

Evaluation and Accessibility of Web Design and Applications

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Abstract

Over the past few years, the value of accessible Web design has rapidly increased. Accessible Web design has gained a lot of attention in the past several years. The complexity of the language employed is rarely taken into account by these guidelines for accessible websites. The main aim of this research is to identify an efficient accessible web page creation methodology. This focused aim of this research is to evaluation and accessibility implemented web applications. The primary objective of the work is to identify an efficient accessible web page creation methodology intended towards the perspective of people with disabilities. Further, to understand the accessibility of web applications the elemental performance is evaluated and the results are studied.

Keywords: Web Development, Accessibility, Web applications, Element Evaluation.

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Introduction

The Internet has become so widespread and intricate that it is now an essential requirement. Exchange of data and content has become a natural and routine part of the user experience due to these developments. Information and Communication Technology (ICT) has become integral to our daily lives as a result of a profound social and technological transition that has developed over the past decade(Chaudhary, 2021). Despite the challenges they face, people with disabilities can also participate fully

in the information era and the recent digital society. Internet use among the disabled population is significantly higher than among the general population. Users are now more like creators than just consumers of information. It is becoming extremely prevalent to use dynamic Web apps due to the evolution of the web(Duarte et al., 2016). Static HTML web pages are being transformed into dynamic and interactive applications through the use of scripting that upgrades the page's content in real time.

In spite of the fact that web applications represent a significant step forward in terms of both web development and human computer interaction, the accessibility of web pages might be disrupted by their presence. For the purpose of making websites more accessible to individuals with disabilities, a number of regulations and guidelines have been produced by organisations such as the World Wide Web Consortium (W3C) and the Web Accessibility Initiative (WAI).

In this research, the involvement of users and the production of accessible content is

the primary focus of this paper. Either of these factors is crucial to the successful execution of web pages which adhere to the design among all the principle and enable access to services and information to the largest potential user base. The proposed work has 2 determined objectives, (i) Implementation of accessible web page and (ii) evaluation of accessible webpage. Obviously, the needs of those with certain cognitive disabilities have been taken into consideration, but primary audience for the creation of accessible information is far broader.

Literature Review

Accessible web design

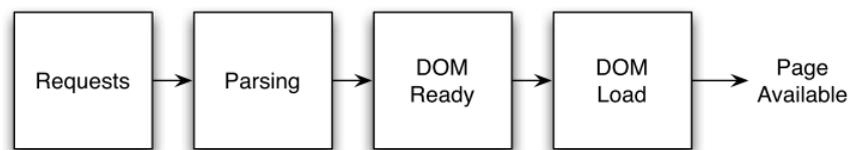


Figure 1: Web page Loading process(Fernandes, 2013)

Updated information is accessible without the requirement to reload the page in web applications implementing Javascript/AJAX(Oyefolahan et al., 2019). An example of such a feature can be seen in Google Gmail, where new messages automatically appear without the user having to refresh the page. To facilitate faster browsing and interaction, web applications may also include keyboard commands, which may potentially trigger some active web change. No longer necessary to manually reload pages to see the latest material. This kind of behaviour is common on flight trackers, stock tickers, and e-mail systems(Gibson, 2007). Despite the fact that these applications are seeming to be more like graphical interfaces, they

nevertheless make use of web technologies like the encoding, content transmission and presentation. Optional textual replacements need to be made available. Since screen readers like JAWS often have trouble with AJAX and dynamically generated content, an increasing number of Web pages are being designed without evaluation for accessibility(Kearney-Volpe & Hurst, 2021). The content and structure of a Web page can be reconfigured with the help of dynamic Web. This is accomplished in a number of ways, including the introduction of new HTML code, the replacement of old HTML code, and the display or concealing of formerly available information and HTML elements.

