EVALUATING THE LIBRARY WEBSITES OF INDIAN INSTITUTES OF TECHNOLOGY (IITs): A STUDY OF WEBSITE ACCESSIBILITY

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The accessibility of the library website states the performance of the website, and its usability for the users. The home page of any website is considered the first point of information display and provides connectivity to all the information available. This study has analyzed the accessibility of the library website home page of all the twenty-three IIT's (Indian Institute of Technology) by using the Web Accessibility Evaluation Tool (WAVE), an automated accessibility evaluation tool. The WAVE tool shows the errors presented on the website, which cause difficulties in information access by the users. The present study evaluated the home page of each of the IITs library website based on the inbuilt errors of WAVE software and depicted with the help of graphs. This analysis technique can be used to improve the web page design and accessibility of any website, and can be used while designing or timely update the website.

Keywords: library, library website, website, website accessibility, WAVE.

INTRODUCTION

In the digital era having a website is the necessity to communicate the information for any organization whether it is academic or non-academic (Ahmi & Mohamad 2016). Similarly, for Libraries a website is essential to display all the relevant information and to provide access to the digital information sources. The website of a library displayed all the information regarding information resources including collection of print and e-resources availability, new arrivals, resources on trials, list of subscribed print and e-resources, etc. The home page of any website is considered the first point of access, where information is adorned in a hierarchy. Users get some complete information and for others got links on the home. A well-developed and accessible website of the library supports how good the library's infrastructure and information support for its users. Nowadays, the user's priority to search the library collection is to explore the website. So, it is important to have the website as an information gateway for the users which serves the access to all the information resources subscribed

or owned by the institution. The library website manages the accessibility of e-resources as well as the metadata of material in print or digital resources like CD/DVD etc. The library needs to develop a well-structured and easily eye-catching website with rich in relevant content for the academic use. So, the user gets library resources easily for their academic work. As very few users already knows what they are searching for but most of them did not know about what information they need and what all resources are available in the library. This study is a simple approach to evaluate the accessibility of the 23 IITs library website home page with an open source tool WAVE, which will be helpful to anyone who is involved with website work for any organization.

REVIEW OF LITERATURE

Various studies are available on evaluation of accessibility of websites of educational institutes and also on evaluation of accessibly of library website. Madhusudhan and Ahmed in 2013 evaluated library websites of Indian Institutes of Management (IIMs) in India with a mixed method approach and a checklist, based on multimedia, content, and user-interface features. Pareek and Gupta in 2013 evaluated 52 academic library websites of Rajasthan to analyse various features of website using a 133-item checklist. Windriyani, Ferdiana, and Najib in 2014 did the evaluation of six websites of Sebe by categorizing technical criteria with the help of TAW (Web Accessibility Tool) and non-technical criteria through direct observation using Webometrics success criteria. Pant in 2015 evaluated website usability of Central Science Library (CSL), University of Delhi by using a Multi-method approach of evaluation with standard checklist and questionnaire survey. Similarly, Verma and Devi (2015) have analyzed the contents of the 7 Central Universities library websites of the North Eastern states in India with 66 items checklist under 6 broad headings. Ahmi and Mohamad in 2016 reported the web accessibility of 20 Malaysian public universities based on two evaluation tools AChecker and WAVE. Studies show the evaluation of home page design and development of library websites to show what different information is available there and increase usability (Brower, 2004; Poll, 2007; Kumar & Bansal, 2014).

Kesswani and Kumar in 2016 did the comparative study of web accessibility of the top universities and educational institutions of different countries using WCAG 2.0. The authors provided the analysis results with the final output Pass or Fail the desired criteria as specified under WCAG. Most of the studies are on the evaluation of accessibility of library websites for special users like users with visually or hearing impaired problems (Southwell and Slater 2012; Billingham, 2014; Yoon, Dols, Hulscher, & Newberry, 2016). Carvajal, Piqueras and Mérida, in 2018 evaluated websites of Chilean universities which are listed in The World University Rankings with the help of validators recommended by the W3C and WAVE. The validators recommended by the W3C used to check the HTML code and the CSS style sheets and WAVE is to evaluate errors. Ismail & Kuppusamy in 2019 pointed out the need and importance of enhancing the accessibility of websites by using web accessibility evaluation tools, Eval Access and WAVE applied on 40

websites. Similarly, Sahoo and Panda in 2019 analyzed web contents of 18 IIT libraries in India and ranked IIT Delhi library as number one and IIT Tirupati library is at the lowest rank. Kumari and Verma in 2020 did an evaluation of accessibility of websites Institutes under the DEPWD, Ministry of Social Justice & Empowerment by using automatic web accessibility evaluation tool WAVE and AChecker. They did an evaluation of websites with both WAVE and AChecker tool and ranked based on the number of errors found.

OBJECTIVE OF THE STUDY

1. The main objective covered in this study is to analyze the errors presented on the library website home page of 23 IITs by using an automated tool WAVE.

SCOPE AND LIMITATIONS OF THE STUDY

The present study described an evaluation of errors available on the library website homepage of 23 IITs, by using an automated tool, i.e. WAVES for checking the accessibility of any website. The study was restricted to the library home page of 23 IITs and selected an evaluation tool called WAVE. The study does not provide any kind of comparison or ranking of the selected libraries but evaluated errors on individual library website for each IITs.

