New Perspectives in Science Education
International Conference
NEW PERSPECTIVES in SCIENCE EDUCATION

Accessibility Evaluation of the Websites of the Regional Libraries in Bulgaria

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Abstract

A well-designed and accessible library website is a barometer of the information support it can provide to its users. However, the web content offered by the libraries often does not meet the accessibility requirements of users with various disabilities. This makes it difficult for the most democratic institutions to fulfill their informational, educational, cultural, inclusive, and socializing function in a digital realm. Organizations are increasingly using specialized tools based on applying different accessibility testing standards to evaluate the accessibility of their websites. These tools are easy to use, even by people who are not IT specialists. However, their function is limited to providing the user only with a detailed report based on the set standards, not making the corresponding website accessible. This paper aims to evaluate the accessibility of the homepages of the websites of all 27 regional libraries in Bulgaria using the web-based tool Accessibility Checker. Based on the results obtained, it was concluded that they generally do not meet the accessibility standards and requirements of the Web Content Accessibility Guidelines (WCAG) and the European Accessibility Act (EAA), with visually impaired users being the most affected. In addition, it has been summarised that to ensure a website is fully accessible, its elements must be tested manually, as accessibility is related to the human experience.

Keywords: *Web accessibility, Regional Libraries, Accessibility Checker, WCAG, Bulgaria*

1. Introduction

1.1 Libraries and Web Accessibility

The realities of the information society demand that the equitable provision of online-based services to all users becomes a primary concern, as digital formats are now a standard for information exchange. Equal access is among the most essential principles for everyone's participation in society, and it is also a fundamental concept in the field of library and information science [17]. Due to the necessity of information sharing, having a website is more than a requirement for any organization. For libraries, a well-designed and accessible website is a testament to how well their infrastructure is built and a barometer of the information support they can provide to their users [4].

Accessibility barriers for people with disabilities continue to be an issue globally. Still, public libraries and their web resources have the potential to support this group in terms of education, employment, community, or personal development [7]. However, the accessibility of web content offered by libraries often does not meet the requirements of users with various disabilities, making it difficult for the most democratic institutions to fulfill their informational, educational, cultural, inclusive, and socializing functions in a digital realm [15].

1.2 Web Content Accessibility Guidelines (WCAG)

The World Wide Web Consortium (W3C), through the Web Accessibility Initiative (WAI), is among the leading organizations promoting web accessibility. WAI's mission is to encourage the creation of international standards for developing accessible websites, the most popular being the Web Content Accessibility Guidelines (WCAG) [1]. The WCAGs were developed in collaboration with people with disabilities worldwide to offer a common standard for web accessibility that meets the global needs of individuals, companies, and governments. They are intended primarily for web content developers and web accessibility assessment tools. Different versions of WCAG reflect advances in website development, design, and assistive technologies. Currently, there are four versions - WCAG 1.0, WCAG 2.0, WCAG 2.1, and WCAG 2.2. Each version is backward compatible, covering additional guidelines without replacing the previous ones [11].

WCAG 2.1 remains the most widely used standard, including 78 accessibility criteria. These criteria are categorized into three levels of compliance: A – the minimum required level; AA – the medium level, which is usually the goal of most website owners; and AAA – the highest level, which cannot be

achieved for all web content. The guidelines aim to make website content accessible to a broader range of people with disabilities - sensory, motor, communication, and intellectual [12]. WCAG 2.1 does not inherently possess the characteristics of a piece of legislation but establishes the standard for web accessibility legislation in many places worldwide. For instance, the European Accessibility Act (EAA) of the European Union is based on WCAG 2.1 [3].

