

E-Commerce Website Accessibility Assessment

Portugal Case Overview

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Abstract. The World Wide Web, boosted the development and exponential growth, worldwide, of numerous online businesses. Most of organizations in the developed countries are present, in some way, online. It is based on this assumption, that digital accessibility plays a fundamental role in democratizing the use of online technologies for all citizens, including the most physically disabled: with motor or perceptive difficulties. A website could be considered accessible if it is also functionally usable, which means, easiness to interpret the content as well as navigating through the web pages, offering the customer a satisfying and inclusive experience. In this context, we propose to develop an accessibility assessment tool, *ShoppingForAll*, targeting users with a low degree of disability, in accordance with the Web Content Accessibility Guidelines (WCAG 2.1) for level A of compliance. This new tool will be applied to a restricted set of online stores, national or with an infrastructure in Portugal. The criteria used to select the websites under the study were native language and the position in the sales ranking. After analysing the results obtained, it was possible to establish a set of recommendations aimed at improving the accessibility of e-commerce websites. Our contribute aimed to promote and increase, albeit modestly, the accessibility on the Web. This tool can be used by experts in information technologies, by developers, and possibly e-commerce website managers.

Keywords: Web Accessibility Assessment, usability, e-commerce, W3C, WAI.

1 Introduction

The past decade has seen the rapid development of e-commerce platforms throughout the world. In Portugal, e-commerce had several obstacles, seemingly insurmountable to its growth, specially the cost of Internet access (inaccessible to a large part of the population at the time), and also in the mistrust into shopping online [20].

As the World Wide Web became the world's largest source of information, it is now essential for a large number of users, particularly people with physical disabilities and, therefore, with special needs (SN), which in a lot of cases may be the only way for them to get access to certain information [11]

In 2020, there are more than 4.5 billion people accessing the Web, which means that about 60% of the world population makes use of this technology. Thus, technology is a fundamental role in the lives of a large number of the populace and cannot be seen as an obstacle, but as an opportunity. Technologies in general, and the Internet in particular, can open doors to a more accessible world where barriers of communication, social integration and quality of life can be easily surpassed [9]

It has created new business, services, entertainment and many more ways to interact, improving communication to a new level. E-Commerce is now able to reach a diverse range of potential buyers, with only a connection to a web and an able device. This means that more people can become able to buy products and services and benefiting the ease of use and access to websites and its functionalities [15]

With this in mind, accessibility can be considered incredibly important to everyone. The WHO [37] reports that around 15% of the global population experiences some form of disability. This means that over one billion people lives with a disability, of whom between 2-4% experiences significant difficulties in functioning.

Accessibility in the Web not only helps people with permanent disabilities, but also people with temporary or conditional disabilities, such as slow connection to the Web, broken arm, or even aging. With an accessible Web, we can offer equal access and opportunity to everyone, including people with disabilities [13]

2 Main concepts – a brief literature review

2.1 e-Commerce

Having overcome the initial difficulties, e-commerce is increasingly being used in Portugal, and has seen a significant growth in recent years. According to the report carried out by the CTT Group [6], e-commerce in Portugal grew 17% in 2018, reaching a total value of about five billion euros. This indicates that there has been a steady increase in online purchasing.

Having an online store can be relatively easier than dealing with the logistical challenges of a physical store. Even though this might be true, there are some disadvantages to owning an online business like hiring qualified staff for this technology, investment in online advertisement, personalized support, among others [26].

2.2 Usability

The degree of user satisfaction in the use of a particular software application, which may be available on the Web or on a computer can define the usability concept. Another indissociable concept of usability concerns the accessibility of an application, i.e. the extent to which the application allows the user to perform his tasks, regardless of the integrity of his physical abilities [25], [1], [2], [3]

Usability and the design process of a website are undoubtedly connected. An e-commerce website, in particular, must be user-friendly. Which is guaranteed by the web designer when the website meets the user needs, facilitating purchases and the use of their services [11]

Regarding to users with special needs, “a website is not usable unless it’s also accessible” once “while usability implies accessibility, the opposite is not necessarily true.” [2], [3].

2.3 Accessibility

Some of the early definitions of accessibility [19], define accessibility “as the potential of opportunities for interaction”. Merriam-Webster dictionary [23] defines accessible as “easily used or accessed by people with disabilities: adapted for use by people with disabilities”.

Some authors [8], [22], [25], [28], [33], goes further and states that accessibility is a dynamic process, associated not only with technological development, but especially with the evolution of society. It presents itself in different stages, varying from one society to the other, according to the attention given to human diversity by that society, at the time.

