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Web accessibility standards in libraries

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Abstract: Website creating which is compatible with accessibility standards is kind of best practices. These standards enable to extend group of information users such as: people with disabilities, people who encounter incompatibility and technological problems and seniors. Communication via website is, or should be, an important sphere of library activity. In many countries accessibility standards related to public institutions are required by law. Especially it is worth paying attention on the standards proposed by W3C Consortium called Web Content Accessibility Guidelines (WCAG). 15th October 2012 they gained the status of the international standard ISO/IEC 40500:2012 Information technology - W3C Web Content Accessibility Guidelines (WCAG) 2.0. Paper will be an attempt to answer on questions, if libraries apply these standards and what kind of defects and facilities can be found on web pages. There will be performed an analysis of accessibility of selected national libraries' websites. The research is financed by National Science Centre based on grant DEC-2011/01/N/HS2/01062.

Keywords: web accessibility, standardization, European national libraries websites, web accessibility standards, validation, survey, websites quality

1. Introduction

Communication through website is, or should be, an important sphere of library activity. Unsuitably designed websites can make unnecessary barriers for people with disabilities, just as badly designed library buildings prevent some from entering[1]. We are even not aware, how many people do not access the Internet as easy because their disability prevents them from accessing it by using the same technology than non-disabled people. Improving accessibility on an existing library websites may seem overwhelming at first, but there are many tested solutions to make the process more effective. Sometimes simple features implemented into a website could successfully support people who, for various reasons, need a special solution in the availability of resources[2].

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In extreme cases disregarding of these standards or ignorance of the subject could be sources of health risk for website users. For example people afflicted with photogenic type of epilepsy should not watch blinking and flashing elements like banners, etc. These elements are not right for users with concentration and vision disorder and dyslexics, too (Paszkiewicz, 2011).
Recently many countries and international institutions have got interested in this problem and in effect they have implemented technical standards (see Table 1) which specified access to information financed by public funds (mainly data which is present in information systems dedicated to citizens). It is a significant sign of taking care for various needs of members of social life. These trends refer directly to universal designing or barrier-free designing[3] conceptions which create products, services, environment and enabling them to be used by as many people as possible (regardless of their age, means and situation). This approach allows avoiding special adaptation process of system users, too.

Table 1. National web accessibility standards – examples

Country	Implemented standard
Czech Republic	Pravidla pro tvorbu přístupných webových stránek
France	Référentiel général d'accessibilité pour les administration RGAA 2.2.1
Germany	Barrierefreie-Informationstechnik-Verordnung – BITV 2.0
Ireland	WCAG 1.0
Poland	WCAG 2.0
The Netherlands	Webrichtlijnen 2.0
Spain	UNE 139803:2012
United Kingdom	BS 8878:2010
United States	Section 508 Amendment to the Rehabilitation Act

It is also worth paying attention on activity of World Wide Web Consortium, which mainly creates standards. Under one of the W3C section called Web Accessibility Initiative (WAI) emerged a code of rules which should be a model for website designers and internet resources editors. These rules are named Web Content Accessibility Guidelines (acronym WCAG). Up till now WAI released two versions of WCAG recommendations. On the 15th October 2012 they became an international standard *ISO/IEC 40500:2012 Information technology -- W3C Web Content Accessibility Guidelines (WCAG) 2.0*. It is nowadays used in the large scale[4].

2. Methodology

The most important inquiry, which must be asked, is: are presently existing librarian websites accessible in corresponding way to considerations mentioned above? It is possible to get fragmentary answer on this question by using

validators. Validators are applications which verify correctness of web site's syntax. They indicate problems, which are worth to pay attention during the process of designing and modifying web page. It is worth to note that there are no applications which are able to indicate individually if the web site fulfils accessibility requirements. People, who can understand various needs of users, are necessary in complex evaluation of the web site.