1.3 Tools for Web Accessibility Evaluation

There are various tools by which the accessibility of websites can be evaluated. Their working principle is based on the application of different accessibility testing standards. These tools are easy to use even by people who are not IT specialists [5]. It is important to note that the tools can only provide the user with a detailed report based on the set standards but cannot make the corresponding website accessible. The most common web accessibility assessment tools are Accessibility Checker, Bobby, HERA, TAW, WAVE, Axe, SortSite, etc [11].
This paper aims to evaluate the accessibility of the homepages of all 27 regional libraries in Bulgaria (Table 1) using the web-based Accessibility Checker tool (https://www.accessibilitychecker.org/).

№	Name of The Library	Website Link
1	Regional Library „Dimitar Talev“ - Blagoevgrad	https://www.libblagoevgrad.org/
2	Regional Library “P. K. Yavorov” - Burgas	https://burgaslib.bg/
3	Regional Library "Pencho Slaveykov" - Varna	http://www.libvar.bg/
4	Regional Library "P. R. Slaveykov" - Veliko Tarnovo	https://libraryvt.com/bg/
5	Regional Library "Mihalaki Georgiev" - Vidin	https://libvidin.eu/
6	Regional Library "Hristo Botev" - Vratsa	https://libvratsa.org/
7	Regional Library "Aprilov-Palauzov" - Gabrovo	https://libgabrovo.com/
8	Regional Library "Dora Gabe" - Dobrich	https://libdobrich.bg/
9	Regional Library "Nikola Y. Vaptsarov" - Kardzhali	https://www.libkli.com/
10	Regional Library "Emanuil Popdimitrov" - Kyustendil	https://www.libkn.bg/
11	Regional Library "Prof. Benyu Tsonev" - Lovech	https://liblovech.bg/
12	Regional Library "Geo Milev" - Montana	https://montanalib.com/
13	Regional Library "Nikola Furnadzhiev" - Pazardzhik	https://libpz.eu/
14	Regional Library "Svetoslav Minkov" - Pernik	https://www.libpernik.net/
15	Regional Library "Hristo Smirnenski" - Pleven	https://www.lib-pleven.com/
16	Regional National Library "Ivan Vazov" - Plovdiv	https://libplovdiv.com/
17	Regional Library "Prof. Boyan Penev" - Razgrad	https://www.librz.org/
18	Regional Library "Lyuben Karavelov" - Rousse	https://www.libruse.bg/
19	Regional Library "Partenii Pavlovich" - Silistra	https://www.libsilistra.bg/
20	Regional Library "Sava Dobroplodni" - Sliven	http://reglibsliven.iradeum.com/
21	Regional Library "Nikolai Vranchev" - Smolyan	https://www.librarysm.com/
22	Sofia City Library	https://www.libsofia.bg/
23	Regional Library "Zaharii Kniazheski" - Stara Zagora	https://www.libsz.org/
24	Regional Library "Petar Stapov" - Targovishte	https://libtg.info/
25	Regional Library "Hristo Smirnenski" - Haskovo	https://library-haskovo.org/
26	Regional Library "Stiliyan Chilingirov" - Shumen	https://libshumen.org/
27	Regional Library "G. S. Rakovski" - Yambol	http://www.libyambol.org/

Table 1. Regional libraries in Bulgaria and their websites

2. Accessibility Checker as a Website Evaluation Tool

Accessibility Checker's working principle is based on scanning the codes of the specified websites to identify accessibility deficiencies. Its primary mission is to provide the most up-to-date, reliable, and accurate accessibility information. On the one hand, website owners need to avoid lawsuits and, on the other hand, to improve accessibility for an increasing number of disabled users. Accessibility Checker cannot make a website accessible but can guide which elements do not meet accessibility requirements – the tool checks for accessibility issues against WCAG 2.1, Level AA guidelines. The assessment can select specific legislation – European Union, US, Canada, Germany, Australia, or France - depending on what the website is [3].