Guidelines for enhancement

It is also possible to reveal a shortage of scholarly investigation of Easy-to-Read guidelines. Specifications for E2R practise often detail the steps necessary to provide accessible content. Prior guidelines were largely based on the heuristic experiences, frequently produced by institutions aiding people having cognitive impairments(Ahmi & Mohamad, 2019). There is very little guidance on the Internet concerning how to accomplish E2R. Web page and content creators appear to lack sufficient expertise in writing E2R information, while those in the social sector and those requesting E2R online have insufficient knowledge on how to give reachable information as a part of the accessible Web design(Burzagli et al., 2010).

Methodology

Since user input is crucial, it stands to reason that users should be included in every stage of development. Assistive technologies (AT) allow individuals with disabilities to more easily provide input to, or receive output from, a computer. In order to better understand the distinctions between evaluating Web applications and traditional Web pages, this article explores the development of the QualWeb implementation for WCAD 2.0(Joy et al., 2022) features with continuous monitoring of document model object in HTML. The methodology has been adopted from Kerstin Matausch et al. In order to succeed and remain competitive, a website's success must be reliant on users experience after accessing it. Before beginning the development process, it is crucial to define the website's audience and goals.

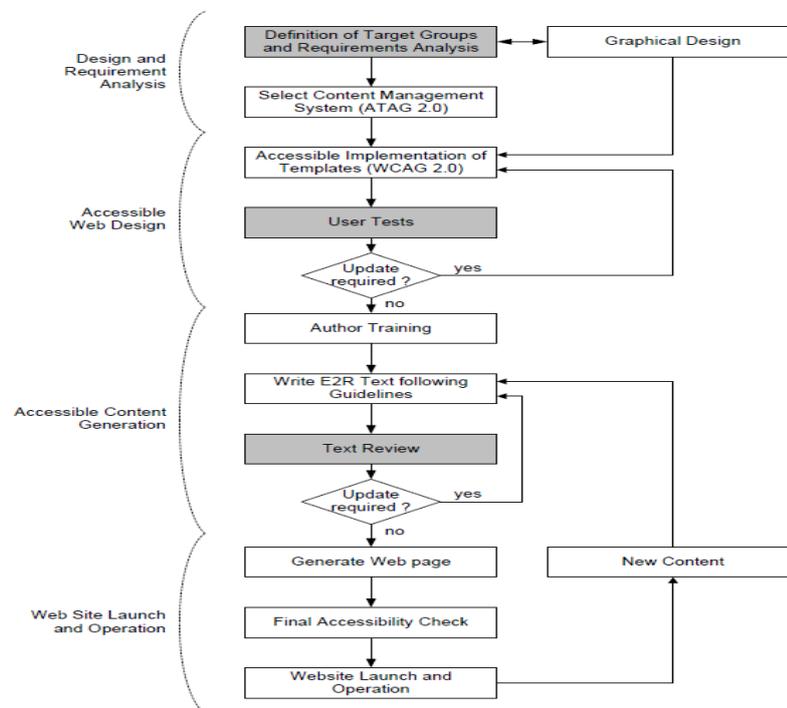


Figure 2: Workflow chart for accessible web page creation(Matausch et al., 2012)

Accessible implementation

Some aspects of creating accessible Web sites, such as providing alternative text for

all images used in material that provides information or writing in a clear and concise manner, cannot be incorporated in

the templates themselves, but must be accomplished by the creators. Creators are required to be educated on how to effectively utilise the chosen Content Management System (CMS)(Novak & Shonola, 2021). Writing in an easy-to-read (E2R) style makes the material more accessible. The European guidelines for creating accessible content define this approach, which relies heavily on interaction from consumers. Accessible content is created initially, and then Web pages and subsequently the entire website is generated. When a new article or a page needs to be added, the method of creating accessible material must be initiated from the outset. After the development phase, accessibility and model validation is mandatory, presumably with at least one representative from each intended audience.