We can understand that accessibility is important in both physical and digital spaces. Though in the physical space, the term accessibility is usually used when describing an inclusive design for people with reduced mobility [21].

2.4 Web Accessibility

In the digital space, web accessibility refers to the features made available by the websites to all users for a satisfactory and inclusive experience: including users with motor or perceived limitations [4], [31].

Web design has been evolving in the past two decades to be more inclusive with its design, and even though people with disabilities have been overcoming barriers throughout their life experience, using capability-enhancing technologies, it’s still important to get a better access in the web community [7], [12], [29], [30].

After researching some of the most popular e-commerce websites based in Portugal, we can find various issues in terms of accessibility. There is a large number of websites that don’t follow the accessibility guidelines provided by the various standards that are available worldwide [27].

2.5 Web Accessibility Guidelines

The World Wide Web Consortium (W3C) is the leading standardization organization for the World Wide Web. It consists of a group of nearly 400 members, which includes several groupings, namely companies, government bodies and independent organizations. W3C aims to establish standards for the production and dissemination of content for the Web [5], [38].

W3C provides a set of Web Content Accessibility Guidelines (WCAG), defining three levels of compliance (A, AA and AAA), which cover different groups of individuals and situations. Level A is the minimum level required for accessibility to individuals with a low degree of disability.

The latest guidelines are WCAG 2.1 dated June 5, 2018, based on the previous WCAG 2.0 (from December 11, 2008) with some adjustments, with the main objective of making Web content more accessible

This is reinforced in a study by a few authors [14], [16], [17] that studied accessibility in a thousand Portuguese enterprises, and found that only four enterprises met a WCAG 2.0 level A compliance, and none met levels AA or AAA. The article concluded that the “accessibility levels of the Portuguese enterprises websites is extremely low and concerning”.

2.6 Web Accessibility Assessment: Automatic & Manual Tools

There are automatic and manual tools that allow web accessibility evaluation, through the use of software programs or online services, which help the evaluator understand if the accessibility guidelines are being correctly followed. Unfortunately, these types of tools are not very effective as a unique way to test accessibility since there are difficulties in automating in somewhat subjective situations [34].

There several of tools that allow an accessibility evaluation, this research will resume, two of the main tools used worldwide, and accepted as some of the best [35]:

1. **TAW.** *Web Accessibility Test*. It is an online automatic tool that analyses web accessibility, it still uses the outdated WCAG 2.0 from 2008. It has a user-friendly interface and allows selection for the three levels of conformity. It generates an automatic report that is often incomplete because it requires the user to analyse various parts of the website, manually [32].
2. **WAVE.** *Web Accessibility Evaluation Tool*. This tool doesn't allow a selection of levels of compliance. Since it works with the evaluator, doesn't allow a complete auto-evaluation. It's also more complex, recommending a more experienced user. It provides the evaluator a set of valuable information for correction the noncompliance with the guidelines [36].

On the other hand, manual evaluation is, in some way, less objective than automatic evaluation, with the exception of the application of the guidelines defined by WCGA, which can be performed directly, without much margin for subjectivity. These guidelines are necessary for a complete evaluation, due to the high number of situations and tests that cannot be integrated in automatic tools [2], [3].

3 Assessment Method Proposal

This research analyses the web accessibility of three e-commerce Portuguese websites based on the Web Content Accessibility Guidelines 2.1 [35]. The analysis was carried out during February-June 2020.

The main goals to attain were in first place 1) obtaining an overview over the accessibility of the three most used websites in Portugal regarding e-commerce website. Secondly 2) conclude about the compliance of those websites with the level A of the WCAG 2.0 created by W3C Consortium.

With that purpose was created and used a semiautomatic web accessibility evaluation tool, combined with a manual analysis carried out by an evaluator. This tool, named **ShoppingForAll** was developed in a spreadsheet (Ms Excel) and was inspired by the UserFocus¹ method, currently available, that allows to test the usability of a website. We also used a very well-organized and useful checklist created by WebAIM² based on WCAG for the level A of compliance



Figure 1. *ShoppingForAll* structure.

Through this tool, we'll be capable of comparing the results and scores obtained by each website and analyse their strengths and weaknesses. We chose the multiple case study methodology, which met our intentions once is "as an intensive study about a person, a group of people or a unit, which is aimed to generalize over several units" [18].