3. Literature Review

Several studies worldwide have tracked the use of accessibility assessment tools on library websites. In her research, S. Maatta Smith looked at 127 urban libraries in the United States, members of the

Urban Libraries Council (ULC), and assessed the accessibility of their websites' home pages using the WAVE tool, according to WCAG 2.0 guidelines. It was concluded that the websites did not meet the required accessibility criteria, and the digital divide between people with disabilities and others persisted [9]. Three years later, Y. Liu, A. Bielefield, and P. McKay again applied WAVE to evaluate the websites of ULC member libraries, which by then numbered 129. The results showed that only 7 of the websites' homepages were found to have no accessibility issues [8].
Using the Siteimprove tool, incorporating WCAG 2.1 guidelines, S. Panda and R. Chakravarty evaluated the accessibility of the websites of 23 libraries of the Indian Institutes of Technology (IITs). From the results, the authors conclude that although the websites are well-designed and offer easy navigation, there are still several accessibility issues that need to be addressed [10]. N. Tiurkedzhy used the Web Accessibility Checker tool, following WCAG 2.0 guidelines, to evaluate the websites of 25 libraries in Ukraine. The tool identified several errors, mainly related to insufficient color contrast and lack of alternative text on videos and images [14]. In another study by A. Sharma and R. Choudhary, the accessibility of the websites of libraries of the top 50 universities in India was evaluated. The authors used the WAVE tool with WCAG 2.0 guidelines. It was found that most of the homepages of the websites studied had issues that hindered accessibility for people with various disabilities [13].

4. Methodology

The survey, conducted between April and July 2024, assessed the accessibility of the websites of all 27 regional libraries in Bulgaria. The Accessibility Checker tool was used for this purpose. After entering the URL of each website, the accessibility assessment was selected to be made according to the guidelines of European legislation (in particular, the European Accessibility Act (EAA).
Each submission resulted in a report detailing the issues identified and recommendations for addressing them. The main elements of the reports on which the website accessibility conclusions are based are divided into three groups: the current status of the website regarding its compliance with WCAG 2.1, Level AA, and EAA guidelines; a compatibility score calculated as a percentage (in the process, the Accessibility Checker changes from 85 to 90, the rate below which a website is at risk of being sued. This change does not affect the results as there are no websites in this range) and statistics on the status of the items that passed the assessment process. The third group notes the problematic items, those that passed the check, and the number of manual checks recommended. The collected results were tabulated and analyzed using Microsoft Excel.

5. Limitations

The study results are based solely on the reports obtained from the Accessibility Checker tool, and no accessibility specialists or people with disabilities were involved in the website accessibility evaluation. It is essential to note that at the time of the survey, Bulgaria had not incorporated the EAA into its national legislation, despite stating that it would do so by December 2023 (the deadline for Member States to include the EAA was 28 June 2022, and by 28 June 2025, they must ensure that their products and services meet a set of standard EU accessibility requirements).

6. Results

Studies in the academic literature examine access to information for all users in Bulgarian libraries. Based on their research conducted in 2006, V. Grashkina, T. Todorova, and T. Panova summarized the possibilities of access to electronic information that they can provide to people with disabilities [6]. Equal access to information for students with disabilities in university libraries in Bulgaria is a topic explored by T. Todorova and R. Vasileva [16]. Until now, however, researchers have not been focused on the problem of accessibility of Bulgarian library websites, and this study is the first of its kind. Its results show that only two websites, or 7.41% of all 27, received a compatibility score of 100% (Fig. 1). Even with this score, Accessibility Checker defines them as "Partly compliant". For these, as for the other websites, the tool recommends manual testing of all elements, which would most fully determine their compliance with accessibility requirements. The remaining 25 websites (92.59%) included in the study have a "Not compliant" status, with scores ranging from 39% to 74%. The average score calculated according to the results obtained is 59%, and four errors were found for each website.

