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Comparative Analysis of Web Accessibility Standards and Regulations

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ABSTRACT

Today websites play important role in our day to day life. It has made our life very easier and approachable to many operations that were a distant dream in the past. Websites allow user to access information from wide range of sources. These web services are available for all including person with disabilities, older people and people living in remote area. But the people with disabilities have several accessibility barriers to access the internet due to poor and improper designing of web interfaces. Accessibility professional are accessing various Accessibility standard, to implement the Accessibility project as per their need. Specific project require specific standard such as USA has ADA, and uses section 508. Indian government have GIGW for their Government portal. European Union has adopted their own standard. WCAG 2.0 is an internationally accepted standard for web accessibility, developed by Wide Web Consortium (W3C). It is difficult to provide smooth project remediation right from the beginning, when asked for particular Accessibility standard implementation. Each standard has different structure to organise and implement the Accessibility guidelines on the website. Implementation of web accessibility standard demands, time, effort and cost estimate. The researcher wants to provide complete analysis of selected web accessibility standards and regulations that has helpful to organization and it will also be helpful for designing accessibility evaluation tools and addressing multiple compliance. The researcher prepared a questionnaire to assess knowledge of web accessibility expert defining certain criteria and parameters. Researcher administered a questionnaire to Accessibility expert as part of Pilot Study. After conducting pilot study, it was found that Accessibility expert were not aware about any tool for comparative analysis of various Accessibility standard and guidelines.

Keywords- Web Accessibility, Accessibility guidelines, analysis, compliance, comparative.

1. INTRODUCTION

The web accessibility movement is started in late nineties in world. United States of America introduced section 508 in US rehabilitation act followed by Americans with disabilities act (ADA). World Wide Web consortium also started web accessibility initiative (WAI) in 1996 and started developing guidelines for content accessibility, authoring tools accessibility, browser accessibility etc. Product based software companies like Microsoft, IBM, Oracle, Adobe etc. also started developing accessibility standards for their own products in late nineties.

First version of Web content accessibility guidelines (WCAG1.0) was released in 2003. Since then accessibility was started to be addressed throughout the globe. Australia passed an act (disability discrimination act) (DDA) in 1998. Several European states like Switzerland, Ireland introduced accessibility standards for their countries. United Kingdom had also the similar laws in late nineties. India also had persons with disabilities act in 1995 but there is no mention about accessibility of website and software application. Accessibility is being addressed in India after signing on United Nations conventions on rights of persons with disabilities (UNCRPD) in 2007. Then India introduced a government of India guidelines for web accessibility (GIGW) in 2009 to address accessibility issues in government web portals.

Managing accessibility projects is a challenge and growing need in the IT industry as there is no tool for generating accessibility projects estimate.[1] Due to this accessibility professionals end up spending more time and efforts to prepare an estimate for the web accessibility projects. [2] The focus is towards

developing a tool for generating systematic estimate for the web accessibility projects by using comparative analysis of web accessibility standards across regions and organization that helps in providing similarities and differences in expert the standards. Comparative study has carried out on the various parameters to compare the accessibility standards. [3]

Comparative study of web accessibility standards helps in designing a tool that can generate project estimate which includes efforts, time and cost to implement the specific accessibility standard into client website. [4] Accessibility professionals are facing challenges in preparing the fairly accurate project estimate in case of accessibility remediation and designing from beginning. Only experienced accessibility experts can prepare the project estimate with lot of study and research which is not only time consuming but also an approximate value.

Providing complete analysis of selected web accessibility standard and regulations has helpful to organization and also for designing accessibility estimation tools for addressing multiple compliance. With the help of sample data collected through pilot study it was found that accessibility expert were not aware of any such detailed comparative analysis of various accessibility guidelines and standards, or about availability of any such tool for comparison of accessibility standards. This research application integrates the systematic comparison of accessibility standard. Generating project estimate report for specific accessibility standard considering all parameters of the accessibility guidelines that helps in accessibility remediation of the website.[5] Application can be compatible to adapt newer version of accessibility standards. Initially application can be used to generate report for WCAG, Section 508 and GIGW implementation.[6] Comparative information of various accessibility standards and guidelines is not available for the organisation who wishes to adapt accessibility in their system which creates difficulty for the organisation to make decision. Publicly available web accessibility standards and regulations on web has downloaded and manual comparison has done by aligning and mapping accessibility checkpoints, sections, levels etc for every web accessibility standard that the researcher want s to compare.

