.5. WCAG-Guidelines on the regulation of accessibility

WCAG = Web Content Accessibility Guidelines.

The WCAG are recommendations for the design of accessible pages and form the technical basis for the BITV. It is a recommendation and not legally binding. However regulations like the BITV refer to these recommendations. At the moment the WCAG are in Version 1.0. In the meantime however many technical details are obsolete and not up-to-date. Therefore Version 2.0 is being worked on and in discussion in appropriate for a. In the meantime Version 2.0 is judged as “Last Call Working Draft” saying that all relevant parts are regarded stable. The introduction can be expected in the near future. Version 1.0 by now is seven years old, an eternity in the internet.

The guidelines of version 1.0 are very extensive and cannot be displayed at this stage. Altogether there are 14 guidelines representing a general basis for accessible design. The guidelines are supplemented with “checkpoints”, these again are assigned to three different priority levels. Further they refer e.g. to concrete technical realisation of CSS and HTML. You’ll find the English original at:

<http://www.w3.org/WAI/WCAG10/>

A German translation is available at:

<http://www.w3c.de/Trans/WAIwebinhalt.html>

Due to the size only the main differences between the two versions are briefly outlined. The most elementary difference between the versions is that in 2.0 no reference is taken to specific techniques like HTML or CSS except the examples. The represented guidelines,

principles and criteria of success shall describe a accessibility always being generally valid. The decision of independency from technology is a result of the development time of WACG versions. This will probably result in longer validity of guidelines. A conformance level is assigned to the criteria of success in Version 2.0. However they are not classified by priorities as in Version 1.0. All criteria are thought of as important. Criteria assigned to conformity level 3 have the special characteristic that they don't have to be applicable to all types of websites. For this reason it's enough to fulfil 50 % of the criteria of success in level 3 and to reach an offer according to conformity level 3. For the first two conformity levels 100% of the criteria need to be fulfilled.

6.6. Section 508

The USA are seen as a successor in terms of accessibility. The laws respectively guidelines are not adjusted to the WCAG but are based on another basis in Section 508. In contrast to WCAG and BITV section 508 is law and guideline in one. Its reach and importance is much bigger this way. Concerned by section 508 are not just administrations as it's the case in Germany but also companies working on behalf of an authority and bound to law. Concerning the guidelines section 508 however is much more generous than WCAG.

Guidelines for accessible websites according section 508 can be compared with the requirements of priority one WCAG 1. The regulation for accessibility of websites in section 508 is one year younger than WCAG 1, thus came into existence in 1998. Section 508 was written in 1986 containing much more than barrier free web design.

At present the guidelines of section 508 are obviously also in revision just like WCAG.

Web links:

Compare WCAG and section 508:

<http://www.jimthatcher.com/sidebyside.htm>

Section 508:

<http://www.section508.gov>

7. Technical aspects

To mention beforehand, what cannot be delivered at this stage is the provision of knowledge in CSS and (X) HTML for basic design of standard conform web-pages. You'll find useful literature references in the appendix.

In the following it is much more about designing special elements of a web-page barrier free, e.g. form sheets, images and spread sheets.

7.1. Colours

When choosing colours not only the needs of partially sighted people should be considered but those of all visitors. Reading texts on a screen is principally more tiring than on paper. The reading process is about 20 % slower.

Combining complementary colours should always be avoided. Many people e.g. have a red-green weakness and possibly don't realise the differences. Shril colours should be renounced as they are tiring for the eyes.

Contrasts should always be sufficiently strong and the text should stand out from the background colour. Courses of colours or patterns as text background are not suitable. For measuring contrasts the free colour contrast – analyser from the initiative *Web for All* is suggested on: http://www.webforall.info/html/deutsch/col_analy.php

Changes (active link) or framework instructions (click on blue button) only defined by colours should be marked additionally.

For test purposes: All information and functions should be unlimited usable if the page is looked at without colours.

7.2. ***Text-Formatting***

Reading texts on the screen is very tiring; the more important is a possibly very best picturing of the text elements in the internet page.

Some rules are applicable:

- Font sizes should be quoted relatively in ‘%’ to ensure a correct scaling. The same counts for line spacing.
- Choose a well legible and known type like e.g. ‘Verdana.’ Exotic fonts should not be applied.
- Black font on a bright background can be read more comfortably than black font on white background. In doubt use the colour contrast analyser.
- Flashing or flicking fonts should be avoided in any case. They can possibly trigger epileptic fits.
- Offer a print version of the contents removing all unnecessary elements.

