

SPECIAL ISSUE

शोध सचिवा

An International Multidisciplinary Quarterly
Bilingual Peer Reviewed Refereed Research Journal

• Vol. 7

• Issue 25

• January to March 2020

National Conference On
“Current Trends in Management - Changes & Challenges”
27th & 28th February - 2020

Organized by
Yashaswi Education Society's International Institute of Management Science Chinchwad,
Pune In association with Associations of Indian Management School (AIMS)



Editor in Chief

Dr. Vinay Kumar Sharma
D. Litt. – Gold Medalist



sanchar
Educational & Research Foundation

CONTENTS

S. No.	Title	Name of Authors	Page No.
1.	Diagnosing Thyroid Symptoms & Remedies Using Data Mining	Dr. Sudhakar D. Bhoite Mrs. Sarika Panwal	1
2.	Decision Support Systems For Crop Selection - AN Imperative For Enhancing Farmers Income	Mr S. S. Managave Dr. R. D. Kumbhar	6
3.	Creativity At Workplace: Advantages, Limitations And Outcome	Ms. Kalyani Sachin Patil	14
4.	Role Of Industry 4.0 In The Adoption Of Gig Economy	Dr. Anjum Sayyad Dr. Sheena Abraham	20
5.	Inclusion Of New Need-Based Services In Existing E-Governance Services Offered By Government Of India At Grampanchayat Level	Dr. Kalpana Salunkhe	24
6.	Consumer Demographics And Reverse Logistics	Dr Ashutosh Zunjur Dr Vandana Mohanty	32
7.	Financial Services Outsourcing: New Frontier Of Knowledge Process Outsourcing	Dr. Pallavi Sajanapwar	39
8.	Social, Ethical And Legal Aspect Of Marketing In India	Mrs. Bhakti Joshirao	45
9.	A Study Of Status And Challenges Of Indian Startups	Mr. Pandurang Bhausahab Akhade	50
10.	A Study On Challenges Before Foreign Trade Of India	Dr. Kajal Vijay Khandagale	55
11.	A Smart Class Attendance Technique For Face Detection And Recognition In A Group Of Students	Mr. Narayan Kulkarni Dr. H.S. Fadewar	61
12.	Software As A Service (Saas) Marketing – Issues And Challenges	Mr Ketan Poojari Mr Aniket Joshi Mr Ajinkya Jagtap Mr Kartik Jadhav Dr Bharati Rajiv Jadhav	68
13.	Economic Value Added: Performance Measurement Yard Stick For Wealth Maximization With Reference To Select IT Companies Listed On BSE.	Dr. Gauri Prabhu Mrs. Poorva Pachpore	75
14.	Impact Of Technology On Indian Education Sector	Dr. Rajesh R. Gawali	82
15.	Literature Review On Comparison Of Web Accessibility Standards	Mr Shantnu Ladkat Dr. Shivaji D. Mundhe	86
16.	Intelligent Automation In The Insurance Sector	Mr. Sunil Joshi Dr Shivaji D. Mundhe	92
17.	A Study The Influence Of Green Marketing Strategies On Performance Of Milk Processing Units In Ahmed Nagar District	Mr. Sudam Balasaheb Shinde Dr. Preeti Kulkarni	96
18.	Savings And Investment Habits Of Youngsters Of Khed Block Of Pune District	Dr. Sonali L. Patil	100