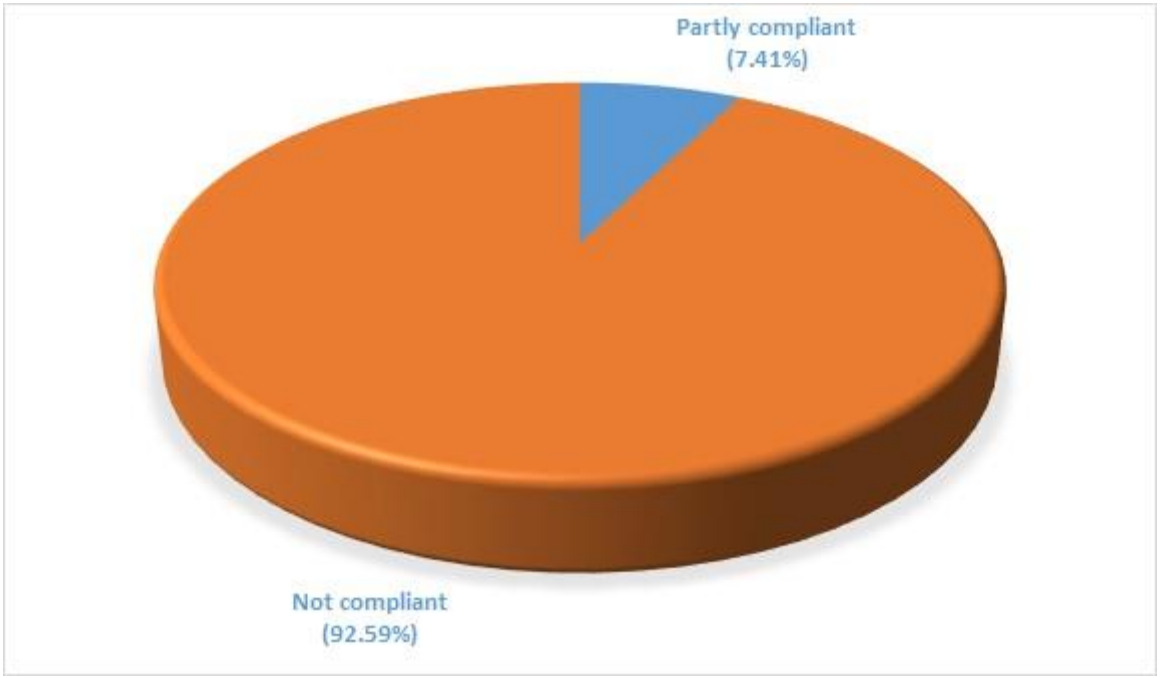

Figure 1. Compliance of websites with WCAG accessibility standards and requirements set by the EAA

The total number of identified accessibility problems on the websites of regional libraries in Bulgaria is 19 (Fig. 2). "Links do not have a discernible name" stands out as the most common error. It is present in 22 websites, or 81.48% of the total. According to Accessibility Checker guidelines, links should have a unique name or a short description in the code that will allow the screen reader to read it. Otherwise, it will just read "link", and the user will not know where that link leads. For proper readability, the color contrast of the website needs to be in line with WCAG guidelines. This issue may affect the blind or visually impaired who use screen readers. Another common problem related to 19 regional libraries' websites (70.37%) was "Background and foreground colors do not have a sufficient contrast ratio". Low-contrast text is difficult or impossible for many users to read. For example, a person with color blindness, or Daltonism, may perceive green or red objects as yellow.

