Comparison of Accessibility in EU Public Sector Websites

Ana Keselj, Petra Bego, Krunoslav Zubrinic, Mario Milicevic

Department of Eletrical Engineering and Computing, University of Dubrovnik

Cira Carica 4, 20000 Dubrovnik, Croatia

ABSTRACT

The European Parliament stresses that the Internet is now an essential tool not only for accessing information and communicating with others, but also for many other daily activities, as it allows access to many services. Therefore, it is very important in the process of enabling participation in democracy and social inclusion. European Parliament has ensured that current standards for its products and content are met, including those to be heard in the EU Web Accessibility Directive, which came into force in December 2016. EU members have committed to taking appropriate measures to ensure access for people with disabilities on an equal basis with others from September 2018. Almost three years have passed since this law came into force and it is questionable how the law has been interpreted and applied to websites of public bodies and services. This paper examines the extent to which the legislation has affected the accessibility of public sector websites of EU member countries.

Keywords: Web accessibility, Accessibility evaluation, Impact of legislation

INTRODUCTION

Digital accessibility is the ability of a website, mobile application, or electronic document to be easily navigated and understood by a variety of users, including those users who have visual, auditory, motor, or cognitive disabilities (WhatIs.com, 2016). According to the World Health Organization, about 15% of the world's population lives with some form of disability, such as mobility or physical disabilities, visual, hearing, cognitive, and mental disabilities. This includes approximately 93 million children and 720 million adults who have significant functional limitations. It is expected that there will be an increasing number of people with disabilities due to demographic changes, including an aging population and a global increase in chronic health conditions (W.H.O., 2020). Everyone is likely to experience a disability at some point in their lives, and particular problems make invisible disabilities that are not immediately apparent to others.

All these facts make disability a serious global medical and social problem. With the paradigm shift from the medical to the social model, disability has been reclassified as a human rights issue because people with disabilities often experience discrimination, violence, prejudice, and denial of autonomy. With appropriate services and supports to help overcome barriers, people with disabilities can participate in society like everyone else.

Today's information society is based on the use, creation and manipulation of information in digital form using web, mobile, desktop and embedded applications. In addition to physical and environmental barriers, people with disabilities in such an environment face additional problems in their daily lives. Several countries have recognized the problems faced by people with disabilities in such an information society and have attempted to normalize this area by law.

In 1990, the United States Congress passed the Americans with Disabilities Act (ADA, 2010), which mandates that all public and private spaces be made accessible to people with disabilities. This regulation states that all ICT including software, websites, web applications, and hardware used or contracted by U.S. federal, state, and local governments must comply with mandated standards. Over the years, as technology evolves, published standards and guidelines are modernized. In the past period, the same area is regulated by law in many other countries (BGG, 2002), (Degener, 2002).

The European Union has been much slower than the US to recognize the importance of ICT for people with disabilities. In 2016, European Parliament and the Council of the EU adopted Directive (EU) 2016/2102 on accessibility of websites and mobile applications of public bodies (European Parliament, 2016). This directive requires websites and apps of public bodies, with a limited number of exceptions (e.g., broadcasters, live streaming), to meet certain technical accessibility standards.

Results of research conducted in (Barricelli & al, n.d.) shows analyses of accessibility of Italian municipal websites ten years after the enactment of Sancta Act. The results shows that the most websites are not accessible despite the existence of the national law of accessibility. One of possible reasons could be that web developers do not see

accessibility as a priority (Kuzma & Price, 2009). Paper (Kous & al., 2021) investigated whether the websites of Slovenian municipalities complied with the Act of the accessibility of websites and mobile application in the years 2017 and 2018, that is before and after its adoption. The results indicate that web accessibility improved in Slovenia in the year 2018, compared to the year 2017. When it comes to the impact of legislation of web accessibility in Croatia, authors in (Keselj, et al., 2021) concluded that the websites affected by the new regulations have a rather stagnant trend in terms of accessibility which means that legislation contributes to changes.

This policy is based on the most recent version of the guidelines, the Web Content Accessible Guidelines (WCAG) 2.1, compliance level AA (W3C, 2021). According to the EU standard, users should at least be able to easily zoom in on most of the website up to 300%, navigate most of the website using only a keyboard, and operate most of the website using assistive devices such as a screen reader or magnifier. Most EU members and the EU have committed to take appropriate measures to ensure access for people with disabilities on an equal basis with others from September 2018. In 2012, before the Directive (EU) 2016/2102 on accessibility of websites and mobile applications of public bodies, it was found that only one-third of Europe's public sector and government websites were fully accessible (European Commission, 2012). Therefor we have been motivated to investigate whether the legislations have improved accessibility of official government websites from EU member states.

