

# Evaluating the conformance with WCAG2 of Romanian municipal websites

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## ABSTRACT

Web accessibility in the public sector is precondition towards the establishment of a barrier-free Europe. The Digital Agenda for Europe has clear objectives as regards the enhancement of digital literacy, skills, and inclusion. Recently, a new European directive has been issued that requires the web accessibility of public sector bodies by September 2020, the latest. This paper reports on the accessibility of municipal websites in Romania. The evaluation has been carried on in March-April 2019 and targeted the first 60 towns ranked on the population. The results show that web accessibility is low, none of the websites passing the requirements of WCAG 2.0. The comparison with similar evaluation results in 2014 shows very little progress and could be explained by a weak accessibility policy at country and local level as well as bad practices in web development.

## Keywords

Web accessibility, accessibility checking tools, WCAG 2.0, conformance, municipal websites.

## ACM Classification

D.2.2: Design tools and techniques. H5.2 User interfaces.

## INTRODUCTION

Equal access to the digital services for all citizens requires the identification and removal of barriers affecting their use by people with disabilities. One in six people in the European Union (EU) has mild to severe disability. Taking into account the population aging the number of people that are restricted to fully benefit from the digital services is likely to increase in the future.

Several initiatives at European level exist that show the commitment to a barrier-free Europe: the European Disability Strategy 2010-2020 [6], the Digital Agenda for Europe [5], and the new Action Plan for eGovernment 2016-2020 [8], to mention just a few. Recently, a new European directive has been issued that requires the web accessibility of public sector bodies by September 2020, the latest [7].

An underlying principle of the new Action Plan for eGovernment is inclusiveness and accessibility of digital public services. The basis of accessibility requirements is the Web Content Accessibility Guidelines (WCAG2) document that was issued in 2008 by the W3C (World Wide Web Consortium). WCAG2 specifies three levels of conformance (A - lowest, AA, and AAA - highest) [22]. For

EU public websites the AA level of conformance is required.

This paper reports on the accessibility of municipal websites in Romania for visually impaired people. The evaluation has been carried on in March-April 2019 and targeted the first 60 towns ranked on the population.

The rest of this paper is organized as follows. In the next section, we present the main concerns and initiatives at international and European level as well as some recent results regarding the accessibility of Romanian public websites. Then the evaluation results are presented and discussed. The paper ends with the conclusion and intention of future work.

## WEB ACCESSIBILITY

### Web accessibility in Europe

W3C launched the Web Accessibility Initiative (WAI) to develop strategies, guidelines, and resources to support web accessibility [21]. The first version of accessibility guidelines (WCAG1) was published in 1999. The second version was published in 2008 (WCAG2) and this is the reference which is now recommended for the accessibility policies. WCAG2 is based on four accessibility principles: perceivable, operable, understandable and robust [22].

Many differences exist between European countries as regards the regulations and measures for accessibility. Although most countries have a strong policy on the web accessibility for public websites, the accessibility status is not good: only 12.5% of governmental websites passed the accessibility level A (automatic checkpoints) of WCAG1 in 2007 [12].

There are few studies targeting the accessibility of local e-government websites in Europe. Moreover, there are some studies that analyze the web accessibility in terms of findability of the information on the web, without any concern for web content accessibility guidelines.

Paris (2006) analyzed the accessibility of 26 local government websites in Northern Ireland. She found that 85% of the websites failed to pass the lowest level of conformance. Kopackova et al [11] investigated the accessibility on a sample of 39 Czech websites and found that that results in 2008 are worse than the results in 2006.

Gambino et al [9] checked the web accessibility of Italian province and region chief towns in 2012. The evaluation has been done on a sample of 976 webpages (for most websites they analyzed two webpages) and the results showed that the websites were not accessible.

Angelico et al. [3] analyzed the transparency and web accessibility of 86 Portuguese municipalities in 2016 by using the AChecker Tool. The analysis has been restricted to the homepage. They found that 76% of websites don't pass the lowest level of conformance which shows that web accessibility is not a concern for municipal managers.

The study of Sanchez-Labela et al. [17] analyzed the accessibility of 62 Spanish municipal websites in 2016 and shows that none is fully accessible. They found that most affected by the accessibility issues are people with visual disabilities.

Ruano [16] studied the e-Government strategies in Spanish municipalities and found a relationship between the population size and e-government capacity to deliver digital services. As regards web accessibility, this relationship is reflected in higher compliance with accessibility guidelines for the websites of bigger municipalities.

Welleman et al. [23] analyzed the main factors influencing the adoption and implementation of web accessibility standards in municipalities. They found that assigning responsibilities, management decisions, perceived benefit, and legislation are important for the adoption process. They also suggested that different strategies might be needed in small and large municipalities.

More recently, Akgul [1] analyzed the accessibility of Turkish local e-government websites in a wider evaluation framework that includes usability, quality, and readability. The results showed many web accessibility errors.