Evaluation

In comparison to its predecessor, the QualWeb Evaluator 3.0 enhances upon the accessibility evaluations it can do in a browser(Kaur & Kumar, 2015). When using the updated version of the Interaction Simulator, the HTML DOM tree is passed on to QualWeb to implement the necessary accessibility tests with the tools in the Techniques subsystem. Concurrently, the application makes use of an Observer that is tasked with monitoring the Document Object Model(DOM) tree for any indications of a modification in its state. In such situation, the DOM has been passed along to the evaluation module as it

is treated as a new state. The Interaction Simulator will keep navigating around the Web app until all the interactive features have been evaluated or induced by triggering.

Results and Discussion

The search engine with the specified methodology returns several results as a word cloud, with the most likely outcome displayed in bigger letter size than the others. Experts in accessibility with a last review, can find any remaining issues with content's accessibility which creators missed during the creation task. Accessible content generation is initiated every time a new page or article was added. The second objective of the research was to evaluate the accessibility of profound web applications available in web. Twenty interesting applications available on the web in web application category such as email portals, online shopping portals was considered for evaluation. It is noticed that most web pages redirect with sorted buttons. In order to reduce the potential for confusion that these redirects can cause, ~~we have~~ this study prefers to only follow up to five of them per page. The outcomes of the experiment are described as following. The web applications tested in this work had an average of 550 pieces per page. This research aimed to determine how many possible states a Web application page might have by looking at the variations in evaluation outcomes such as eligible, decline and warning error.

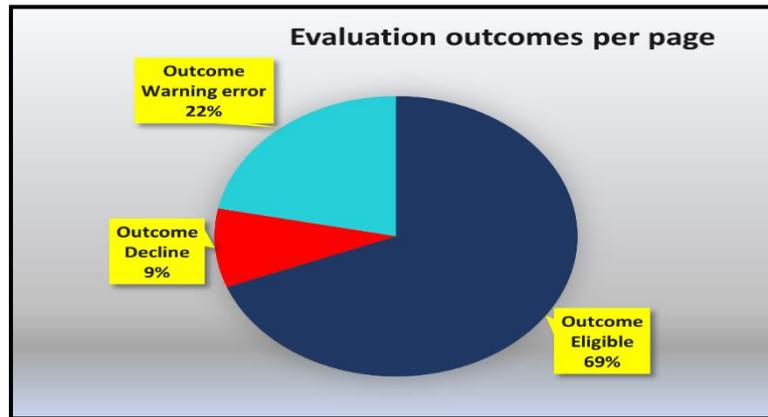


Figure 3: Pie chart representation showing the evaluation outcome data.

Figure 3 represents better orientation and navigation are facilitated by the distinct visual separation of the navigation bar and the content. This means the user is more likely to receive relevant results. Web pages, and by extension the entire website, can be generated after accessible information has been produced. A significant majority of accessibility issues would go undetected if these counts of redirecting stages (5) were not triggered in a conventional computerised Web accessibility evaluation. The majority of errors or prospective problems in dynamic apps are recognized by Cascading Style Sheets (CSS), which shows more warnings. There is an increase in difficulties or probable problems when a new page state is examined, indicating that accessibility concerns would not be recognized and fixed if these states were not considered. The findings demonstrate that researchers and specialists in the field of accessibility are capable of automatically evaluating all of the states that can be triggered in a page, without the need for human interaction. Given the inherent dynamism of Web applications, in few cases a whole service is contained within a single page. These cases are imperative, and the evaluation

techniques has to be revised to stop considering Web pages as static entities.

Conclusion

Internet complexity is reduced significantly when accessibility, usability, and text complexity are all taken into account. This leads to more user-friendly websites, which are crucial to customer happiness, loyalty, quality, and success. The growing number of people who need information and services to be simple to comprehend and use will only increase as the population ages and as the Internet becomes more pervasive. This research study concludes that the mentioned accessibility implementation method was identified efficient among several works reported. Various web applications were evaluated further to understand the insights and performance of the accessible web applications. The results concludes that several possible page states in a Web application, can have an impact on accessibility. Hence, new strategies are being implemented, more applications are being tested, and restrictions on redirected traffic are being removed as part of ongoing effort towards development.

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