

CONFORMANCE OF UNIVERSITY WEBSITES FROM THE REPUBLIC OF MOLDOVA TO WEB CONTENT ACCESSIBILITY GUIDELINES

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It is presented a review of university websites in Republic of Moldova based on manual and tool-supported accessibility checking. A number of 5 websites is evaluated against WCAG 2.0 recommendations. They were taken into consideration only the accessibility techniques and rules for level A – the lowest accessibility level. As a result of analysis it is concluded that there is a preponderance of university websites that do not meet the legal requirements regarding the web accessibility. A lot of work and effort has to be done to make these websites accessible.

Key words: *university web site, web content, accessibility checking, WCAG 2.0 recommendations.*

1. Introduction. Active participation in society requires usable and accessible ICT tools. Unfortunately, for a large part of the population the web content is difficult to use if not unusable. The consolidation of an information society in Moldova requires equal access to the information technologies for all citizens. Most public web sites have barriers that affect the access to information for people with disabilities.

The accessibility of public web sites is a key quality attribute for the successful implementation of the Information Society. The purpose of this research is to present a review of accessibility of university websites in Republic of Moldova. The actuality of the theme derives from the regulations imposed by the European standards, and by the desire to grant equal access to web resources to every citizen. Development

and testing according to accessibility rules is both a trend and a necessity. The objective of research is to find the level of conformance with accessibility rules, in order to understand the current situation. This information could be further used to improve the websites, to have them more accessible, more user friendly for any type of end user. A number of 5 websites will be evaluated against WCAG 2.0 recommendations [1]. We will take into consideration only the accessibility techniques and rules for level A – the lowest accessibility level. The analysis of results will reveal the level of web accessibility of university web sites. As a result of test execution we will highlight the aspects found.

2. Preliminary considerations. According to statistical data provided by Moldovan National Bureau of Statistics [2], in 2012 there were approximately 183 thousand people with various disabilities. At 10 thousand inhabitants there are 516 people with disabilities, and every sixth person with disability falls into the category of severe disability. People with disabilities represent 5.2% of the total population and children with disabilities – 2.1% of all children in Moldova. Accessibility research is a relatively unexplored field in Moldova and there is little accessibility data related to public web sites.

Testing is the process of analysing a software product to detect the differences between existing and required conditions (that is defects/errors/bugs) and to evaluate the features of the software product.

Non-functional requirements (NFRs, or system qualities) describe system attributes such as reliability, maintainability, scalability, accessibility, usability (often referred to as the “ilities”). They can also be constraints or restrictions on the design of the system. Non-functional refers to aspects of the software that may not be related to a specific function or user action.

Accessibility testing is a type of non-functional testing designed to determine whether individuals with disabilities will be able to use the system in question, which could be software, hardware, or some other type of system.

Web accessibility aims at enabling all users to have equal access to information and functionalities on the web. More specifically, Web accessibility means that people with all abilities and disabilities can perceive, understand, navigate, and interact with the Web.

Web accessibility also benefits people *without* disabilities. For example, a key principle of Web accessibility is designing Websites and software that are flexible to meet different user needs, preferences and situations. This flexibility also benefits people *without* disabilities in certain situations, such as people using a slow Internet connection, people with “temporary disabilities” such as a broken arm and people with changing abilities due to aging.

A quick test to find out how does a website perform for people with disabilities, there is a list of 6 simple tests that anyone can do without any development knowledge:

- 1) Unplug the mouse and/ or turn off the track pad;
- 2) Turn on High Contrast Mode;
- 3) Turn off Images;
- 4) Check for Captions or Transcripts;
- 5) Click on Field Labels;
- 6) Turn off CSS.

When talking about web accessibility we need to refer at a concrete level, as Web Content Accessibility Guidelines (WCAG) has three **priority levels**:

Priority 1: Web developers **must** satisfy these requirements; otherwise it will be *impossible* for one or more groups to access the Web content. Conformance to this level is described as A. (People with some disabilities “will find it impossible to access information” in a document that does not pass level “A”).

Priority 2: Web developers **should** satisfy these requirements; otherwise some groups will find it *difficult* to access the Web content. Conformance to this level is described as AA or *Double-A*. (People with some disabilities “will find it difficult to access information” in a document that does not pass level “Double-A”).

Priority 3: Web developers **may** satisfy these requirements, in order to *make it easier* for some groups to access the Web content. Conformance to this level is described as AAA or *Triple-A*. (People with some disabilities “will find it somewhat difficult to access information” in a document that does not pass level “Triple-A”).