19.	Factors Affecting Customers' Perception Towards Ayurvedic Medicines With Reference To Pune City	Dr. PushprajWagh	110
20.	Analysis Of Customer's Hotel Bills Using Seaborn Of Python	Prof. Prashant N. Wadkar Dr Shivaji D. Mundhe	116
21.	Solid Waste Management System In Pimpri – Chinchwad – Problems And Prospects	Dr. Jayasree Nambiar	120
22.	Impact Of Product Packaging On Consumer Perception And Purchase Intension	Ms. Rupa Manoj Rawal Ms.Pooja Shrish Kulkarni	127
23.	Sentiment Analysis Of Customer Feedback Using HIVE	Ms. Kavita T. Rangari Dr. Abhijeet Kaiwade	136
24.	A Study On Performance Evaluation Of CPSE ETF In India	Prof. Mahesh Mahankal Dr. Prabha Singh	147
25.	A Survey On Big Data Analysis Using Hadoop	Dr. D.R. Vidhate	153
26.	A Study On Identifying Loopholes And Problems In Recruitment And Selection Practices Of Tech Mahindra.	Mr. Janardhan D. Mandhare Dr. Safia Farooqui	158
27.	A Study Of Social Networking Sites In Perception Of Educational Data Mining	Asst. Prof. Pranita Vishal Yerankar Asst. Prof. Shital C. Kadam Dr. Abhijeet Kaiwade	165
28.	Role Of Police Department In India: With Special Reference To Pune City	Prof. Dr. Jitendra M. Hude	169
29.	Partial Capital Structure Adjustment And Speed Of Adjustment Towards Optimum Capital Structure In Selected BSE Listed Cement Companies	Mr Vikas Adhegaonkar Dr. E.B. Khedkar	175
30.	Impact Of Social Media On Consumer Behavior Towards Ayurvedic Medicines With Reference To Pimpri - Chinchwad	Dr. PushprajWagh	181
31.	Workforce Diversity And Job Satisfaction On Employee Retention	Dr. Vandana Mohanty Dr. Sujit K. Acharya	186
32.	A Study On The Role Of Visual Management & Lean Management In Production Process	Mr Nitin N. Kanade	193
33.	Support Vector Machine : A Supervised Machine Learning Algorithm	Prof. Shubhangi M. Choudhary Dr. Avinash S. Jagtap	197
34.	Market Potential For Export Of Cut Rose Flowers From India	Mr. Tambe Prakash Dr. Rupendra Gaikwad	203
35.	The Contemporary Trends In Management Institutes To Meet The Changing Corporate Scenario	Dr. Prashant Radhakrishna Tambe	210
36.	Study Of Performance Appraisal Review System Of Tata Motors Ltd, Pune	Ms. Preeti Sakhre Dr. Rajendra Sabnis Mr. Abhishek Kulkarni	220
37.	Impact Of Recession On The Automobile Components Industry In Pune Region.	Dr. Gauri Prabhu Mrs. Poorva Pachpore	227



38.	A Study On Credit Card Fraud Detection Using Machine Learning	Dr. Sachin Misal Mr. Tushar Kathane Dr. Shivaji Mundhe	231
39.	Trend and Pattern of FDI Inflows In India With Special Reference To Maharashtra And Karnataka	Dr. Kedar V. Marulkar Dr. Nilam V. Jadhav	235
40.	Application Of Operations Research Tools And Techniques In Project Management	Mr. Onkar Arun Wagh Prof. Sarang Annasaheb Dani	239
41.	A Study Of Mobile Data Consumption Amongst Rural Consumers Of Western Maharashtra	Mr. Yogesh Khomane Dr. Rupendra Gaikwad	248
42.	Opting Right Tools For Novel Data Science	Dr. Poonam Sawant Prof. Smita Chavan Prof. Ashwini Chavan Prof. Pradeep Shitole	252
43.	An Application of ICT for SMART E-Governance in India: Forthcoming Challenges and Prospects.	Dr. Ashwini Brahme Dr. S.D. Mundhe Prof. Sagar Kulkarni Prof. Manasi Kulkarni	256

LITERATURE REVIEW ON COMPARISON OF WEB ACCESSIBILITY STANDARDS

Shanattu Ladkar
Dr. Shivaji D. Mundhe

ABSTRACT

"A literature review is a critical analysis of published sources, or literature, on a particular topic. It is an assessment of the literature and a brief summary, evaluation and comparison. It is typically written to demonstrate understanding of the literature on a selected topic, by analysing and then synthesising the information." [Y1].

INTRODUCTION

The need of implementing web accessibility standards is increasing. There are various standards available globally. This is a literature review covering various research papers, Journals and websites. The review is divided into two parts.

The web accessibility movement started in late nineties throughout the globe. The United States of America introduced section 508 (US rehabilitation act), followed by the law Americans with disabilities act (ADA) [7,8]. World Wide Web consortium also started web accessibility initiative (WAI) in 1996 and started developing guidelines for content accessibility, authoring tool accessibility and browser accessibility, etc. [9,10,14,18]. Product based software companies like Microsoft, IBM, Oracle, Adobe, etc. also started developing accessibility standards for their own products in late nineties. [12,15].