The selection of Portuguese e-commerce websites was made through the *SimilarWeb*³ platform, because it collects data from various sources, such as ISP (Internet Service Providers), and obtains direct measurement of the volume of visits to the websites.

The three best positioned websites were **1st** Worten.pt, **2nd** Fnac.pt and **3rd** RadioPopular.pt. Besides the position in the national ranking, another used criterion was the category of products, knowing that products related to informatics and household appliances are popular with regard to electronic commerce.

The website accessibility compliance assessment methodology was used, considering the WCAG 2.1, as so were the variables analysed.

¹ Available at <https://www.UserFocus.co.uk/resources/guidelines.html>

² Available at <https://webaim.org/standards/wcag/checklist>

³ Available at <https://www.similarweb.com/pt/top-websites/portugal>

4 Results

The analysis shows that Worten.pt website is 95% compliant regarding web accessibility, however, this is for the A. From the point of view of the four principles that represent WCAG 2.1 – Perceptible, Operable, Understandable and Robust – it can be seen on Table 1 (below) that Worten.pt’s most complied with Understandable and Robust. Followed by Fnac.pt, which provided a final score of 90%.

This test ended with RadioPopular.pt, which had a final evaluation of 80%, although a good score, it’s still a bit far from both the competition. Through these results, we can assume that accessibility may have implied, or been a reason to the volume of visits of each e-commerce website

Table 1. Worten.pt results.

RESULTS				
Results summary	Score	# Questions	# Answers	Score
Principle 1 - Perceptible	17	19	19	95%
Principle 2 - Operable	12	18	18	83%
Principle 3 - Understandable	6	6	6	100%
Principle 4 - Robust	3	3	3	100%
Total Score		46	46	<u>95%</u>

5 Discussion

As a main point of discussion, it should be noted that, in Portugal, complying with level A of conformance is not mandatory to e-commerce websites that don’t belong to the state [10]. It’s also imperative to understand that these websites do not present any type of statement on accessibility, or if they comply with it officially.

It should also be prominent that, since the homepage of these websites are the main door for the user, it should be a primary target for improvements and enhancements in accessibility. Improving these websites should be a responsibility taken by all these organizations, since it improves the user experience, and reduces the digital divide that people with limitations can suffer.

This study provides, originality based on the fact that the three e-commerce websites that were tested, are becoming essential in the daily lives of the general citizen, and that

a semiautomatic tool was created, based on a renown, currently available, test on website usability complemented with a checklist created by WebAIM⁴. Furthermore, this study reinforces conclusions reached by other studies [17], that highlight that a number of Portuguese organizations do not prioritize accessibility in their e-commerce websites.

From a technical point of view, in terms of accessibility studies in Portugal, it's also worth mentioning that due to WCAG 2.1, released in 2018, being a somewhat recent recommendation previous studies were focused on guidelines that are now outdated.

6 Conclusions

Based on the results obtained, it is considered that the three websites evaluated are not considered 100% accessible for individuals with a low degree of disability. In order to increase this accessibility to the minimum requirements for these individuals, this study provides five ways for improvement as shown on the next table:

Table 1. Proposed ways for improvement we accessibility.

❶ Alternative Text.	Images on the website should always have an alternative and clear text, describing the image. Null if the image is decorative
❷ Highlight on the Button	Provide clear feedback to the user so that he knows he is positioned under the element.
❸ Navigation with Keyboard	Website must be fully accessible with keyboard (through "Tab" and "Enter" keys), Some elements on the HTML5 code might have to be changed.
❹ Subtitles and Description	The videos must offer the possibility to activate subtitles (avoid Google automatic subtitles).
❹ Use of ARIA ⁵	Web developers can use the attributes of ARIA "role" and "aria-*" in the HTML language elements. It increases accessibility of web pages.

In what regards to the limitations, ShoppingForAll was developed with level A of accessibility in mind, which means, it doesn't yet contemplate all the checkpoints that are present in WCAG 2.1.

The Internet should be accessible to everyone. And when we think about the creation, development and evolution of an e-commerce website, we must also think about users with special needs, facing unnecessary barriers to make an online purchase.

⁴ WebAIM is one of the leading providers of web accessibility expertise internationally. WebAIM is a non-profit organization based at the Center for Persons with Disabilities at Utah State University.

⁵ ARIA - Accessible Rich Internet Applications

The diagnosis performed on this study can help organizations to make decisions and corrections to provide a more accessible website to everyone. The main social value of this study is to convey that even the most frequented e-commerce websites in Portugal contain some serious problems that can be corrected, and to provide greater visibility to users that need more accessibility.

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