In the following survey, which had place in May 2013, author decided to use free available validator of web sites WAVE (Web Accessibility Evaluation Tool)[5] because it includes a majority of WCAG 2.0[6] and so called Section 508 recommendations[7]. WAVE can help in evaluating the accessibility of web content. It allows to reveal advantages and disadvantages of web pages.

The following print screen shows validator in action (see Figure 1). The panel on the left contains exemplary results of validation, which are divided into six categories: regular errors, alerts, features (improvements in accessibility), structural elements, HTML5 with ARIA and finally contrast errors.

Figure 1. Validation by WAVE Web Accessibility Evaluation Tool – screenshot

Previously survey was to test all web sites of all European national libraries. After the preliminary examination three of them had to be rejected:

- Malta – website of the national library doesn't exist;
- Belarus – website exists but it does not allow to be validated;
- Andorra – autonomous website does not exist.

The final list of national libraries which web sites were examined includes 43 countries (see Table 2).

Table. 2. List of examined national libraries with URLs

No.	Country	URL
1.	Albania	http://www.bksh.al/
2.	Austria	http://www.onb.ac.at/

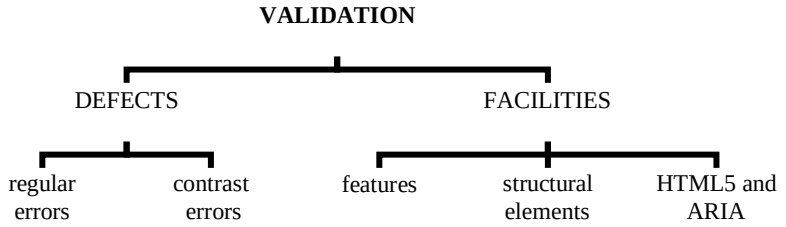
3.	Belgium	http://www.kbr.be/accueil_fr.html
4.	Bosnia and Herzegovina	http://www.nub.ba/
5.	Bulgaria	http://www.nationallibrary.bg/
6.	Croatia	http://www.nsk.hr/
7.	Cyprus	http://www.cypruslibrary.gov.cy/
8.	Czech Republic	http://www.nkp.cz/
9.	Denmark	http://www.kb.dk/da/index.html
10.	Estonia	http://www.nlib.ee/
11.	Finland	http://www.kansalliskirjasto.fi/index.html
12.	France	http://www.bnf.fr/fr/acc/x.accueil.html
13.	Germany	http://www.dnb.de/
14.	Greece	http://www.nlg.gr/
15.	Hungary	http://www.oszk.hu/
16.	Iceland	http://landsbokasafn.is/index.php
17.	Ireland	http://www.nli.ie/
18.	Italy	http://www.bncrm.librari.beniculturali.it/
19.	Kazakhstan	http://www.nlrk.kz/page.php
20.	Lativa	http://www.lnb.lv/
21.	Liechtenstein	http://www.landesbibliothek.li/
22.	Lithuania	http://www.lnb.lt/
23.	Luksembourg	http://www.bnl.public.lu/fr/index.html
24.	Macedonia	http://nubsk.edu.mk/
25.	Moldova	http://www.bnrm.md/
26.	Montenegro	http://www.cnb.me/
27.	Norway	http://www.nb.no/
28.	Poland	http://www.bn.org.pl/
29.	Portugal	http://www.bnportugal.pt
30.	Romania	http://www.bibnat.ro/
31.	Russia	http://www.nlr.ru/
32.	San Marino	http://www.bibliotecheromagna.it/
33.	Serbia	http://www.nb.rs/
34.	Slovakia	http://www.snk.sk/
35.	Slovenia	http://www.nuk.uni-lj.si/
36.	Spain	http://www.bne.es
37.	Sweden	http://www.kb.se/
38.	Switzerland	http://www.nb.admin.ch/
39.	The Netherlands	http://www.kb.nl/
40.	Turkey	http://www.mkutup.gov.tr/

41.	Ukraine	http://www.nbuv.gov.ua/
42.	United Kingdom	http://www.bl.uk/
43.	Vatican	http://www.vatlib.it/home.php

3. Comparison of the library websites – defects and facilities

All websites were being evaluated in terms of disadvantage and advantage occurrence. For the purposes of this study the first group, containing regular errors and contrast errors, will be called "defects" and the second group including features, structural elements and HTML5 with ARIA will be called "facilities" (see Figure 1). Alerts will be omitted from further consideration because of its neutral character.