2. Related Work:
This work comes from these main criteria, 1. Person with disabilities face many challenges to access the website, 2. Accessibility expert are unaware about the availability of tool to compare various web accessibility standard, 3. Organisation seeks comparison of various web accessibility standards in order for smooth implementation of the guidelines.

3. Objectives of the study:
3.1 To gather and analyze available web accessibility standards and regulations in world to understand their specific context.
3.2 To provide systematic comparative information of each web accessibility standards and regulations in terms of similarities and differences.
3.3 To find out usability of selected accessibility standards and regulations for users with disabilities.

4. Hypothesis:
i) Systematic Comparative information of various accessibility standards and regulations of latest versions is unavailable.
ii) Comparative study of various web accessibility standards and regulations are helpful in addressing multiple compliance.

5. Research questions:
Question pertaining to objective 3.1
Q.1 How many accessibility standards are available in world.
Q.2 What is the specific objective of each accessibility standards and regulations?
Q.3 What is the scope of each accessibility standards and regulations?
Question pertaining to Objective 3.2
Q.1 How comparative analysis can be presented and made available?
Q.2 What is the similarities and differences in each selected accessibility standards and regulations?
Q.3 What is co-relation of each accessibility standards and regulations?
Q.4 How addressing one accessibility standard or regulation will fulfill other compliance?
Questions pertaining to objective 3.3
Q.1 How effective is the selected accessibility standards and regulations?

6. Research methodology:

Experimental method has used for comparative analysis.

6.1 Manual analysis:

Publicly available web accessibility standards and regulations on web has downloaded and manual comparison has done by aligning and mapping accessibility checkpoints, sections, levels etc. in each web accessibility standards taken under study.

6.2 Checking effectiveness:

Selected web accessibility standards has implemented one after other in the experimental portal and usability has checked each time from 5 selected web accessibility experts. Their structured feed back in the form of short questionnaire has noted and usability before implementation, usability of the experimental portal after implementation of each accessibility standards has taken.

7. Data collection:

Primary data:

The primary data has collected in the first stage of the research. Primary data has collected from the selected sample of experts that are accessibility professionals. In the second stage of the research for checking effectiveness. The sample size has 10 experts.Geographical area selected for research sample is Maharashtra. Approximately 100 Accessibility professionals in various district. Sample size is 50 out of 100 for entire research.10 samples has taken for pilot study. Source of Sample-NGO, Institution, IT sector.

Researcher has used Google Docs to collect the data from experts.

Secondary data:

Secondary data from various sources from web has collected and analyzed.

8. Tools used

a. Microsoft Excel is used for mapping each web accessibility standards simultaneously.
b. Questionnaire is used to collect feedback of the expert.
c. T test is used to record and analyze user feedback before and after implementation of each web accessibility standards.

9. Pilot Study Design:

We designed a questionnaire to assess knowledge of Accessibility expert on various parameters related to comparison tool for S Web Accessibility standards. This questionnaire was administered on 10 Accessibility professional the researcher formulated 38 questions for the questionnaire. The parameters considered for the study were

a) Total number of accessibility standards
b) Objectives of accessibility standards
c) Difference between accessibility standard
d) Similarities between accessibility standard
e) Availability of tool to compare accessibility standard.

Thus the study was carried out on 10 accessibility expert. 38 Questions pertaining to above parameters were framed and designed in 3 Point Likert Scale. The responses included 'Yes', 'No' and can't Say or Agree, Disagree and strongly agree depending upon the question. In the first part the participant filled in the demographic information. The questions included were about their academic qualifications, their age and experience in this field. The questions were also framed on awareness about objectives, similarities and differences of various accessibility standards. The respondents were also asked if they are aware about any tool to compare different web accessibility standard.

The researcher designed questionnaire that assessed knowledge of Accessibility expert pertaining to information about tools to conduct comparative analysis of various web accessibility standards

Question Frame

The 3 Point Likert Scale was administered to 10

Accessibility expert each gave us completed response to every question. 50% of the respondent were female and 50% were male they belong to age group of 23-28 years most of them were high school passed. Almost all respondent belong to physical accessibility sector, almost all respondent were accessibility tester. Most respondent were experienced in the field of implementation of web accessibility standard, almost all of them had experience of one or two years. Almost all the respondents were aware about the objectives of web accessibility standard.