The first version of Web content accessibility guidelines (WCAG1.0) was released in 2003. Since then accessibility started getting attention throughout the globe [9,10]. Australia passed an act; Disability Discrimination Act (DDA) in 1998. Several European states like Switzerland, Ireland

introduced accessibility standards for their countries. United Kingdom also established similar laws in late nineties [4,5,6,7,14]. India also passed 'people with disabilities act in 1995' but had no mention of website accessibility and software application. Accessibility action started in India after signature on rights at United Nations conventions for the persons with disabilities (UNCRPD) in 2007. Thereafter, India introduced a 'Government of India Guidelines for Web accessibility (GIGW)' in 2009 to address accessibility issues in government web portals [13]. 2009 was the start time of addressing accessibility barriers in mobile applications including mobile web applications. Apple and android had prepared best practices for mobile web [16,17].

This literature review is covering various research papers, Journals and websites with a focus on;

- Web Accessibility Research globally available
- Availability of tools, comparison of Web Accessibility standards and regulations

Literature review

- The research paper entitled "An extensible environment for guideline-based accessibility evaluation of dynamic Web applications" by

*PhD Research Student, Savitribai Phule Pune University

**Professor & Director, Yashaswi's IIMS, Chinchwad, Pune

Antonio Giovanni Schiavone.

The author mentions that tools were developed during the last decade to facilitate the automatic or semi-automatic evaluation of Web site from accessibility perspective. The tools did not go through updates/revisions overtime and currently are kind of obsolete or dated in keeping pace with changing technology as well as evolution of accessibility standards and guidelines. The evolving technology has created new challenges for automatic accessibility testing/ evaluation as the current tools do not fully cater to that. This paper discusses a software environment meant for evaluation of Web site accessibility and usability. The subject tool as an ability to specify and update the guidelines that should be validated without making changes during the tool implementation.

Journal:-Universal Access in the Information Society. March 2015, Volume 14, Issue 1, pp 111-132. <https://link.springer.com/article/10.1007/s10209-014-0399-3>

➤ The research paper titled "An exploratory study of the accessibility of state government Web sites".

Authors have reviewed relevant legislation and judicial decisions. This research paper presents the results based on the analysis conducted for the Web accessibility on the selected sample of home pages from the 50 states plus the District of Columbia. It is noted that 29% of the web pages do not meet the requirements of Conformance to Web accessibility Level A, whereas just 1 state conforms to level AA. The minimum level recommended for Web accessibility conformance is AA. Also, noted that none of the states conform to Level AAA. The author compares various websites against compliance levels.

Journal:-Universal Access in the Information Society. June 2006, Volume 5, Issue 1, pp 41-50. <https://link.springer.com/article/10.1007/s10209-006-0023-2>

➤ The research paper entitled "Banking Websites in India: An Accessibility Evaluation" by Arvind

Kaur and Diksha Dani. Paper focuses on the analysis of the status of accessibility implementation levels in banking website. For people with disabilities accessing banking services from home/remote places is more convenient than visiting bank branches. This enables them to be more independent in managing their finances. The research paper also discusses the accessibility score of different disability types. It also presents data analysis with respect to the difference between mean accessibility errors of public banks as well as private sector banks in India. Also, evaluation done with correlation of accessibility of the popularity as well as importance of the websites.

The author mentions the finding that none of the evaluated websites were completely accessible for the people with disabilities. No significant difference was observed from accessibility perspective with websites of the public and private sector banks in India.

Journal:- entitled "Springer" CSI Transactions on ICT March 2014, Volume 2, Issue 1, pp 23-34

➤ The research paper entitled "An Educational Pool to Support The Accessibility Evaluation Process" by Christopher Bailey and Dr. Elaine Pearson (Proceeding of the 2010 International Cross Disciplinary Conference on Web Accessibility (WCA) Article No-12 describes the development of web accessibility knowledge management tool known as the Accessibility Evaluation Assistant (AEA), designed to assist novice auditors in the process as accessibility evaluation. The tool is designed primarily for undergraduates & postgraduates computing students with limited knowledge for web accessibility, limited opportunity to study accessibility & limited access to expert reviewers or disabled user groups. Author identified the target audience based on their access needs in relation to the content of the site. The final deliverable for the project would be the development of a database driven web-based tool, an easy to understand the format for the checks they must carry out to effectively evaluate the accessibility of a website.