Figure 2. Defect group and facilities group



The survey showed that websites of such countries like: Kazakhstan, Cyprus, Denmark, Estonia, Serbia, Slovenia, Turkey and Vatican contain the biggest number of defects. All of them are characterized by low contrast. According to the validation results, the worst website managing by National Library of the Republic of Kazakhstan with 7 errors is the most unfriendly site to the users.
Web page of German National Library is only one European website which does not contain any errors. Full comparison of the library sites in terms of defects are shown in Table 3.

Table 3. Ranking of library websites in category defects (May, 2013)

Country	Defects total	Regular errors	Contrast errors
Kazakhstan	**7**	6	1
Cyprus	**6**	5	1
Denmark	**6**	5	1
Estonia	**6**	5	1
Serbia	**6**	5	1
Slovenia	**6**	5	1
Turkey	**6**	5	1
Vatican	**6**	5	1
Albania	**5**	4	1

Bulgaria	**5**	4	1
Croatia	**5**	4	1
Finland	**5**	4	1
Hungary	**5**	4	1
Ireland	**5**	4	1
Moldova	**5**	4	1
Romania	**5**	4	1
Sweden	**5**	4	1
Ukraine	**5**	4	1
Liechtenstein	**4**	4	0
Portugal	**4**	3	1
Slovakia	**4**	3	1
The Netherlands	**4**	3	1
United Kingdom	**4**	3	1
Belgium	**3**	3	0
Bosnia and Herzegovina	**3**	2	1
France	**3**	2	1
Greece	**3**	2	1
Lativa	**3**	2	1
Lithuania	**3**	2	1
Luksembourg	**3**	2	1
Macedonia	**3**	2	1
Montenegro	**3**	2	1
San Marino	**3**	2	1
Switzerland	**3**	2	1
Iceland	**2**	1	1
Italy	**2**	1	1
Norway	**2**	1	1
Russia	**2**	1	1
Spain	**2**	2	0
Austria	**1**	0	1
Czech Republic	**1**	0	1
Poland	**1**	0	1
Germany	**0**	0	0
Arithmetic mean	**4**		

The best national library web pages, those which contain the biggest number of facilities, belong to such countries like: Greece, San Marino, United Kingdom, Czech Republic, Latvia, Lithuania, Switzerland, and The Netherlands. Detailed comparison of the library sites in terms of facilities are presented in the Table 4.

Table 4. Ranking of library websites in category facilities (May, 2013)

Country	Facilities total	Features	Structral elements	HTML5 and ARIA
Greece	**13**	4	4	5
San Marino	**11**	4	7	0
United Kingdom	**11**	6	5	0
Czech Republic	**10**	3	6	1
Lativa	**10**	4	4	2
Lithuania	**10**	3	5	2
Switzerland	**10**	5	5	0
The Netherlands	**10**	2	5	3
Austria	**9**	5	4	0
Croatia	**9**	1	5	3
Macedonia	**9**	4	5	0
Russia	**9**	3	3	3
Sweden	**9**	5	3	1
Finland	**8**	2	6	0
Hungary	**8**	4	4	0
Iceland	**8**	3	5	0
Luksembourg	**8**	5	3	0
Poland	**8**	3	5	0
Slovakia	**8**	4	4	0
Belgium	**7**	5	2	0
France	**7**	4	3	0
Germany	**7**	4	3	0
Montenegro	**7**	3	4	0
Italy	**6**	2	4	0
Liechtenstein	**6**	5	1	0
Slovenia	**6**	3	3	0
Denmark	**5**	2	3	0
Norway	**5**	2	3	0
Romania	**5**	2	3	0
Albania	**4**	2	2	0
Bosnia and Herzegovina	**4**	1	3	0
Cyprus	**4**	3	1	0
Moldova	**4**	3	1	0
Portugal	**4**	2	2	0
Turkey	**4**	3	1	0
Estonia	**3**	1	2	0
Ireland	**3**	1	2	0