Links are a special text element in the web. Links should speak for itself and exactly point out where a click on it will lead to.

Links like “Click here” or “here” are not really helpful. Link text should be informative. For nor handicapped visitors the link contents may result from context but if the page is read out it is not often the case.

If pictures are linked the “alt” text mustn’t miss in any case. Further on all links should be controllable with the tabulator key.

The chapter usability already pointed that in navigation if possible should be placed at the beginning of the page at a place where the visitor expects navigation.

Link lists should be put in order vertically and not side by side.

The status of a link should be recognisable which is easily done by CSS Formatting.

The following states apply to links:

CSS

`a:link`

Link to unvisited page

`a:visited`

Link to already visited page

`a:hover`

Link the mouse is pointing on.

`a:active`

Link just clicked on

`a:focus`

Link just focused on by tabulator key.

External links should be additionally marked not just because the actual page is left. Often a new browser window is opened. It's possible to place a small image in front of the link to draw attention on it. To get there an own class can be defined with the suitable name "extern".

So called jump links offer great help particularly to the user of screen readers. With the help of jump links they can directly navigate themselves to the requested page in the internet without having read out previous contents repetitively by somebody else. Jump links don't need to be visible on the page in normal status but should be displayed if steered for by keyboard navigation.

7.3. Forms

Forms are meanwhile integral part of any web page and e.g. used as contact form or search form. Specially forms are often not produced conform to standard and not remotely free of barriers.

In barrier- free forms descriptions need to be clearly assigned to control elements like input fields or checkboxes. It looks as follows:

HTML

```
<label for= "vor">Vorname: </label>
```

```
<input type="text" name="vorname" id="vor"=size"45">
```

With the help of CSS control elements can be highlighted visually when navigating with keyboard.

Notes of all kind should be directly in front of the respective control element (e.g. compulsory detail).

Often groups can be created with complex forms. They can be marked with the <fieldset> option.

HTML

```
<fieldset>
```

```
<legend>heading group</legend>
```

```
Here are the control elements for the group
```

```
</fieldset>
```

<legend> serves as groups heading

People like to already preoccupy control elements with contents. It is controversial to what extend this contributes to accessibility.

In the authors view preoccupying rather presents a potential error source than help.

Everybody has to individually decide for or against preoccupying.

7.4. Tables

A popular instrument to lay out web-pages are tables. In doing so an HTML function is misused and this can cause problems. The table function is meant to produce data tables. Thus screen readers may realise significant problems with websites using nested tables for the layout. If a page is being newly programmed a strict separation of layout and contents should be kept beforehand. The only layout tool should be CSS in use. If layout-tables come to use in spite they should have not headings.

It doesn't need much fantasy to imagine how difficult it is for partially sighted people to understand data tables when they are read out. Exactly the advantage of a table to visually select data is missing. HTML offers structural elements to design tables understandable and free of barriers.

Small and simple kept tables can be designed very well with the 'scope' attribute. The screen reader recognises by 'scope' and 'col' that everything below the column heading is linked to it. 'row' has the same effect for line heading and connects everything that is positioned right of it.

Example:

HTML

```
<table>
<caption> bus schedule Bremen – Osterholz Scharmbeck</caption>
<thead>
<tr>
<th scope="col">Buslinie</th>
<th scope="col">destination</th>
<th scope="col">departure</th>
<th scope="col">arrival</th>
</tr>
</thead>
<tbody>
<tr>
<th scope="row">2345</th>
<td>station Osterholz</td>
<td>12:00</td>
<td>16:00</td>
</tr>
<tr>
<th scope="row">6789</th>
<td>Bremen central station </td>
<td>13:22</td>
<td>17:45</td>
</tr>
</tbody>
</table>
```

For complex tables ‘headers’ and ‘id’ attributes should be used, because they also allow headers within the table. Basically large tables should be avoided whenever possible and split up into small tables.

7.5. Images

The displaying of texts as image should be avoided. Information in graphics is only accessible for people who can see it. Alternative texts when using images are compulsory. The alternative text shortly describes the information contained by the graphic. That's why the ALT-attribute is integrated as supplement to the IMG-Tag in HTML. There are 1024 characters established for the Alt text but they are normally hardly in use.

When using graphics only serving the purpose to layout the website the ALT-attribute can be left blank to avoid the filename to be read out by the screen reader.

Problematic are apart from texts in graphic form are also diagrams. When they are complex displaying contents in Alt text becomes difficult. An additional data table is mostly the better way. A further possibility is to precisely describe the contents on an extra page.