Published in proceedings of the 2010 International Cross Disciplinary Conference on Web Accessibility (W4A), at Raleigh, North Carolina.

➤ The research paper entitled “**Evaluation, Repair & Transformation of Web Pages for Web Content Accessibility. Reviews of Some Available Tools**” by Michele Kirchner (2002) gives the concept of web sites to people with disabilities. Author briefly mentions the problems introduced by most used browsers. Author revised some of the available web site testing tools available aligned to the requirements of the accessibility standards/guidelines. The author mentions that the web represents a large communication infrastructure for common people and disabled people would benefit more with the evolution of new technologies. He also describes many tools which exist to test/check the web pages from the accessibility perspective & mentions some of the tools those can repair non accessible pages as well. Web developer should be trained to design and develop accessible pages for easy access to impaired people.

Published in proceedings of Fourth International Workshop on Web Site Evolution. **Date Added to IEEE Xplore:** 06 January 2003.

<https://ieeexplore.ieee.org/document/1134091>

➤ The research paper entitled “**A Benchmark for Testing the Evaluation Tools for Web Pages Accessibility**” by Michele Kirchner, elaborates the problems related to web pages Accessibility. Paper talks about the web pages which remain unattended by various sites from accessibility perspective and is this requirement is expected to become an important parameter in the coming days. A web page is considered accessible if it can be viewed by various browsers especially by the special browsers used by disabled people. The Author says that it is worth noting that the accessible web pages play an important role as those can be easily accessed through PDA, smartphones or other portable devices. The author developed complete site which comprises of 28 pages and each violating one

specific WAI directive, with a total of 40 checkpoints. Research results and the benchmark web pages were submitted to three experts for the validation.

Source IEEE Explore

Conference: Web Site Evolution, 2003. Theme: Architecture. Proceedings. Fifth IEEE International Workshop

https://www.researchgate.net/publication/4035597_Benchmark_for_testing_the_evaluation_tools_for_Web_pages_accessibility

➤ The research paper entitled “**A Visual Impaired Simulator to Achieve Embedded Accessibility Designs**”. by Konstantinos volts, Theofanis Oikonomou, Peter Korn, Dimitrios Tzovaras and Spyridon Likothanassis (2009). The research found gaps indicating the lack of non-accessible software applications which causes large productivity losses. The researcher says that due to these inadequacies for impacted people are unable to fully leverage the benefits at the work, while undergoing education as well as various economic & social activities. Researcher also mentions different types of disabilities that is impacted due to deficiencies in the ICI design & development process as well as lack of accessibility support tools for designers/developers. The researchers developed a simulator for embedded accessibility design. It is divided in the categories: basic concepts of simulator and simulator functionalities.

Published in 2009; IEEE International Conference on Intelligent Computing and Intelligent Systems **Date Added to IEEE Xplore:** 28 December 2009

<https://ieeexplore.ieee.org/document/5358165>

➤ The research paper entitled “**Accessible as an Indicator of Jordanian E- government Website Quality**” by Dr. Amar Nizar AbuAli, Abdel salam Obedidant and Haifa Youser. Abu-Addose in 2013 evaluate Jordan E- Government Website Bobby wherein the automatic testing tool were used. The researcher mentions that Jordan E- Government website lacks accessibility and needs further improvements to improve website quality. This

website should go through several design guidelines to ensure that the user have good experience while using the website.

Published in: 2013 Fourth International Conference on e-Learning "Best Practices in Management, Design and Development of e-Courses: Standards of Excellence and Creativity"

Date Added to IEEE Xplore: 20Feb 2014

<https://ieeexplore.ieee.org/document/6745534>

➤ The research paper entitled "Evaluating Accessibility Features of Tutorial creation Software" by **Diana K. Wakimoto and Aline Soules** elaborates the accessibility features and case of use of three tutorial creation products. –

- a) Camtasia ® 6
- b) Captivate ® 4 &
- c) Voice thread ®

Research compares these products to analyse which product creates the most accessible tutorial. At the end, research finds that Camtasia & captivate exceed Voice Thread in terms of Accessibility Compliance. In this research paper researcher also finds that the VPATs were accurate with minor exceptions.