3. Web sites for testing. This research is reviewing the universities websites for accessibility. The sample consists of top 5 universities from Moldova according to the Ranking Web of Universities [3].

Below are the web resources for each of the 5 universities:

1. State University of Moldova, <http://usm.md/>
2. Technical University of Moldova, <http://www.utm.md/>
3. Free International University of Moldova, <http://ulim.md/>
4. Nicolae Testemițanu State University of Medicine and Pharmacy, <http://usmf.md/>
5. Academy of Economic Studies from Moldova, <http://ase.md/>

For testing purposes, we have chosen the home page and two other pages for each university, as shown in Table 1.

Table 1

List of pages that will be checked for accessibility

University name	Home page URL	Second page URL	Third page URL
USM	USM Home page	Bilateral Agreements and Affiliations	Research Units
UTM	UTM Home page	Faculty of Computers, Informatics and Microelectronics	Proposals and Suggestions
ULIM	ULIM Home page	Admission to master (virtual application)	Contacts
USMF	USMF Home page	Affiliations	Contacts
ASEM	ASEM Home page	Reclamation (Ethic Commission)	Admission to Master

From the hundreds of pages of documentation on WCAG and the multitude of success criteria and techniques, we had the challenge of identifying a certain number of techniques that will be suitable and applicable for all the websites under test. Also, as according to our scope, only techniques having Level A have been chosen.

After a good analysis and an accurate selection, we come with 11 tests. We have written our tests coming from success criteria and making it focused to catch a single problem. Also, for each test we have provided link to the corresponding technique:

- TC 01** Ensure all images have a valid ALT attribute ([H37](#));
- TC 02** Ensure caption/summary for a table element is provided ([H73](#));
- TC 03** Ensure h1-h6 tags are used to identify headings ([H42](#));
- TC 04** Ensure that when text is resized content is not lost or obscured ([G179](#));
- TC 05** Check that all functionality can be accessed using only the keyboard ([G202](#));
- TC 06** Ensure keyboard focus is not trapped in any of the content ([G21](#));
- TC 07** Check that each web page has a descriptive title ([H25](#));
- TC 08** Check that each link has a text that describes the purpose of the link ([G91](#));
- TC 09** Ensure the primary language of the page is identified using the *lang* attribute ([H57](#));

TC 10 Ensure that user is informed which are the required fields and is informed which were not completed ([G83](#));

TC 11 Validating Web pages with Total Validator Tool ([G134](#)).

There are two major approaches to testing the accessibility of web pages. The traditional one is manual accessibility testing, using a browser, a text editor and our best judgment or intuition. The newer method is the use of automated web accessibility testing tools. However, it's not a good choice to use only one

method. Below we will explore the benefits of both approaches and will suggest how to combine both methods to achieve better results in a shorter amount of time.

4. Results of testing. Using both manual and automated techniques we have come to the below results. Regarding at the aggregated test results (figure 1) we can say that the website with the fewer number of defects – 27 for all three pages is UTM’s website. On the opposite, the most erroneous website is ULIM’s site with a total number of 248 defects.

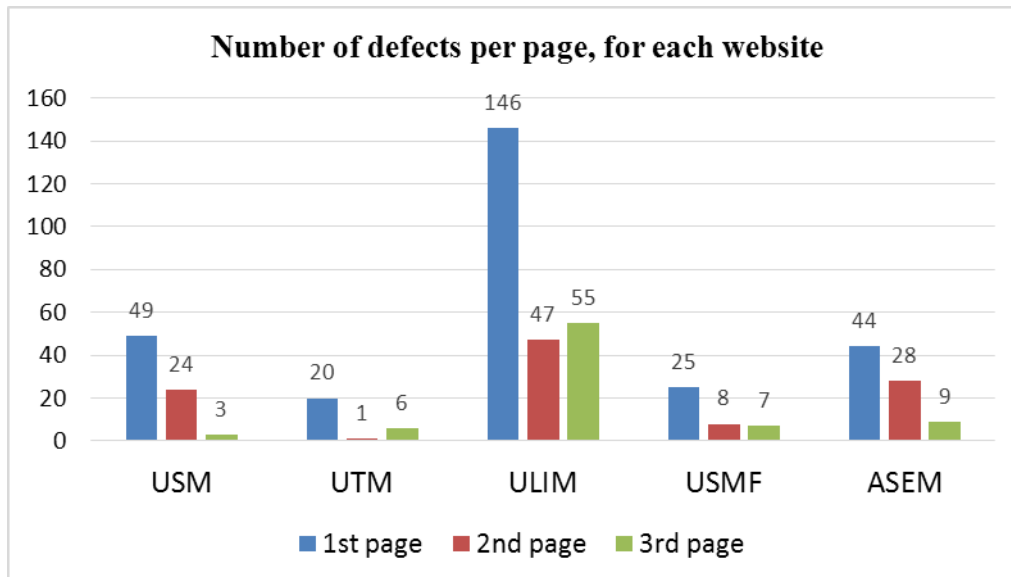


Figure 1. Bar chart showing the number of defects per page, for each website

As we can see, the highest number of errors is on the first page of each website, as for the other two pages, we have indicated the unique defects, not repeating the ones found on the first page.