**Web accessibility of Romanian municipal websites**

Statistical data provided by the National Authority for Disabled People (ANPD) is mentioning 823,956 people with various disabilities, out of which 95,699 are visually impaired people. Most of them (87733, i.e. 92%) have severe and marked visual disability [2].

In 2015 a national strategy has been launched that aims at removing the barriers for people with disabilities. However, although some concern for accessibility exists, there is a lack of clear policies and action plans targeting web accessibility. There is no current action plan for monitoring the accessibility of municipal web sites.

A study on the European government and parliament websites reveals a low accessibility score for Romania which has been ranked the 24<sup>th</sup> out of 27 countries [12].

Few studies are available that assess the conformance with WCAG2 of Romanian public websites. Studies focusing on municipal websites are even fewer and their results show that web accessibility is low.

Two previous studies checked the conformance with WCAG2 on a sample of 60 municipal websites in 2011 [14] and 2014 [15]. The comparison of evaluation results showed that accessibility is not preserved in time.

**EVALUATION RESULTS**

**Method and tool**

The evaluation was carried on in March-April 2019. For comparison reasons, this study used the same method and tool as in the evaluation carried on in 2014 [15]. The sample includes the municipal websites of the first 60 Romanian

towns ranked upon population, according to the 2011 census. The total population of these towns is 7862.1 thousand inhabitants which represent 39.07% of the total population of Romania.

For each web site, only the home page was validated for two main reasons. First, almost all pages have a similar layout that is featuring a header, a horizontal menu and one or two vertical menus. Validating two pages may conflate the number of errors. Second, municipal websites have different information architectures which may diminish the relevance of comparison between websites for the second web page.

The conformance with WCAG2 (level AA) was assessed in a tool-based approach by using the Total Validator v12.0.0 [18], which is an accessibility checking tool for HTML code, broken links, WCAG1, and WCAG2 (any level). Additionally, the number of links and the level of the heading (if any) have been collected.

The accessibility errors have been then analyzed and discussed by the accessibility principle and guideline.

**Summary of results**

A summary of evaluation results is presented in Table 1 that includes the total number of errors, the number of websites with errors (N), maximum and mean (M) number of errors, and standard deviation (SD).

*Table 1. Summary of results*

Categories	Errors	N	Max	M	SD
WCAG2	5170	60	1135	86.17	156.42
WCAG2 A	4193	60	495	71.07	102.40
WCAG2 AA	977	38	361	16.56	62.64
HTML	9542	60	1149	159.03	215.58
Parsing	653	41	114	15.93	25.76
Link	5473	54	656	101.35	149.36

A total number of 5170 WCAG2 errors were detected, out of which 4193 are level A errors and 977 level AA errors. The average number of errors per web page is 86.17 (SD=156.42) with a minimum of 1 and a maximum of 1135 errors. Only 38 towns had WCAG2 AA errors with an average of 16.56 (SD=62.64).

All homepages have HTML errors. There are also many homepages with parsing (N=41) and link errors (N=54).

Another accessibility issue is a large number of links on the homepage that is varying from 24 to 938 with an average of 263.97 (SD=207.71). A number of 52 websites have more than 100 links and 29 websites have more than 200 links which makes it difficult to use by people using a screen reader.

A grouping of towns according to the total number of WCAG2 errors (accessibility score) is presented in Table 2.

*Table 2. Websites on the total number of WCAG2 errors*

Accessibility score	Number	Percent
1-10 errors	6	10.00
11-20 errors	6	10.00
21-50 errors	20	33.33
51-100 errors	16	26.67
Over 100 errors	12	20.00
Total	60	100.00

A number of 12 websites (20%) having over 100 errors

account for 63% (3258) from the total number of WCAG2 errors.

**Analysis of most frequent error types**

Most of the WCAG2 errors are related to the first principle (perceivable) which account for 88.67% (4584) of the total number of errors. From these, 3234 (62.55%) are related to the first accessibility guideline (provide text alternatives for non-text content), 443 (8.57%) to the second (adaptable – content that can be presented in different ways), and 977 (17.54%) to the fourth guideline (distinguishable – easier for users to see and hear content).

The rest of 586 (11.33%) WCAG2 errors are related to the other three principles: operable (4.07%), understandable (0.37%), and robust (6.91%).

The main types of WCAG2 errors are presented in Table 3. Three error types are more frequent: the lack of text alternative for non-text content (20.64%), and the lack of text description for the link (23.31%), and the use of absolute instead of relative units (17.54%).