10. Pilot Study Results
10.1   Findings
The finding of the pilot study was very interesting. Almost all the respondents were not aware about web accessibility standards. Almost all the participants were aware about any one accessibility standard. Almost all the respondent agreed that they are aware about objectives of web accessibility standard. But the almost all participant replied that they cannot elaborate objectives of web accessibility standard. 70% of web accessibility expert had experience between zero to five years.20% of accessibility expert had experience between five to ten years. 10% expert had more than ten years of experience. Almost all the expert holds certification in web accessibility standard. 70% of respondent had an attended training on accessibility whereas 30% had not attended any training on accessibility. 50% of participants were not aware about difference between available web accessibility standard. 40% participants were partly aware about difference between available web accessibility standards whereas 10% of the participants were fully aware about difference between different web accessibility standards. Almost all the respondents were partly aware about the similarities between different web accessibility standards. 50% of the participants never tried to compare any web accessibility standard, whereas 30% of respondent were partially sure whether they tried to compare different web accessibility standard. 20% respondents actually compared different web accessibility standards. 60% of the respondent replied they don't think comparison of web accessibility standards is needed. 20/% felt the need for comparison of web accessibility standards. 70% respondent felt that comparison of web accessibility standard has helpful in addressing multiple compliance. 30% were partial whether comparison of web accessibility standard has

helpful in addressing in multiple compliance or not. 60% of respondents were not aware about availability of any tool to compare web accessibility standards. 20% were not aware about availability of any tool to compare web accessibility standards whereas 20% were aware about tool to compare web accessibility standards.

Almost all the participant felt that availability of tool to compare web accessibility standard has useful to them. Almost 90% said as there are no much difference in different web accessibility standard there is no need for a tool for comparison. 10% of the participant felt the need of comparison of web accessibility standards. 80% respondent replied that they came across common errors while implementing web accessibility standard. 20% said they didn't come across any common errors while implementing web accessibility standard. Almost 80% replied that they can name common accessibility problem. 20% respondent said they were not able to name common accessibility problem. Almost all respondent said that they were aware about accessible content.   80% respondent said that they can name some common accessibility barriers. 20% said they cannot name some common accessibility barriers. 70% respondents were aware about accessibility training courses. 30% respondents were partially aware about accessibility training course. 80% respondents were partially able to follow guidelines for implementing accessibility standard given in English. 10% were able to follow accessibility guidelines given in English. 10% respondents were not able to follow guidelines given in English.60% respondent felt provision of comparison of various accessibility standard is required by the client. 20% respondent disagreed that comparison of various accessibility standard is required by the client. 20% of the respondent strongly agreed that comparison of various web accessibility standards is required by the client. 50% felt that Principal, Success Criteria, Check Point and Level can be used as parameters to compare web accessibility standard. 20% respondent felt that Principal, Success Criteria, Check Point and level cannot be used as parameters to web accessibility standards. 30% respondent replied that they can't say whether Principal, Success Criteria, Check Point and Level can be used as parameters to compare web accessibility standards. 70% respondents were not aware about parameters to compare web accessibility standards. 30% respondents were aware about parameters to compare web accessibility standards.

80% respondents were not able to describe parameters in detail to compare web accessibility standards. 20% respondents were able to describe parameters in detail to compare web accessibility standards. 50% were able to identify factor in deciding time estimate to implement specific web accessibility standards. 50% were not able to identify factor in deciding time estimate to implement specific web accessibility standards. 50% respondents were not able to identify factors to consider in deciding cost estimate to implement specific web accessibility standards. 30% respondents were able to identify factors to consider in deciding cost estimate to implement specific web accessibility standards. 20% respondents said they were not able to say whether they are able to identify factors to consider in deciding cost estimate to implement web accessibility standards. 60% respondent said that they are partially aware that efforts in implementing web accessibility standards are measurable. 40% respondent said that they were not aware that efforts in implementing web accessibility standards are measurable. 60% respondents were aware that addressing one accessibility standard or regulations will fulfil other compliance. 40% respondents were not aware that addressing one accessibility standards or regulations will fulfil other compliance.