The paper is organized as follows: section 2 describes accessibility evaluation tools and compares accessibility of government websites', Section 3 analyses result and gives a deeper insight in challenges of accessibility, Section 4 describes common accessibility errors of analyzed websites and gives possible solutions and finally, Section 5 concludes the paper.

COMPARISON OF GOVERNMENT WEBSITE'S ACCESSIBILITY

The Web Content Accessibility Guidelines 2.0 (WCAG 2.0) were developed to provide recommendations and guidance for creating accessible web content that meets the needs of diverse users. They consist of twelve guidelines organized under four principles, which state that an accessible website is one that can be perceived, served, understood, and robust. For each guideline, there are testable success criteria located at three levels: A, AA, and AAA.

In order to check whether the websites meet the certain guidelines, automatic accessibility evaluation tools are used (W3, 2021). These are either software programs or online services based on the automatic application of accessibility guidelines and do not use artificial intelligence to obtain results. It is necessary for an expert to interpret these results and thus give them relevance. For example, when describing an image with the alt attribute, the expert must assess whether a particular description is relevant.

For this analysis, WAVE[1] was chosen as the most appropriate tool. WAVE can detect errors, contrast errors, potential errors, but it also highlights features, structural HTML and Accessible Rich Internet Application elements (ARIA) that can improve accessibility, but only if implemented correctly. The absence of errors does not mean that a website is accessible or compliant. Errors are critical issues that must be fixed first. An example of an error on a website would be the absence of a description (HTML alt tag) of the image. Contrast errors are errors that affect people with low vision or color blindness. The preferred contrast between background and text is 7: 1, and the minimum is 4.5: 1 (Car, et al., 2019). Alerts are errors that cannot be classified as critical but are a potential barrier to accessibility.

The importance of web accessibility has been recognized by many countries around the world, which have legislated how public web content, such as government websites, must be designed to be accessible to all people. EU and most of the member countries of the EU have committed to take appropriate measures to ensure access for people with disabilities on an equal basis with others as of September 2018. One of the member countries is the Republic of Croatia, whose parliament passed the Law on the Regulation of Public Facilities with strict deadlines. Almost three years have passed since this law came into force and it is questionable how the law has been interpreted and applied to websites of public institutions and services.

In order to investigate the extent to which the legislation has affected the accessibility of public sector websites not only in Croatia but also in other EU member states, official government websites from EU member states were analyzed using accessibility evaluation tool WAVE. The analysis took into account errors, features, number of measures each country has legislated and whether the website has accessibility options. The websites used in this research were found on the official EU website[2]. This research was conducted during January and February of 2021.

RESULTS AND DISCUSSION

The results of our research are presented in Table 1. The country with the most accessibility policies and laws in EU is Germany with 56 laws. Their official government website has no errors and has 29 features. This result is not surprising considering that in 2002 Germany issued a regulation for the Creation of accessible information technology (ger. Barrierefreie Informationstechnik-Verordnung, BITV) (BGG, 2002) in accordance with the law on Equal Opportunities for Disabled People. The official government website of Cyprus is error free, but the website is not responsive. Responsive design is an important aspect of accessibility because it ensures that the layout adapts to the user's screen. Such optimization makes it easier to read and navigate the content on different screen sizes.

Romania is the country with the most errors. Their government website has 53 errors.

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[1] WAVE, https://wave.webaim.org/

[2] European Union, https://europa.eu/european-union/about-eu/countries_en

The Greek government website also stands out, which according to the results has 2 errors and 0 features on the website.

As users with disabilities are a very diverse group of people whose needs and preferences vary widely, it is important to implement accessibility options so that users can customize the website to the settings that work best for them. It is important to emphasize that accessibility options and design benefit all people, not just people with disabilities, because different situations and environments affect how a person uses a website. For example, a person using a phone screen outdoors in bright sunlight would benefit from contrast modification options, but so would people with low vision or a visual impairment.

Most Countries such as Bulgaria and Croatia have implemented accessibility options such as increasing/decreasing font size and changing contrast. Estonia's government website has not implemented the options directly, but they have written instructions on how to download accessibility plugins for some browsers and operating system tools.