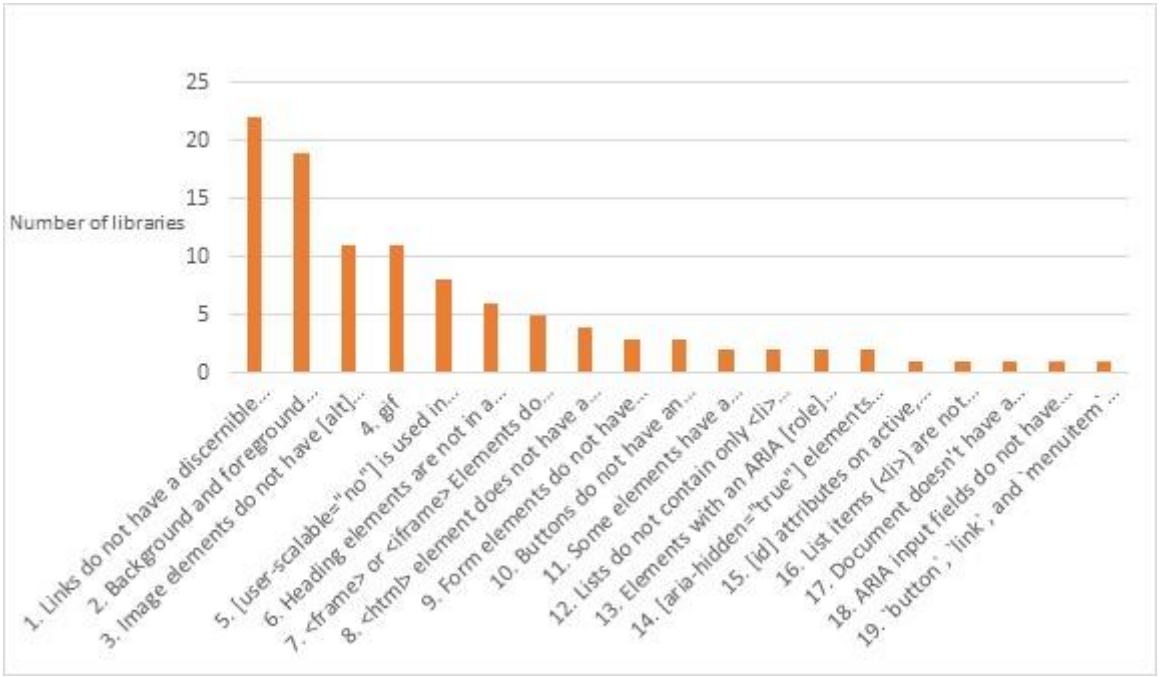

Figure 2. Problems identified in comparison to the number of libraries

The third most common problem tracked on 11 of the websites (40.74% of all) was "Image elements do not have [alt] attributes". According to the guidelines from the received reports, information elements should aim for short, descriptive alternative text, and decorative elements can be omitted with an empty alt attribute. Developers include text, images, and videos to present a website's content. Users who use screen readers can only navigate if a corresponding description is added to each image. Also, on 11 websites, there was a problem briefly described by Accessibility Checker as a "gif". The explanation here is that people with neurological issues need to be able to freeze any moving elements on the website to prevent a possible seizure. The next most common problem is represented as "[user-scalable="no"] is used in the <meta name="viewport"> element or the [maximum-scale] attribute is less than 5" and occurs in 8 of the websites (29.63%). This means that screen magnification is disabled, which presents a difficulty for low-vision users. They rely on the ability to zoom in to see the content of a web page well.

For six websites (22.22%), the error "Heading elements are not in a sequentially-descending order" was encountered, again related to the blind and visually impaired. Users of screen readers and other assistive technologies rely on frame headers to describe the content of frames. Navigating through frames and inline frames can be complicated and confusing for this group of people if the frames are not tagged with title attributes. "<frame> or <iframe> Elements do not have a title" is an issue that occurs on 5 of the websites evaluated (18.52%). Screen readers have commands to navigate between titles or to a specific item quickly. Using appropriate title elements and landmarks can significantly improve site navigation by assistive technology users. For 4 of the websites (14.81%), Accessibility Checker identified an error "<html> element does not have an [lang] attribute". From the reports received, it is clear that if a page does not have a `lang` attribute, the screen reader assumes that the page is in the default language that the user selected when setting it up. However, if the page is in another language, the screen reader may not reproduce the text correctly.