Image maps as far as they are created client based are not a problem but here it applies even more than with other pictures to offer very precise ALT entries. Additionally an alternative link list can be offered.

7.6. PDF-Documents

The principle rule is everything that can be displayed in (X)HTML should be offered in (X)HTML. For some documents however PDF is the only possibility e.g. presentations, legally binding documents, invoices, graphic designed documents or mathematic and scientific notation like footnotes. However exactly the advantage PDF documents offer that is a platform independent appearance becomes a problem as accessibility means adaptation to personal means.

But with necessary knowledge PDF documents can be created free of barrier.

Basis for barrier free PDF documents is tagged PDF comparable with the valid source code in (X) HTML Format. Tagged PDF, introduced since version 5.0 allows the following functions.

- Structuring of contents with headings, paragraphs
- Navigation via bookmark
- Inserting alternative text for pictures

Enlargeable Pictures, adaptation of both font and colours and keyboard operation require barrier free PDF-documents and these again tagged PDF as basic requirement.

To be able to navigate in a PDF document with a screen reader bookmarks are required. They are links forming a sort of directory listing.

Since version 5 Adobe has been offering an integrated accessibility test. This allows checking the accessibility of PDF-Documents. Parts of the documents potentially causing problems are highlighted visually. In Adobe Acrobat 7 you can run the test the following way:

1. Open PDF-Document with Adobe Acrobat
2. Menu “extended”>”output help”> “complete check”
3. Choose from the following options: Create output help report, include correction instructions, create comment in document, all check options
4. “Start check”

8. Controversial Features / Technologies

It’s not always absolutely clear whether a technique serves accessibility or rather causes further problems. Following some of these problem cases are introduced. In most of the cases it appears useful and helpful to have a close look at the own project and then decide on application of a technology. Here the expected user group has to be essentially considered.

8.1. *Captcha*

In times of spam floods, uncountable bots spamming panels and guest books webmasters like to use all possibilities of security against it. One of these popular but only partly effective protective measures is Captcha. With pictures and distorted text displayed on to be entered by the user the hope is linked that robots don't decipher the text. This way e.g. registration forms for panels are secured. But these Captchas offer only partly protection as modern bots can select them since long.

For blind and partially sighted people however these pictures present almost invincible obstacles. Contents of pictures cannot be read out with screen reader and partially sighted people can hardly decipher contents. Sometimes normally sighted people too can hardly decipher their contents. So it is without doubt possible that handicapped persons are hindered in taking part in opinion exchange panels. The operation of panels should be thought of at least. Possibly a good spam filter does the same job.

A consideration from case to case is recommendable, in a panel for photography or flash animations most likely few partially sighted people online thus the operation of captchas may be relatively easy. Also in this case target group specific interpretation of accessibility is highly recommended.

8.2. *AJAX*

Ajax and accessibility is a story for itself and there are several treatises on this particular subject. The question whether AJAX is free of barriers can be answered in one sentence: It depends on the application!

AJAX can be operated for different purposes. The principle is based on the fact that content is loaded dynamically and not the entire website. This allows significant speed

increase. Disadvantage is that reloading of contents requires Java script In case Java script switched of in the browser the contents is not accessible any longer consequently the page not free of barriers.

There are also AJAX Applications whose basic functionality is maintained without AJAX. This is e.g. Live search as known by *Google suggest*. When using “live search” the user enters the word he is searching for in the search mask. Simultaneously proposals are listed correlating with letters entered till now.

Without AJAX the search can be used like an ordinary search form, there are no restrictions in functions. Here Ajax just offers an additional feature.

Some functions often described as AJAX are pure Java script applications, the contents often loaded at page- set up but only removed.

Here the webmaster needs to ensure that contents are displayed completely per default while Java script is turned off.

Particularly with on many new Web 2.0 applications so called *social software* is excessively applied. This is particularly problematic as these pages live on their users and often completely exist of user generated contents. Excluding whole groups like handicapped people from participation in these pages cannot be the aim!

8.3. Access keys

For blind people Access keys can offer very important support in the useful application of a page. This way a blind person doesn't need to listen line for line how to get to the requested place.

For Access keys to offer added value they have to be programmed accordingly and the distribution of the access keys has to be useful. It is recommended to introduce the same access keys on all websites so they don't have to be learnt newly for each website.