Kazakhstan	**3**	2	1	0
Ukraine	**3**	3	0	0
Bulgaria	**2**	1	1	0
Vatican	**2**	0	2	0
Serbia	**1**	0	1	0
Spain	**0**	0	0	0
Arithmetic mean	**7**			

Statistically, the arithmetic mean of defects among European web pages is 4, wherein it is not connected with the number of defects but this quantity relates to types of defects. Analogically, the arithmetic mean of facilities is 7.
It is worth to pay attention on fact that web sites with the lowest number of errors do not contain significant amount of facilities. Simultaneously, notable quantities of errors do not occur on the web pages with the lowest number of facilities. This means that web sites of European national libraries are comparable in terms of accessibility.
The distinct exception to this rule is site which belongs to the Greek National Library. It has the highest factor of improvements (almost two times higher than European arithmetic mean) and in the same time it has low number of errors (under the arithmetic mean).

4. Are the library websites accessible?

The carried out validation can help to answer on question, if the websites of the national libraries meet accessibility requirements in terms of technology (connected with syntax and web page structure). There was created accessibility indicator for this purpose. Its ratio can be obtained according to the following formula:

AccInd (accessibility indicator) = facilities total – defects total

The higher accessibility indicator is, the more accessible websites are. Pages with the indicator under ratio 0 are considered as low accessible, pages with ranks from 1 to 5 are averagely accessible, finally pages with grades 6 and above are recognized as accessible.
The survey revealed that 13 countries have pages which AccInd is under ratio 0. Other 16 countries have average accessible websites. Rest of the examined pages (14) have AccInd with ratio higher than 5. As it can be seen the tendency is upturn, the number of pages with higher amount of facilities than defects grows constantly. For detailed information see Table 5.

Table 5. Accessibility indicator (AccInd) ranking

Country	AccInd
Serbia	-5

Kazakhstan	-4
Vatican	-4
Bulgaria	-3
Estonia	-3
Cyprus	-2
Ireland	-2
Spain	-2
Turkey	-2
Ukraine	-2
Albania	-1
Denmark	-1
Moldova	-1
Portugal	0
Romania	0
Slovenia	0
Bosnia and Herzegovina	1
Liechtenstein	2
Finland	3
Hungary	3
Norway	3
Belgium	4
Croatia	4
France	4
Italy	4
Montenegro	4
Slovakia	4
Sweden	4
Luksembourg	5
Iceland	6
Macedonia	6
The Netherlands	6
Germany	7
Latvia	7
Lithuania	7
Poland	7
Russia	7
Switzerland	7
United Kingdom	7
Austria	8
San Marino	8
Czech Republic	9
Greece	10

5. The most popular defects and facilities on library websites

This section presents the results of the analysis of the most frequent defects (regular and contrast errors) and facilities (features, structural elements, HTML5 and ARIA).

The most frequent defect which is present on web pages of European national libraries is very low contrast of texts in comparison with the color of background. Its ratio is often under the standards which allow noticing color by healthy people; all the more these texts are not suitable for reading for users who do not distinguish colors properly. 39 of 43 websites struggle with this issue. Moreover another frequent problem, which is often found on the web pages, consists in missing elements. These are usually errors caused by losing alternative text for linked image or losing form label, document language and alternative text.

In case of facilities, the most frequent improvement is alternative text for linked image. It is really interesting because simultaneously it is one of the most popular defects. 23 of all examined pages have both link image missing alternative text (error) and link image with alternative text (feature). This indicates that web designers notice necessity of using this element but repeatedly they introduce it not too strictly. The case of alternative links, which do not refer to links, looks like similarly. Other popular facilities refer to structural elements present in the framework of the page, such as lists and headers. Indicating of structural elements is very crucial for the sake of people who use assistive technologies (for example: screen reader) to navigation. Detailed list of defects and facilities occurring on the websites is presented in Table 6.