The result of the questionnaire test positive on reliability as it showed .

Conclusion:

With the above conducted pilot study the researcher came to conclusion that the accessibility expert are not aware about availability of tool to compare various web accessibility standards and if the tool is made available to them in near future it has useful to them in implementing the web accessibility standard in clients website.

This is pilot study

References:
[1] Baowaly,M.K.,Hossain,J.M.,Bhuiyan, M.,2012.Accessibility analysis and evaluation of government website in developing countries: case study Bangladesh

[2]Mankoff,J., Fait,H., and Tu Tran., 2005. Is Your Web Page Accessible? A Comparative Study of Methods for Assessing Web Page Accessibility for the Blind. In Proceedings of SIGCHI Conference on Human Factors In Computing Systems (pp.41-50), Portland,USA

[3]Klein,D.W.,Kresowik,D.,and McCoy.,2005.A Study of the Accessibility of Ten States' Web Services and their Policies on Web Accessibility for People with Disabilities.

[4]Richards,J.T.,Hanson,V.L.,2004. Web Accessibility: A Broader View.Proceedings of the 13th international conference on World Wide Web.

[5]S.Lujana-Mora.2013.Web Accessibility Among the Countries of the European Union: A Comparative Study. Actual problems of Computer Science.,vol.1,no.3,pp..18-27,ECCC Foundation.

Cullen, K., Kubitschke, L., Boussios, T., Dolphin, C., Meyer, I., 2009. Study report: Web accessibility in European countries: level of compliance with latest international accessibility specifications, notably WCAG 2.0, and approaches or plans to implement those specifications. European Commission. Internet: http://ec.europa.eu/digital-agenda/en/news/study-report-web-accessibility-european-countries-level-compliance-latest-international (visited November 2 2013)

Slatin, J., & Rush, S. (2003). Maximum Accessibility: Making Your Web Site More Usable for Everyone. Boston, USA: Addison-Wesley.

USA government, Americans with disabilities act document, internet:http://www.ada.gov/ enforce_current.htm(visited 17th November 2015)

USA government, rehabilitation act document, internet:http://www.section508.gov/content/about-us(visited 18th November 2015)

World wide web consortium, Web accessibility

Results and Discussions

Parameters	Questions	Mean
Number of Web Accessibility Standards	Are you aware about web accessibility standard	.882
	How many web accessibility standard do you know	.882
	Do you know exact number of web accessibility standard available in the world.	.873
Details about web accessibility standards	Do you know objectives of web accessibility standard	.882
	If yes can you elaborate objectives of web accessibility standard briefly?	.882
	Do you know difference between web accessibility standard in detail.	.869
	Do you know similarities between available web accessibility standard in detail.	.882
	Efforts in implementing web accessibility standard are measurable	.882
Availability of tool for comparison	Do you know about any tool to compare web accessibility standard	.872
	If a tool is made available to compare web accessibility standard will it be useful to you?	.882
	Can we use following parameters to compare web accessibility standard i) Principal ii) Section criteria iii) Check point iv) Level	.863
Problem related to implementation of web accessibility standard	Do you come across common errors while implementing web accessibility standard.	.873
	Can you name some common accessibility problem	.873
	Can you name some common web accessibility barriers?	.873
	Can you identify factors to consider in deciding time estimate to implement specific web accessibility standard	.872
	Can you identify factors to consider in deciding cost estimate to implement specific web accessibility standard.	.867

initiative, article designing for inclusion, internet:http://www.w3c.org/wai/designingforinclusion(visited on 17 november 2015)

World wide web consortium, resources document, internet:http://www.w3.org/WAI/Resources/Overview(visited 02 november 2015)

Oracle corporation inc, corporate policy document, internet:http://www.oracle.com/us/corporate/accessibility/policies/index.html(visited on 23 september 2015).

Adobe corporation inc, corporate accessibility document, internet:http://www.adobe.com/accessibility(29 november 2015)

Government of India, ministry of information and communication technology, government of India Guidelines for web accessibility document, internet:http://web.guidelines.gov.in/#&panel1-3 (visited 23 september 2015)

Web accessibility in mind, Uta state university initiative, laws throughout the world, internet:http://webaim.org/articles/laws/world/(visited on 25 november 2015)