The foundation “access for all” recommends to distribute access keys the following way:

0 “Direct to start page”

1 “Direct to navigation” (Jump link within Web page)

2 “Direct to contents” (Jump link within Web page)

3 “Direct to contact”

4 “Direct to sitemap”

5 “Direct to search”

Access keys are to be seen ambivalent as there are some points speaking against their application. Different browsers have different keys to be pressed besides the access keys and this can cause irritation. Additionally for the addressed group of persons suffering from impairment of the motor nerves the pressing of several keys is a considerable obstacle. Further on many keys are already distributed by other programs. In this case too everyone should decide individually and possibly project-related whether the application of access keys is useful.

8.4. Frames

Because all frames have to be readout for the overall survey of the page they are judged problematically. In particular older text browsers are having problems with it.

Meanwhile many blind people are able to cope with standard browsers reasonably well provided appropriate setting of the screen reader also with framesets still staying circumstantial. For this purpose the frames need to be properly embedded in the page and they have to be named usefully. The NOFRAMES-Element should also come to use particularly since the BITV requires to put an alternative at disposal for all dynamic contents.

Generally frames are a potential obstacle and when creating or redesigning a page planning should rather happen without operation of frames and preferably with CSS.

9. Testing Accessibility

Testing accessibility on the entire page unfortunately isn't that easy. Even individually conducted tests as they are offered e.g. by BIK online never test the whole Internet presentation with big suppliers possibly existing of some thousand pages. The pages are just exemplary searched for and examined in different aspects. Nevertheless the tests are really recommendable and allow a realistic assessment of a page's accessibility.

There is a whole range of online tests checking the page on special characteristics; additionally they are online free available and further introduced now. These tests however never consider full accessibility but special criteria such as validity of the text source.

In the appendix you'll find some Web links on pages with tools suitable for testing, besides different validation tools you'll e.g. also find tools to measure contrasts or simulators for different forms of eyesight handicaps or display in various browser types.

The Internet Portal "BIK-online" (<http://www.bik-online.info/>) offers a good but fee requiring test on accessibility. BIK is short form for "accessible informing and communicating." BIK is a project supported by the Ministry for Labour and Social Affairs whose aim is to make Web-offers more accessible and thus improving handicapped people's opportunities for labour. On the website you'll find further information on the test procedures.

On <http://www.bitvtest.de> there is a free self test available which is example for the check list in the appendix. After registration one can check different projects on the criteria of accessibility and save results.

9.1. HTML and CSS Validation Tools

Validation tools offer possibility to check one's HTML, XHTML or CSS files on semantic correctness. Meanwhile there is also a validation tool for RSS Feeds. Valid source text is basis for a website low in barriers. Only this way the page contents can be displayed in all common browsers faultless and error-free. With these automatic tests one has to consider that they can detect faulty source text but not correct source text in improper use. For example principally barrier free tables but not always when applied for web design. This way a validation tool can only establish whether an 'ALT' text is existing or not. If a text belongs there or if it contains a useful description at all it can't do either.

The W3C validation tool for CSS and (X)HTML files and RSS and ATOM Feeds you'll find on following URL's:

CSS: <http://jigsaw.w3.org/css-validator/>

(X)HTML: <http://validator.w3.org/>

RSS/ATOM: <http://validator.w3.org/feed/>

10. Accessible Content Management Systems

CMS accessibility needs to be considered from two different perspectives, for one CMS must be able to generate accessible websites for the other the CMS itself must be accessible e.g. manageable by partially sighted editors. The latter is not remotely given by any CM- Systems at current stage of development. This is an area of significant need for development. In doing own tests one should check which system comes closest to the editors' requirements, but a recommendation cannot be given.

The following explains to what extent systems are capable of producing accessible systems. Identifying the contribution of a special CMS to a accessible page is hardly possible. Whether it has been extensively and sumptuously modified to achieve the result or largely allows accessible design by itself can hardly be answered.

An important point is to investigate possibilities for the editors. Especially editors who often haven't been particularly occupied with the subject can destroy a principally accessible page fairly quickly. A double approach seems necessary i.e. on one side the editors should have better training on the other side important is a accessible setting of functions that can be used when editing text otherwise tables are misused in layout again and text is directly coloured in (X)HTML code and not with style sheets and this again results in quick loss of separation of contents and layout.

Correspondingly the editor's area of responsibility should be possibly limited to editing contents and not designing as the editor rarely is an expert in accessible design.

Accordingly if possible the editor for the editors should be flexibly adjustable. Editors of this kind are existing e.g. for the CMS *typo3*.