In the next pie chart (figure 2) we can see the percentage of defects for each website very distinctively.

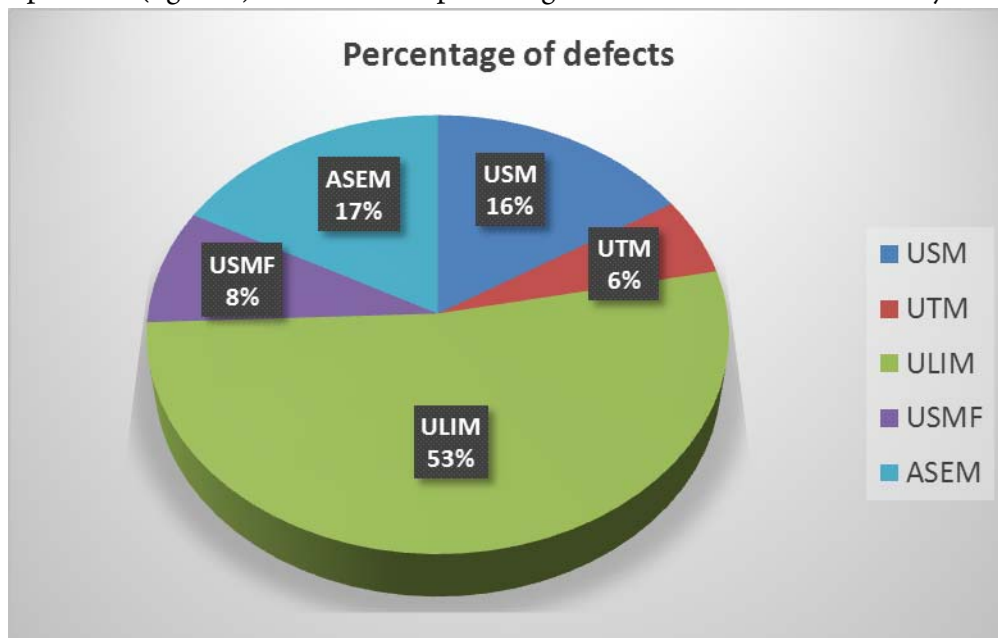


Figure 2. Pie chart showing the percentage of defects for each website

In order to be used by people with disabilities, the web sites content has to be perceivable. Although the accessibility level is low, the online space offers a lot of information on how to assure a good accessibility level for a website, with a lot of recommendations on how to make sure that the content is accessible and with a great availability of accessibility checking tools.

A very easy and totally free way to check website accessibility is validating the web page using a web validator tool. There are many tools available, besides the one that we used:

- AChecker;
- WAVE;
- EvalAccess, etc.

Another alternative is to use the *User testing approach*. This technique would consist in having students to test a beta version of the website before releasing in production a valid version. This testing could last for a certain period (a few weeks till 2-3 months) and the output – the defects, inconsistencies, any issues found should be used to improve the quality. This technique could be used when there are no resources allocated to test a certain website and in this way, it could be useful to have a common effort for having a better web solution.

5. Conclusion. This research contains the results of the evaluation of 5 university web sites for conformance with **WCAG 2.0 level A** requirements (lowest level of conformance). The future purposes are to extend the area of tested websites and to compare the progress in websites accessibility/the degree to which the web accessibility is maintained and improved in time. Also, it is further planned to test the web accessibility against level AA and AAA.

Overall, we have concluded that there is a preponderance of university websites that do not meet the legal requirements regarding the web accessibility.

We can assume that this aspect wasn't taken into consideration. Testing, in our case, accessibility testing should be performed during the entire implementation of an application and should start as early as possible [4]. The analysis should start before any line of code has been written. This is valid for all applications, not depending on the software delivery model, being Agile or Planned Iterative.

In the next future, we intend to carry on a second evaluation with a larger sample and on more pages for each website, in order to better assess the progress of web sites already evaluated and better describe their accessibility. This survey focused only on the high-level educational sector. The results show that a lot of work and effort has to be done to make websites accessible.

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