Website Accessibility - An imperative aspect for web based Information system (WBIS) Testing – A Review

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Abstract - Accessibility, the word is getting buzzed these days, as every business and individual too is having own website. The advantage of which is the reach of business to global world. Hence it is necessary that the website should be easily accessible to everyone using it, whether it may be a person with disability or any device user is using website should serve its purpose and convey the message to the user. Inaccessible websites can cause for the negative impact, frustrating experience for the people, which will indirectly reduce the chances of the user coming back again to the website. This may lead to reduce revenue for business selling online. With so much of significance, it is important to all web projects to have at least basic understanding of website accessibility. In this paper, we have reviewed various research papers based on the concept of website accessibility with the details of the several tools that authors used for evaluation.

IndexTerms - Accessibility, Web accessibility, WAI.
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I. Introduction to Web Accessibility

Web accessibility according to Wikipedia, refers to the inclusive practice of removing barriers that prevents interaction with or access to website, by people with disabilities. When sites are correctly designed, developed and edited, all users have equal access to information and functionality [14].

As per WAI (Web Accessibility Initiative) of W3C, web accessibility means that websites, tools, and technologies are designed and developed so that people with disabilities can use them. More specifically, people can perceive, understand, navigate, and interact with the web, and also able to contribute to the web.

Web accessibility encompasses all disabilities which will affect the use of web like e.g. the feature auditory means if the user is visually impaired then using audio, message can be passed on to the user, the same will also helpful to the person suffering from temporary disability like list of glasses. Responsiveness of the website will let people to use any screen like TV, laptop, mobile or tablet; website will give the same experience to the user. The detailed text under video supports to the user to get access to the message even if the user is having slow internet connection or limited bandwidth.

The importance of web is getting more day by day in any sector like education, hospital, government, health care, and many more. So it is now necessary that the websites should be accessible to give identical experience, access and opportunity to people with different physical conditions. So that the users of the website should get the good experience about the website and it also increase the chances of the user to come back again to the website

II. Advantages of website Accessibility

Following mentioned are the benefits of making website accessible.

- Accessibility increases the website use and it is cost effective
- It increase the market reach of the website
- It also increases the fundability with search engine optimization (SEO)
- Creating an accessible site will increase traffic to your site.
- Efforts taken by an organization to increase web accessibility will also positively increase the public image of the company.
- If for the accessibility sake of purpose, company has created responsive website, then it will reduce the cost of creating multiple copies of the same website for different screens.
- The time taken for site maintenance and development decreases.
- Disable user will get benefited from your site and they can experience the same as normal user can.

III. Website accessibility evaluation

The evaluation of the website accessibility can be done either manually or by using evaluation software tools.

Manual testing is performed by an actual person. It may take longer time to evaluate the website manually and the quality of the result of the manual evaluation of the accessibility depends on the knowledge and the experience of the tester of

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the website. But in case of using software tool, the evaluation is often fast and efficient. Though many software tools are available to test website accessibility, not everything can be computationally tested; some things require human evaluation interference. Software tools should be operated by an experienced evaluator as accessibility check require human judgment. Following are some of the various open source evaluation tools for accessibility -

- WAVE
- JAW
- Total Validator
- Colour identifier etc.

IV. Literature Review

Study has revealed that, human bodies may suffer from the sensory impairments that develop with age like eyesight and deftness. That may reduce the use of websites which is ocean of information and hence they are less likely to learn new things by the people. As a result there is reduction in the use of sources of information which may help in the need. Hence the concept of accessibility has been arrived. Web accessibility is making content available to all individuals, regardless of any disabilities or environmental contents they experience. World wide web consortium establishes the web accessibility initiative (WAI) in 1997 to design web accessibility guidelines. In 1999, they finalized and recommended the use of web accessibility guidelines (WCAG 1.0) to design websites. At the end of 2008, WACG 2.0 was published that applies broadly to more advance technologies, it encloses 12 main guidelines which are based on 4 main principal i.e. Perceivable, Operable, Understandable, and Robust.

Table 1: Principals of WCAG 2.0

Principles	Guidelines
Principle 1: Perceivable	• Website should provide the alternative text for all non-text contents. • If there is any multimedia file in web site then web designer must include the caption for those files. • Website contents should be presented in such a way that if someone use assistive technology then meaning of contents not loose. • All the information which is available on website should be very easy to read and hear.
Principle 2: Operable	• It should be possible that user can perform all available operations in website using keyboard. • Website did not have any data or contents which can be the reason of seizures. • Help should be available for users to search different contents in website and to navigate different available pages in website.
Principle 3: Understandable	• All available contents in website must be readable and easily understandable for all different type of users. • All website contents should appear and operate in predictable way. • Support should be available for users to avoid making mistakes and if mistakes are done from user than there should be mechanism to correct them.
Principle 4: Robust	• All designed website should have compatibility to run on different type of browsers and also different assistive tools can be used.

The main aim behind these guidelines is to promote and achieve website accessibility, so that the website would be usable by both normal as well as people with disabilities.

Many researchers have researched a lot on web accessibility on various topics about accessibility. But in this paper we have presented review of 11 research papers of the field of website accessibility.