Table 6. Defects and facilities present on library websites

REGULAR ERRORS		
Element	**Number of pages**	**Description**
Linked image missing alternative text	27	An image without alternative text results in an empty link. Images that are the only thing within a link must have descriptive alternative text. If an image is within a link that contains no text and that image does not provide alternative text, a screen reader has no content to present to the user regarding the function of the link.
Missing form label	24	A form control does not have a corresponding label. If a form control does not have a properly associated text label, the function or purpose of that form control may not be presented to screen reader users. Form labels also provide visible descriptions and larger clickable targets for form controls.
Document	20	The language of the document is not identified.

language missing		Identifying the language of the page allows screen readers to read the content in the appropriate language. It also facilitates automatic translation of content.
Missing alternative text	16	Image alternative text is not present. Each image must have an alt attribute. Without alternative text, the content of an image will not be available to screen reader users or when the image is unavailable.
Empty link	13	A link contains no text. If a link contains no text, the function or purpose of the link will not be presented to the user. This can introduce confusion for keyboard and screen reader users.
Empty heading	4	A heading contains no content. Some users, especially keyboard and screen reader users, often navigate by heading elements. An empty heading will present no information and may introduce confusion.
Spacer image missing alternative text	4	A layout spacer image (which should have null/empty alternative text) does not have an alt attribute. Spacer images are used to maintain layout. They do not convey content and should be given null/empty alternative text (alt="") so they are not presented to users and are ignored by screen readers.
None	4	Lack of regular errors.
Marquee	3	A <marquee> element is present. A marquee element presents scrolling text that the user cannot stop. Scrolling animated content can be distracting and confusing to users, particularly for those with certain cognitive disabilities.
Image button missing alternative text	3	Alternative text is not present for a form image button. Image buttons provide important functionality that must be presented in alternative text. Without alternative text, the function of an image button is not made available to screen reader users or when images are disabled or unavailable.
Empty button	2	A button is empty or has no value text. When navigating to a button, descriptive text must be presented to screen reader users to indicate the function of the button.
Image map area missing	2	Alternative text is not present for an image map area (hot spot).

alternative text		Image map areas or clickable hot spots provide important functionality that must be provided in alternative text. Without alternative text, the function of the area is not made available to screen reader users or when images are unavailable.
Empty form label	2	A form label is present, but does not contain any content. A <label> element that is associated to a form control but does not contain text will not present any information about the form control to the user.
Page refreshes or redirects	2	The page is set to automatically change location or refresh using a <meta> tag. Pages that automatically change location or refresh pose significant usability issues, particularly for screen reader and keyboard users.
Broken skip link	1	A skip navigation link exists, but the target for the link does not exist or the link is not keyboard accessible. A link to jump over navigation or jump to the main content of the page assists keyboard users only if the link is properly functioning and is keyboard accessible.
Empty table header	1	A <th> (table header) contains no text. The <th> element helps associate table cells with the correct row/column headers. A <th> that contains no text may result in cells with missing or incorrect header information.
Missing or uninformative page title	1	The page title is missing or not descriptive. A descriptive title helps users understand a page's purpose or content. Without a proper title, many users (especially those using screen readers or other assistive technology) may have difficulty orienting themselves to the page.
Multiple form labels	1	A form control has more than one label associated with it. A form control should have at most one associated label element. If more than one label element is associated to the control, assistive technology may not read the appropriate label.
FEATURES		
Element	**Number of pages**	**Description**
Linked image with alternative	37	Alternative text is present for an image that is within a link.