Table 1: Results of the comparison of the accessibility of EU public sector websites

Country	Errors	Features	Number of acts	Accessibility options
Austria	1	41	18	No
Belgium	1	12	9	No
Bulgaria	5	3	7	Yes
Croatia	7	7	1	Yes
Cyprus	0	16	1	No
Czechia	1	19	9	No
Denmark	0	20	1	No
Estonia	21	14	3	No
Finland	7	99	2	No
France	9	10	2	No
Germany	0	29	54	No
Greece	2	0	1	No
Hungary	11	22	5	No
Ireland	2	12	1	No
Italy	3	35	3	No
Latvia	3	30	3	Yes
Lithuania	6	20	3	Yes
Luxemburg	17	32	1	No
Malta	18	7	3	No
Netherlands	3	12	1	No
Poland	10	63	1	No
Portugal	18	38	2	No
Romania	53	53	1	No
Slovakia	6	44	9	No
Slovenia	0	16	1	No
Spain	0	24	1	No
Sweden	3	121	3	No

An interesting solution is presented on the Lithuanian government website, where there is a disability button in the top navigation bar that allows the user to navigate to a differently designed website that offers accessibility options such as increasing/decreasing font size, changing background color, and hiding images. Similarly, the accessibility statement on the Maltese Government's website expresses that their website does not use widgets for font, magnification and color adjustments because they believe that these features are already built into most web browsers or are available via various add-ons and plugins that different users are free to customize to their needs. Although accessibility plugins and widgets are easy to install, it is questionable how long plugin maintenance and support will be available (Zilak, et al., 2019).
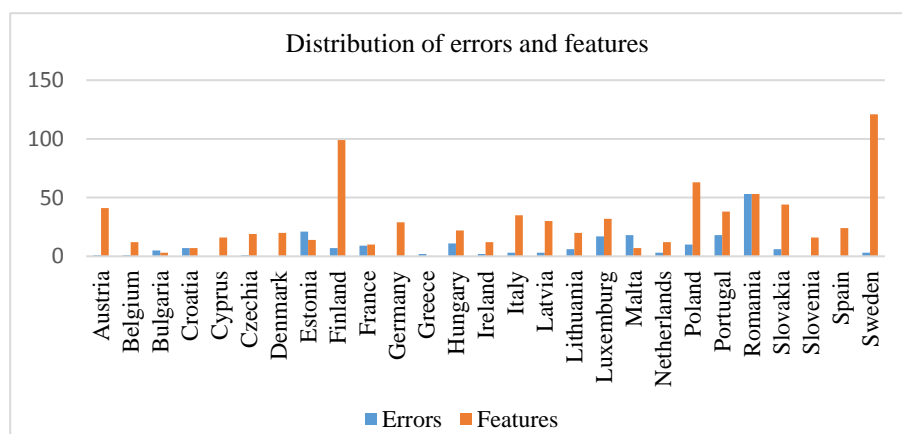

Figure 1: Distribution of *errors* and *features*

It is encouraging that on average there are 7.7 errors per website, while there are 29.6 features per website. Graphical visualization of distribution of errors and features is shown in Figure 1.

RESULTS AND DISCUSSION

Although there are many recommendations and guidelines for ensuring website accessibility, it seems that not much has been done to address all accessibility issues. Insufficient clarity of the technical application of these guidelines or lack of awareness among developers are just some of the possible reasons for this (Okeke & Izuogu, 2013). Therefore, we were motivated to propose technical guidance for developers and designers.

To do this, we considered the accessibility results provided by the WAVE tool. The distribution of errors, contrast errors, alerts, features, structural elements and ARIA are shown in Figure 2.

Errors, contrast errors and alerts are barriers to accessibility, while features, structural elements and ARIA can improve it. Figure 2 confirms the conclusion of section 2 -

Germany is the country with the most accessible government website, while Romania and Greece lead in the number of errors and alerts.