11. Web-links and sources

International - General

<http://www.w3.org/TR/WAI-WEBCONTENT/>

Web Content Accessibility Guidelines 1.0

<http://www.w3c.de/Trans/WAI/webinhalt.html>

Web Content Accessibility Guidelines 1.0 – German translation

<http://www.w3.org/TR/WAI-WEBCONTENT-TECHS/>

Technical appendix to WCAG 1.0

<http://www.w3.org/TR/WCAG20/>

Web Content Accessibility Guidelines Version 2.0 (draught)

<http://wave.webaim.org/index.jsp>

Examination of websites of accessibility

<http://uitest.com/de/analysis/#accessibility>

Tools for testing accessibility

Europe

<http://europa.eu/scadplus/leg/de/s21012.htm>

Germany

<http://www.gesetze-im-internet.de/bitv/index.html>

Regulation on the creation of accessible information technology accordant to the law of equality for handicapped people (BITV)

http://bundesrecht.juris.de/bitv/anlage_8.html

List of requirements

<http://www.einfach-fuer-alle.de/>

An initiative of „Aktion Mensch“

<http://meiert.com/de/publications/articles/20040803/>

Heuristics on accessibility

Usability Evaluation

http://usability.is.uni-sb.de//werkzeuge/wu_index.php

Testing usability

<http://www3.sympatico.ca/bkeevil/sigdoc98/>

Usability Test – English

12. Appendix 1 – Checklist Accessibility

The following checklist doesn't raise a claim on completeness. It just serves the purpose to give a rough survey. To run a complete test one needs to follow the WCAG 1. The present checklist can be used to gain a first impression to what extend one's own page is accessible or not. It is both oriented to the WCAG 1 and WCAG 2. To run the test some tools and different browsers are required. As options for valuation "fulfilled", "not fulfilled" and not relevant come to choice. Not relevant are all defaults not applicable to your page, e.g. if you don't have any forms on your page a related test point can be marked as "not relevant."

The priorities are not applied here as they don't find consideration on WCAG 2 any more.

Number	Rules	Fulfilled	Not fulfilled	Not relevant
1. Alternative Elements				
1.1	Provide alternatives for non text elements			
1.2	Alternative text for graphics (blank alt attribute for layout graphics existing)			
1.3	Alternative text for graphic navigation existing			
2. Colouring				
2.1	Colours are irrelevant for page application. All information clear without colours.			
2.2	Contrasts of graphics o.k.			
2.3	Texts not displayed as graphics			
2.4	All text has sufficient contrast to the background.			
3. Correct source code				
3.1	(X)HTML Documents are valid			
3.2	CSS files are valid			
3.3	CSS is used for positioning of contents			
3.4	Page frames also can be recognized well at low resolution			
3.5	The font size can be changed in the Browser, large documents don't change the layout			

		Fulfilled	Not fulfilled	Not relevant
3.6	Use of (X) HTML Structure elements for formatting of headings and lists			
4. Layout of tables				
4.1	In more complex data tables the reference of headings and contents is assigned with <i>scope</i> or ID and headers			
4.2	If layout tables are existing they can be linearised. Hence contents is put in useful order.			
5. Independence of in -- and output devices (mouse; Keyboard)				
5.1	The page frame can be used also without mouse			
5.2	The order in keyboard navigation is possible and makes sense			
5.3	Elements in focus are highlighted graphically			
6. Temporal alteration of elements				
6.1	Flashing or flickering elements aren't available on the page frame or flashing only for a couple of seconds			

		Fulfilled	Not fulfilled	Not relevant
6.2	Automatic passings aren't available			
6.3	Automatic update of the page frame isn't available			
7.	Special tokens			
7.1	Sequences or words in another language are represented with the <i>long</i> attribute			
8.	Navigation			
8.1	Clear and unequivocal link-texts			
8.2	A sitemap or a directory listing is available			
8.3	The form of the navigation is represented uniformly over the whole page frame			
8.4	The representation of links informs about the file format, (if it differs from HTML)			
8.5	The type of link is recognizable (external link is differently displayed.)			
8.6	The visitor is shown where he is on the Website (e.g. with a breadcrumb navigation)			

		Fulfilled	Not fulfilled	Not relevant
9.	Forms			
9.1	The lettering of form fields is in front of the entry field			
9.2	Letterings in forms are connected to the accompanying entry field by label.			
10.	Frames			
	The <i>title</i> and <i>name</i> attributes of the Frames are meaningful			
	The structure of the Frames is meaningful and understandable			
11.	Other			
	General components of the Web-offers use simple language and common words			
	There is a page frame for everybody, no separate text version for handicapped visitors			
	Elements and attributes classified expired in HTML 4.01 are not in the source text.			