text		Including appropriate alternative text on an image within a link ensures that the function and purpose of the link and the content of the image is available to screen reader users or when images are unavailable.
Alternative text	24	Image alternative text is present. Alternative text presents the content or function of an image to screen reader users or in other situations where images cannot be seen or are unavailable.
Null or empty alternative text	22	Alternative text is null or empty (alt=""). If an image does not convey content or if the content of the image is conveyed elsewhere (such as in a caption or nearby text), the image should have empty/null alternative text (alt="") to ensure that it is ignored by a screen reader and is hidden when images are disabled or unavailable.
Form label	16	A form label is present and associated with a form control. A properly associated form label is presented to a screen reader user when the form control is accessed. Additionally, a label can be clicked with the mouse to set focus to the form control.
Image button with alternative text	7	Alternative text is present for an image input element. Providing the functionality of image buttons in alternative text ensures that the button function is available to all users.
Element language	6	The language of a page element or part is identified. Identifying the language of an element or portion of page that is in a different language than the page itself allows screen readers to read the content appropriately.
Null or empty alternative text on spacer	4	Alternative text is null or empty (alt="") on a spacer image. Spacer images are used to control layout or positioning. Because they do not convey content, they should be given empty/null alternative text (alt="") to ensure that the content is not presented to screen reader users and is hidden when images are disabled or unavailable.
None	3	Lack of features.
Fieldset	3	A fieldset is present. A fieldset provides a visual and structural grouping of related form elements. If present, a fieldset legend presents a description of the grouped form elements to screen reader users. A fieldset and legend are typically

		necessary for groups of check boxes or radio buttons.
Skip link target	2	A target for a "skip" link is present. A "skip" target identifies the location within the page where reading and navigation will resume after a "skip" link is activated.
Skip link	2	A link is present which allows users to skip over navigation or other content. A link that provides functionality for the user to jump over navigation or other elements or jump to the main content of the page greatly assists keyboard users in navigating the web page.
Image map with alt attribute	2	An alt attribute is present for an image that has hot spots. If an image that uses an image map provides content or a function that is not already available through the hot spots (and their respective alternative texts), that information must be in the image's alt attribute in order for it to be available to screen reader users or when images are disabled.
Image map area with alternative text	1	Alternative text is present for an image map area (hot spot). Presenting the functionality of image map areas (hot spots) in the <area> element's alt attribute value ensures that this information is presented to screen reader users or when images are disabled or unavailable.
STRUCTURAL ELEMENTS		
Element	**Number of pages**	**Description**
Unordered list	34	An unordered (bulleted) list (element) is present. Ordered lists present a group of related, parallel items. Users of many assistive technologies can navigate by and within lists.
Heading level 2	24	A second level heading (<h2> element) is present. Headings facilitate page navigation for users of assistive technologies. They also provide semantic and visual meaning and structure to the document.
Heading level 1	23	A first level heading (<h1> element) is present. Headings facilitate page navigation for users of assistive technologies. They also provide semantic and visual meaning and structure to the document. First level headings should contain the most important

		heading(s) on the page (generally the document title).
Layout table	22	A layout table is present. While tables are primarily intended for the presentation of tabular information or data, they are often used to control page layout and formatting. Layout tables can introduce reading and navigation order issues and must not contain header (<th>) cells.
Heading level 3	12	A third level heading (<h3> element) is present. Headings facilitate page navigation for users of assistive technologies. They also provide semantic and visual meaning and structure to the document.
Heading level 4	9	A fourth level heading (<h4> element) is present. Headings facilitate page navigation for users of assistive technologies. They also provide semantic and visual meaning and structure to the document.
Inline Frame	5	An inline frame (<iframe>) is present. The content of an inline frame is read as if it were part of the page that contains it. The content of the iframe must be accessible. A title attribute value for the iframe will generally be read by a screen reader when the iframe is encountered.
Table header cell	3	A table header cell (<th>) is present. Table headers describe the content of their respective row or column. They can be identified by screen readers when data cells are encountered.
Definition/ description list	3	A definition/description list (<dl> element) is present. Definition lists (called description lists in HTML5) present the descriptions for terms or name/value pairs. Users of many assistive technologies can navigate by and within lists.
Data table	3	A data table is present. Data tables present tabular data. Data tables should contain table header cells that identify the content of their respective row and/or columns. Tables with proper table headers provide additional information and navigation for screen reader users.
Ordered list	2	An ordered (numbered) list (element) is present. Ordered lists present a group of related sequential items. Users of assistive technologies can navigate by and within lists.
None	1	Lack of structural elements.
HTML5 AND ARIA		