The following table 2 describes the methodologies or tools used for evaluating web accessibility, result of the evaluation of various research papers based on the study of the web accessibility.

Table 2 : Review of various techniques of web accessibility

Sr. No.	Title	Author, publication , year	Methodology / Tools Used	Result
1	Methods and Techniques of Adaptive web accessibility for the blind and visually impaired	Bujar Raufi, Mexhid Ferati, Xhemal Zenuni, Jaumin Ajdari, Florije Ismaili, Elsevier Ltd. 2015.	Approaches for Providing Adaptive Interaction	Comparison of various adaptive methods for blind and visually impaired.
2	Evaluating the Accessibility of Web Applications	Nádia Fernandes*, Daniel Costa, Carlos Duarte, Luís Carriço, Elsevier Ltd, 2012	QualWeb Evaluator 3.0	For 50 web applications and 1010 elements per page, average 179 elements pass on accessibility test, 77 fails and 448 to be warned and repaired.
3	An assessment of web accessibility of UK accountancy firms.	Russell Willams, Rulzion Rattray, Emraldinsight, 2003	"Bobby" accessibility checking software.	18% of the sample web pages passed with no Priority 1 errors. 7% samples passed at Priority 2

				and there were no passes on level 3 of priority.
4	Web accessibility trends in university libraries and library schools.	David Comeaux, Axel Schmetzke, Emraldinsight, 2007.	Bobby 3.1.1 Tool was used to check accessibility.	As the webpages accessibility checking results of 2002 and 2006 are compared in this, the percentage of accessibility has been increased in both US and Canadian websites of LIS and Library.
5	Web accessibility at Kentucky's academic libraries	Michael Providenti and Robert Zai III, Emerald Group Publishing Limited, 2007	Watchfire's WEBXACT accessibility tester, W3C HTML Validator, W3C Semantic Data Extractor.	Data collected in 2003 and 2007 are compaired. 23% samples were passed in 2003 while in 2007, 37% passed in Priority1. While in Priority 2 and 3 there were no change in the percentage.i.e. 3%
6	An Analysis of Website Accessibility in Higher Education in Indonesia Based on WCAG 2.0 Guidelines	W Arasid, A G Abdullah, D Wahyudin, C U Abdullah, I Widiaty, D Zakaria, N Amelia and A Juhana, IOP Publishing, 2017.	TAW is used as an evaluation Tool for accessibility.	Websites of state universities in west Java has not fully qualified website accessibility. It does not fulfill some criteria from WACG 2.0 like non text context, page titles, link designation.
7	e-Government Website Accessibility: In-Depth Evaluation of Saudi Arabia and Oman	Abdulmohsen Abanumy, Ali Al-Badi and Pam Mayhew, Academic Conferences Ltd, 2005	Testing websites manually using W3C WCAG' guidelines, Bobby (Watchfire, 2002), Multiweb, LYNX, W3C validator service, And email survey from the webmasters of government websites.	The websites of the government of two GCC countries i.e. Saudi Arabia and Oman needs considerable efforts to become accessible. And awareness and importance should be spread as if website is accessible properly than it will be useful and successful.
8	Accessibility and Usability Evaluation of State-Owned Universities Website in Nigeria	Fortune B Deedam, Enefa-a Thomas, Onate E. Taylor	SortSite evaluation tool, Usability.gov guidelines,	Overall usability evaluation found very low, that only 13% websites fulfill aspects to be usable. And 30% websites found with the broken link violation.
9	Web Accessibility: A Broader View	John T. Richards Vicki L. Hanson, WWW 2004, May 17–22, 2004	In this paper, author has given details of web accessibility with need, advantages, aspects, tools. And proposed a technique for web adaption.	With the new proposed technology of web adaption, it is easy to update website to become accessible, readable.
10	Web Accessibility Challenges	Hayfa.Y.Abuaddous, Mohd Zalisham Jali, Nurlida Basir, International Journal of Advanced Computer Science and Applications, 2016	The details about accessibility, guidelines, WCAG 2.0 conformance levels(A, AA, AAA), Challenges for accessibility, Challenges during evaluation of accessibility are explained.	This paper has reviewed the negative impact of web accessibility challenges and has analytically discussed primary problems related with each challenge.
11	The Usability and Content Accessibility of the E-government in the UK	Hoi-Yan Terry Ma, Panayiotis Zaphiris, Universal Access in HCI, 2003	Bobby and LIFT usability and accessibility evaluation Tools,	The result shows a relatively high compliance i.e. 62% with WCAG suggested by WAI. And there is low usability rating i.e.

			Heuristic evaluation and cognitive walkthrough, Assistive Technology	1.78 on the scale of 1 to 3 for the most of the government websites in UK.

Conclusion

Website serves various advantages to the people using it. It offers the independence and freedom to the people about information. Huge information is available on the websites and one can access it from any part of the world. With having many advantages if website is created by keeping accessibility in mind, then people with disability also will get benefited. As accessibility is not the provision for only disable people, it is the step if taken will definitely give the better results in terms of site traffic, SEO, increase online sale, customer satisfaction, maintaining positive image of the business in public etc. Hence here we conclude that accessibility is an important aspect of the website but it will be good if one have started implementing accessibility right from the development of the website.

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