The most common errors on websites were *missing alt attribute, linked image with missing alternative text, empty link, empty button, missing form label, missing lang attribute, empty heading* and *broken ARIA reference.*
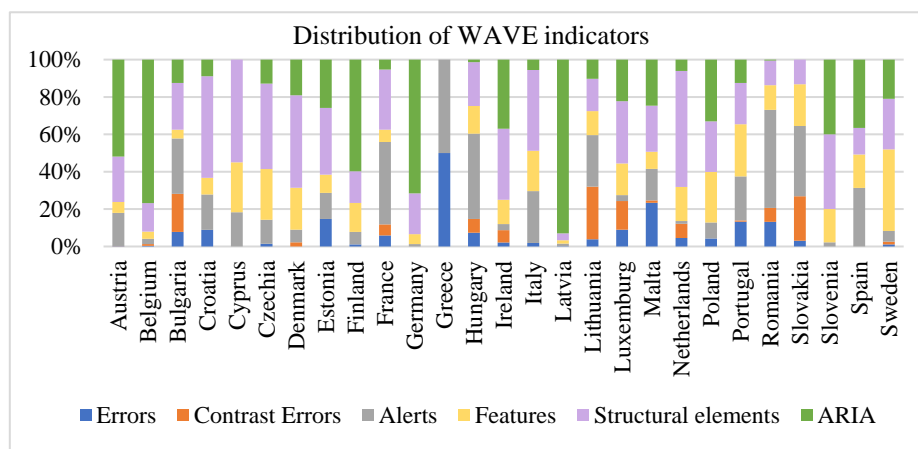

Figure 2: Distribution of *errors, contrast errors, alerts, features, structural elements* and ARIA

Missing alt attribute means that the alternative text is not present. Every image must have alternative text because without it, the content of the image is not available to screen reader users. To address this barrier, an alt attribute should be added to accurately and concisely represent the content and function of the image. The second most common error was the linked image without alternative text. This means that an image without alternative text will result in an empty link. Images that are also a link must include descriptive alternative text. If an image is within a link that does not contain text and the image does not provide alternative text, the screen reader has no content to present to the user. Care should be taken to always add appropriate alternative text to such elements that represents the content of the image or link feature.

Errors such as empty link, empty button, missing form label and missing lang attributes indicate that the associated HTML elements are either missing links, values or appropriate labels. Empty links and buttons need to be removed or provided with text that provides functionality. If a text label is visible for a form control, the label element must be used to associate it to the corresponding form control. The lang attribute is important for screen readers because it identifies the language of the website and allows reading in the appropriate language.

Empty heading means a heading with no content. Some users navigate based on heading elements. Empty heading provides no information and can cause confusion. It is important to ensure that all headings contain informative content.

ARIA is a set of attributes that can be added to HTML elements that define ways to

make Web content and applications accessible to users who use assistive technologies. If the ARIA reference is broken, it means that the aria-labelledby or aria-describedby reference exists, but the target for the reference does not exist. It is important to ensure the element referenced in the aria-labelledby or aria-describedby attribute value exists within the website and has a correct label or description.

The most common alerts on analyzed websites were related to redundant links, redundant title text, and skipped heading level. Redundant links occur when adjacent links lead to the same location, resulting in additional navigation and repetition for keyboard and screen reader users. When possible, redundant links should be combined into one link. Headings provide structure to the document, so some users may be confused or have trouble navigating the site. The document should be restructured to ensure that no heading levels are skipped.

When it comes to design, browsing a website is a multi-sensory experience, thanks to the growing popularity of full-screen video backgrounds, animations and interactive navigation. We observe the growing trend where overlapping elements and micro-interactions such as page transitions, fading or sliding images, hover elements, are being used more than before (Canva, n.d.). The new design trends are a challenge for web designers and developers trying to incorporate accessibility, and this could be the reason for the potential problems presented in the analysis. Possible solutions to this problem would be Stop animations/motions button which would prevent animations and transitions.

If website is being built from scratch, the development should include the following sections according to the Methodology for Developing an Accessible Website (Car, et al., 2019): Defining Accessibility Requirements, Technology Selection and Implementation; Evaluation and Refinement of Implemented Accessibility. This methodology is a product of years of research and multidisciplinary collaboration between academia and the state telecommunications regulatory authority and it actively involves the end users.

CONCLUSIONS

Accessibility is a growing niche, with some emerging digital accessibility trends representing a promising future for this domain. The importance of web accessibility has been recognized by many countries around the world, including EU, which have legislated how public web content must be designed to be accessible to all users. Considering the analyzed data in this paper, it can be concluded that legislation is a factor that has a positive impact on accessibility. The evaluation has shown that although there are many accessibility laws and regulations, 23 out of 28 websites analyzed have errors that are known as barriers to accessibility. Although legislation promotes good practices in web design and development, it is important to raise awareness and need for accessibility among developers.

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