Element	Number of pages	Description
None	35	Lack of HTML5 and ARIA elements.
HTML5 navigation	5	A <nav> element is present. The <nav> element identifies a section of navigation links and can facilitate page semantics and navigation.
HTML5 header	5	A <header> element is present. The <header> element identifies page introduction or navigation. It typically surrounds the site or page name, logo, top navigation, or other header content. HTML5 headers facilitate page semantics and navigation.
HTML5 footer	5	A <footer> element is present. The <footer> element identifies a footer for the page or a page section. It typically identifies authorship, related links, copyright date, or other footer content. HTML5 footers facilitate page semantics and navigation.
ARIA landmark	2	An ARIA landmark role is present. ARIA landmark roles identify and describe structural areas within the page. They also facilitate keyboard navigation.
ARIA	2	An ARIA role, state, or property is present. ARIA provides enhanced semantics and accessibility for web content.
ARIA tabindex	1	A tabindex value of 0 or less is present. Tabindex can facilitate keyboard navigation for interactive elements. A tabindex attribute value of 0 places an item into the keyboard navigation order (i.e., you can navigate to it using the Tab key). A value of less than 0 (typically -1) removes an element from the keyboard flow (you cannot Tab to it), but allows it to receive programmatic focus (e.g., via scripting).
CONTRAST ERRORS		
Element	**Number of pages**	**Description**
Very Low Contrast	39	Very low contrast between foreground and background colors. Adequate contrast is necessary for all users, especially users with low vision.
None	4	Lack of contrast errors.

6. Conclusions

Web accessibility standards are difficult to overestimate. There appear more and more initiatives which are to promote pages friendly to the all users. The answer on question if European national libraries meet accessibility requirements in terms of technology is positive. Major number of them have more facilities than defects. Higher Ratio of arithmetic mean of facilities than arithmetic mean of defects confirms this observation. But it is still much to do in the case of accessibility.

Indicated errors and improvements are only a tip for every type library web designers and webmasters. These factors should be a source of reconsideration of user needs. As it can be seen sometimes simple features implemented into a website could successfully support people who, for various reasons, need special solutions in the availability of resources. It has to be outlined that validation performed in this survey is only one of the evaluating website levels, because fully it consists of automatic validation and evaluation made by human.

Notes

[1]It's estimated that 10-15% of European population are disabled people. It is about 50-75 million people in 27 countries of European Union (Eurostat, 2002).

[2]Among people who, for various reasons, require a different approach to resources availability are: people with disabilities such as blindness, poor eyesight and color blindness, mobility disabilities, hearing impairment and deafness, epilepsy, cognitive or intellectual disabilities, people who encounter incompatibility and technological problems, seniors and others.

[3]The idea of universal design appeared at the beginning of the sixties in 20th century in USA. Its author was Ronald Mace, architect who moved by wheelchair.

[4]Since January 2010 all sites from European Union should be designed according to them on the level AA.

[5]WAVE Web Accessibility Evaluation Tool (2001). Access date 01.05.2013. Available at: http://wave.webaim.org/

[6]Caldwell, Ben [et al.] (2008). Web Content Accessibility Guidelines (WCAG) 2.0: W3C Recommendation 11 December 2008. Access date 20.11.2012 available at: http://www.w3.org/TR/WCAG/

[7]Section 508 is part of "The Rehabilitation Act" which was published by the Congress of the United States. The document guarantees disabled people ie. equality in case of information accessibility.

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