Published in: Library HiTech ISSN: 0737-8831 dt. 8th March 2011

<https://www.emerald.com/insight/content/doi/10.1108/0737883111116958/full/html>

➤ The research paper entitled "A Comparative Assessment of Web Accessibility and Technical Standards Conformance in four EU states" by **Carmen Marincu and Barry MC Mullin (2004)** presents results of comparative survey of web accessibility guidelines and HTML standards in conformance to selected sample of websites from UK, Germany, France and Ireland. In this research paper the author gives some recommendations for improving the accessibility level of websites. Researcher said the generally the conformance level to the web accessibility guidelines and HTML standard found to very poor. Researchers also finds that promoting web accessibility for persons with disabilities is not manifested in improving web

accessibility and HTML validity.

Published in: ResearchGate dated August 2017

https://www.researchgate.net/publication/319579213_Accessibility_Analysis_of_Some_Indian_Educational_Web_Portals

➤ The research paper entitled "An overview of Web Accessibility in Greece: a comparative study 2004 to 2008" by **Ioannis Basdekis, Iosif Klironomos, Ioannis Metaxas & Constantine stephanidis (2009)**. In this research paper author did web accessibility audit of public websites in Greece. In this research paper there is audit Greece websites in 2004 & then 2008. After 4 years 250 public & commercial websites in Greece, 73% of the sample failed to meet the requirement of web accessibility according to Web Accessibility Initiative (WAI).

Published in: Springer - Universal Access in the Information Society

June 2010, Volume 9, Issue2, pp 185–190

<https://link.springer.com/article/10.1007/s10209-009-0166-z>

➤ The research paper entitled "An extensible environment for guideline- based accessibility evaluation of dynamic Web Application" by **Antonio Giovanni Schiavone & Fabio Paterno (2015)** described MAUVE (a software environment for web accessibility & usability evaluation). This tool was based on XML language for web guideline definition. The software finds defects with HTML & CSS accessibility issues and can validate dynamic sites as well. The author concluded that this tool can perform guideline validation with respect to the Web Standards such as HTML5 & CSS3.

Published in: Springer - Universal Access in the Information Society

March 2015, Volume 14, Issue1, pp 111–132

<https://link.springer.com/article/10.1007/s10209-014-0399-3>

➤ **Daisuke sato, Hironobu Takagi, Masatomo Kobayashi, Shinya Kawanaka & Chieko A sakowa** introduced examples of collaboration, analysed several kinds of statistics on the activities of users; in

the research paper entitled “**Explorative Analysis of collaborative Web Accessibility Improvement**”.

The authors divided analysis into five sub-themes.

-Can supporters fix the reported problems in a timely manner? What types of metadata support can they create?

- How can users report their problems? for a service? What type of requests were reported on which type of sites?
- How good is the metadata provided by supporters?
- How robust is the created metadata against the evaluation of the content?
- How can we create a self-sustaining service with active participation?

The authors mentioned that captions are provided not only for use of people with hearing impairments, but also for translation & research support. In this research the author found that supporters were surprisingly productive. They never made malicious metadata. They also found that users were unsure what to ask for GAP. Authors considered some of the features and technologies; but did not describe the accessibility issues on their websites.

The author also focused on WCAG guideline while discussing WCAG i.e. WCAG 2.0 and WCAG 2.1 with checkpoints and success criteria. The author research is on progress in website accessibility area further. They have considered top sites and government web sites for this research. The research finds that government website is showing improperness than top sites on some but not all the criteria.

GAP: To improve the website accessibility in this research is not considered including the tool. The author has discussed all the principles but has not compared those.