The following two issues, "Form elements do not have associated labels" and "Buttons do not have an accessible name", were found on 3 of the websites (11.11%). For the first of these, it was explained that the labels ensure that assistive technologies such as screen readers correctly declare the form controls. Assistive technology users rely on these labels to navigate forms. Those using a mouse or touchscreen also benefit from the labels, as their text presents a larger target for clicking. The second problem is that when a button does not have an available name, screen readers and other assistive tools render it as a "button", which provides no information to users about what it is for.

For two of the websites (7.41%), the errors "Some elements have a [tabindex] value greater than 0", "Lists do not contain only <li> elements and script supporting elements (<script> and <template>)", "Elements with an ARIA [role] that require children to contain a specific [role] are missing some or all of those required children" and "[aria-hidden="true"] elements contain focusable descendants" were encountered. The first refers to the fact that a value greater than 0 implies explicit navigation ordering. While technically valid, this often inconveniences users who rely on assistive technologies. The second error relates to the operation of screen readers, which have a specific way of announcing lists. Ensuring that the list structure is correct helps the screen readers to work. For the third error, the Accessibility Checker explains that some ARIA leading roles must contain specific sub-roles to perform the intended accessibility functions, and for the fourth error, that derivations within an [aria-hidden="true"] element prevent the accessibility of interactive elements to assistive technology users, such as screen readers.

Each of the following problems was found at one website (3.70%): „[id] attributes on active, focusable elements are not unique“, „List items (<li>) are not contained within <ul>, <ol> or <menu> parent elements“, „Document doesn't have a <title> element“, „ARIA input fields do not have accessible names“ and „`button`, `link`, and `menuitem` elements do not have accessible names“. The first explanation is that all focusable elements must have a unique `id` to ensure they are visible to assistive technologies. The second of the problems encountered on only one website is explained by screen readers requiring a list of individual elements, and the third is by the title giving screen reader users an idea of the page. Using search engines, they rely on it to judge whether a page is relevant to their search. The "ARIA input fields do not have accessible names" error is related to the fact that when an input field does not have an accessible name, screen readers present it with a generic name, making it unusable to users. The last of the listed errors, "`button`, `link`, and `menuitem` elements do not have accessible names", is similar but concerns individual elements. Similarly – when an element does not have an accessible name, it is played with a generic name from the screen reader, which causes problems for users.

7. Discussion and Conclusion

Based on the results of the Accessibility Checker reports, it can be concluded that, in general, the websites of the regional libraries in Bulgaria do not meet the accessibility standards of WCAG and the requirements set by the European Accessibility Act (EAA) of the European Union. The accessibility problems affect visually impaired users the most. Because Bulgaria had not implemented the EAA in its national legislation at the time of the survey and the deadline for EU Member States to ensure that their products and services meet standard accessibility requirements is 28 June 2025, these libraries are not yet at risk of lawsuits. However, on the one hand, addressing the outlined problems on time would limit this possibility. On the other, such a move would allow people with disabilities to make the most of the web resources of these libraries as soon as possible, on an equal basis with other users. The fact that the results of international studies align with the conclusions drawn for Bulgaria should not be taken as reassurance. Still, on the contrary - it should serve as an additional motivation for quick and adequate action, revealing the possibility of a leadership position for Bulgarian libraries in terms of providing web accessibility.

As the results of the reports indicate, it should be noted that relying solely on a web accessibility assessment tool is not sufficient. To ensure a website is fully accessible, its elements also need manual testing since accessibility is linked to the human experience [2]. These tools help identify issues; however, the main challenge for web developers lies in thoroughly understanding the needs of individuals with disabilities and adhering to the guidelines set forth by web accessibility standards.

8. Acknowledgments

The paper is an outcome of a project funded by the Ministry of Education and Science of the Republic of Bulgaria under the National Research Programme "Young Scientists and Postdoctoral Students - 2", approved by DCM 206/07.04.2022, DCM 172/22.05.2024.

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