Table 3. Main types of WCAG2 errors

Principle / Guideline	Errors	%	N
<b>1. Perceivable</b>	<b>4584</b>	<b>88.67</b>	<b>60</b>
Alternative text	1067	20.64	42
Link description	1205	23.31	56
Using relative units (AA)	907	17.54	28
Tags instead CSS	562	10.87	33
Labels for controls	293	5.67	43
Tables	215	4.15	20
Headings ordering	157	3.04	42
Other	178	3.44	-
<b>2. Operable</b>	<b>210</b>	<b>4.07</b>	<b>29</b>
Stuttering effect	110	2.13	20
Unique labels (AA)	70	1.35	11
Other	30	0.58	-
<b>3. Understandable</b>	<b>19</b>	<b>0.37</b>	<b>18</b>
<b>4. Robust</b>	<b>357</b>	<b>6.91</b>	<b>24</b>
Total	5170	100.0	

Other frequent accessibility errors are using tags instead of CSS (10.87%), associating labels with controls (5.67%), issues related to tables (4.15%), and improper ordering of heading elements (3.04%).

**Comparison with previous data and discussion**

An overall comparison with the results from 2014 [15] is presented in Table 4 that shows progress mainly related to the decrease of HTML, parsing, and link errors. This confirms the findings of Hanson & Richards [11] in that improvements seem to be related more to changes in web technology and coding practices than to adherence to accessibility guidelines.

Table 4. Summary of results – comparison with 2014

Categories	2019		2014	
	Errors	N	Errors	%
WCAG2	5170	60	6210	60
WCAG2 A	4193	60	4876	60
WCAG2 AA	977	38	1334	36
HTML	9542	60	11424	57
Parsing	653	41	1033	45
Link	5473	54	2010	52

The average number of links on the homepage increased substantially in the last five years, from 191.13 (SD=132.01) to 263.97 (SD=207.71).

An accessibility issue is related to the use of headings. Improper headings ordering is a frequent error occurring at 42 websites, as shown in Table 3. A more details analysis of headings on the homepage reveals that only 43 websites are using headings and only 30 have more than one level of headings.

A comparison of the number of websites in a given error range is presented in Table 5. As it could be noticed, there are minor differences in each category showing that there is little progress in the accessibility of municipal websites. The comparison is done by the number of WCAG2 A errors (lowest level of compliance).

Table 5. Websites by number of errors – comparison with 2014

Accessibility score	2019	2014
1-10 errors	6	8
11-20 errors	7	5
20-50 errors	22	19
50-100 errors	16	17
Over 100 errors	9	11
Total	60	60

A more detailed comparison is presented in Table 6. The total number of WCAG2A errors in 2019 is lower than in 2014. However, the number of errors related to the first accessibility principle is only slightly lower. In order to be used by people with disabilities, web sites content has to be perceivable. Providing with alternative text for images, properly describing a link purpose, and control labels are still accessibility issues for most websites.

Table 6. Number of WCAG2A errors - comparison with 2014

Principle	2019		2014	
	No	%	No	%
<b>1. Perceivable</b>	<b>3677</b>	<b>88.70</b>	<b>3729</b>	<b>76.48</b>
Alternative text	1067	25.45	983	20.16
Link description	1205	28.74	843	17.29
Tags instead CSS	562	13.40	748	15.34
Controls description	293	6.99	231	4.73
Tables	215	5.12	135	2.77
Headings ordering	157	3.74	654	13.41
Other	178	4.26	103	2.48
<b>2. Operable</b>	<b>140</b>	<b>3.34</b>	<b>524</b>	<b>14.85</b>
<b>3. Understandable</b>	<b>19</b>	<b>0.45</b>	<b>73</b>	<b>1.50</b>
<b>4. Robust</b>	<b>359</b>	<b>8.51</b>	<b>613</b>	<b>12.57</b>
Total	4193	100.00	4876	100.00

There are many differences as regards the number of errors related to an accessibility guideline which confirm a finding from the previous studies that municipal websites fail to maintain the accessibility level over time [14, 15].

There are several factors that contribute to the low level of web accessibility which has been identified in a previous study: no regulations at the national and local level as regards the conformance with WCAG2 guideline, no accessibility statement on the websites, no conformance testing before each software release. Unfortunately, this study shows that nothing changed in the last five years.

No relationship between the population size and the accessibility score has been found in this study. The first 20 towns (over 100 thousand inhabitants) have on average 130

errors (SD=247), next 21 towns (50-100 thousand) 79 errors (SD=93) and the last 19 towns (less than 50 thousand) 42 errors (SD=31). Although it seems that bigger municipalities have a lower accessibility score the differences in each group are very large.

There are some limitations to this work. The first is related to the sample size that includes only the first 60 towns. The second is related to the automated accessibility checking has its inherent limitations [20].

### CONCLUSION AND FUTURE WORK

This work contributes to a wide picture of municipal websites accessibility. As regards the current status, the accessibility of the municipal web is still low, with many errors that are violating the first principle of WCAG 2.0. As regards the evolution in time, there is very little progress in the last five years.

In order to ensure the conformance level required for the public web by the EU Directive, a clear accessibility policy is needed at the national and local level. Without regulations on web services procurement, it is unlikely that things will change. At this moment, accomplishing the objective of an accessible public web, including the municipal websites, by September 2020 seems quite problematic.

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