➤ The research paper entitled “**Crowdsourcing-Based Web Accessibility Evaluation With Golden, Maximum Likelihood Inference**” (2018) by Shuyi Song, Jaijun Bu, Andreas Artmeier, Keyue Shi, Yewang, Zhi Yu, Canwang introduced a

crowdsourcing with inference algorithm. The author has evaluated 23901 complex tasks by 50 people with and without disability. The author also conducted a survey to identify frequent barriers that people with disabilities facing in their lives. The frequencies and severities of barriers correlated with their importance in this research. Author contributes

1. Crowdsourcing based web accessibility evaluation system with interface algorithm to conduct accurate and reliable assessments without experts.
2. Comparison of approach with state-of-the-art inference algorithms on evaluation of web accessibility by 50 respondents with and without disability answering for 23901 tasks.
3. Three surveys about frequencies and severities of accessibility barriers in the daily lives of participants.

GAP: This research is helpful for designers to identify and remove accessibility barriers, however the research does not consider the standards or guideline. 23901 tasks have been answered by combination of people with and without disability, and if entire population was chosen with disability the findings could have been different.

➤ The research paper entitled “**Analysis of Navigability of Web Applications for Improving Blind Usability**” by Hironobu Takagi, Shin Saito, Kentarou Fukuda and Chieko Asakawa (2007). This research paper is about accessibility status of real-world applications and analysis of real user behaviour in websites. Researchers introduced automatic analysis method for web page navigation. This research paper also gives the survey of 30 international online shopping sites. Researchers also developed analysis and visualization method for recorded information. The authors elaborated the difference between visual and nonvisual navigation.

GAP: The sample size of 30 international online shopping sites is a less sample size for this research.

Conclusion

Secondary data source is used to study the literature survey. By reviewing the literature; researcher has

found gaps in terms of comparison of web accessibility standards available for comparison, so the web developers, designers and testers may have confusion about the tool as to which standard is better for web accessibility.

It is observed that, some of the past studies are carried out on web accessibility improvement, Accessibility conformance of WCAG 2.0, also improving Accessibility of Mobile OCR Apps.

There are many authors who have given their contribution in the progress of accessibility (as summarised in this paper) and crowdsourcing based web accessibility Evaluation and Analysis of Navigability of Web Applications.

https://www.researchgate.net/publication/319046913_Improving_the_Accessibility_of_Mobile_OCR_Apps_Via_Interactive_Modalities

References

1. Mankoff, J., Fait, H., & Tran, T. (2005). Is Your Web Page Accessible? A Comparative Study of Methods for Assessing Web Page Accessibility for the Blind. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (pp. 41-50), Portland, USA.
2. 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).
3. Sergio Luján-Mora. Web Accessibility Among the Countries of the European Union: a Comparative Study. Actual Problems of Computer Science, 1(3), p. 18-27, ECCO Foundation, 2013. ISSN: 2299-8667.
4. USA government, Americans with disabilities act document, <http://www.ada.gov/enforce-current.htm>(visited 17th November 2015)
5. USA government, rehabilitation act document:<http://www.section508.gov/content/about-us>(visited 18th November 2015)
6. World wide web consortium, Web accessibility initiative, article designing for inclusion:<http://www.w3c.org/wai/designingforinclusion>(visited on 17 November 2015).
7. World wide web consortium, resources document. <http://www.w3.org/WAI/Resources/Overview>(visited 02 November 2015).
8. Adobe corporation inc, corporate accessibility document,<http://www.adobe.com/accessibility> (29 November 2015)
9. Government of India, ministry of information and communication technology, government of India Guidelines for web accessibility document, <http://web.guidelines.gov.in/#&panel1-3> (visited 23 September 2015)
10. Web accessibility in mind, Uta state university initiative, laws throughout the world, <http://webaim.org/articles/laws/world/>(visited on 25 November 2015)
11. Microsoft corporation INC, corporate accessibility standard document. <http://www.microsoft.com/enable> (visited 25 November 2015)
12. Google corporation INC, android accessibility developer's checklist document, <http://www.developers.android.com/accessibility>
13. Apple corporation INC, IOS accessibility document, <http://www.apple.com/accessibility/ios>(28 November 2015)
14. Web accessibility in mind, initiative of Uta state university, eight stapes web accessibility implementation model article,<http://webaim.org/articles/implementation/>(visited 25 November 2015)
15. Y1. www.citewrite.qut.edu.au/write/litreview.jsp