METHODOLOGY

The present study is an approach to evaluate the accessibility of the home page of the websites of libraries of all the 23 Indian Institute of Technology (IITs). The analysis has been done on the basis of six inbuilt default parameters in the WAVE tool. These parameters include Errors, Contrast Errors, Alerts, Features, Structural Element, and ARIA.

SIGNIFICANCE OF THE STUDY

The study provides a very simple way to analyze the errors available on the website which may cause an interruption of information access or wastage of time of users in finding the required information on the website. This makes the users irritated by too many problems faced at the time of exploring the website. WAVE is an open source tool and will be used by any organization, big or small, commercial or academic, or personal website, can use this tool to evaluate and analyze the errors on the website. This study will be useful for libraries with a sufficient budget to do the evaluation and improve the website for their users. It is very simple and can be used by anyone who is involved in the website development and has less technical knowledge about website development. In short the study will be beneficial for improving the design and usability of a website for steady access of the information.

DISCUSSION

Accessibility of Library Websites

Library Website is the digital gateway to all the library assets including information resources and other relevant information. All the relevant information displayed on the home page directly or link address for the same which helps in serving users' needs (Poll, 2007). A website should be well-developed and accessible to make the information clearly displayed and utilized by the users. The accessibility defines how well the

library websites are which supports the aim to provide easy access to information resources (Abascal et al.). There exist several tools which are helpful in measuring the accessibility of library websites. Some of them are WAVE (Website Accessibility Evaluation Tool), SortSite, aXe, Pa11y and totally (ref: "5 Tools to Check Website Accessibility). WAVE is used to evaluate the accessibility of the home page of the websites of the library of IITs, in India. Accessibility tools are the software's programs available online which help to measure the accessibility of the website content based on accessibility guidelines. Many software's available on the web for evaluating website accessibility from different developers. Web accessibility evaluation tools list available on W3C which are openly available tools for evaluation of website accessibility.

Indian Institutes of Technology (IITs)

Indian Institutes of Technology (IITs) are premier autonomous institutes considered as institutes of national importance, are governed by the Institutes of Technology Act, 1961 (Banshal, Singh, Basu, & Muhuri, 2017). There are a total of 23 IIT colleges located across India (Ministry of Education, Government of India). Libraries are considered the heart of any educational institute which circulates information resources in any format either physical or electronic. The Library supports academic curriculum including research

Table 1: Official web address of 23 IITs Library websites

Sl. No.	Name of the Institution	Library Website Home Page URL
1	IIT Bhilai	https://iitbhilai.ac.in/index.php?pid=dept_lib
2	IIT BHU	https://iitbhu.ac.in/cf/lib
3	IIT Bhubaneswar	https://library.iitbbs.ac.in/
4	IIT Bombay	https://www.library.iitb.ac.in/
5	IIT Delhi	http://library.iitd.ac.in/
6	IIT Dhanbad	https://www.iitismlib.ac.in/
7	IIT Dharwad	https://www.iitdh.ac.in/library.php
8	IIT Gandhinagar	http://www.iitgn.ac.in/research/library
9	IIT Goa	https://www.iitgoa.ac.in/campus.php?area=library
10	IIT Guwahati	http://www.iitg.ac.in/lib/
11	IIT Hyderabad	https://library.iith.ac.in/
12	IIT Indore	http://library.iiti.ac.in/
13	IIT Jammu	https://iitjammu.ac.in/library
14	IIT Jodhpur	http://library.iitj.ac.in/
15	IIT Kanpur	http://pkklib.iitk.ac.in/
16	IIT Kharagpur	http://www.library.iitkgp.ac.in/
17	IIT Madras	https://cenlib.iitm.ac.in/
18	IIT Mandi	https://library.iitmandi.ac.in/
19	IIT Palakkad	https://iitpkd.ac.in/library
20	IIT Patna	https://library.iitp.ac.in/
21	IIT Roorkee	http://mgcl.iitr.ac.in/
22	IIT Ropar	https://www.iitrpr.ac.in/library/
23	IIT Tirupati	https://iittp.ac.in/CentralLibrary/

WAVE (Web Accessibility Evaluation Tool)

WAVE is an evaluation tool that helps to make the website more accessible for users by identifying several errors based on accessibility and Web Content Accessibility Guideline (WCAG). Also provides human evaluation of the web content which will help in making the website more accessible and error free. WAVE is a free community service (figure 1), developed by WebAIM (Web Accessibility in Mind) at Utah State University launched in 2001. WAVE has been used to evaluate the accessibility of millions of web pages. The detailed description of the tool is taken from the website of the tool (Ref: WAVE Web Accessibility Evaluation Tool). The accessibility of the website is analyzed by considering six default parameters including Errors, Contrast Errors, Alerts, Features, Structural Element, ARIA. These six parameters are defined below in brief:

Errors: These errors are sum up of different errors including missing, broken and empty links. These errors are missing alternative text, linked image, missing alternative text, empty heading, empty button, empty link, broken ARIA reference and broken ARIA menu.

Contrast Errors: This error shows the paucity contrast between text and background colors if any. To make decent visibility there is a need to set an adequate contrast of text for all users, especially users with low vision.

Alerts: It is important to introduce significant overhead on screen reader users. Alerts include errors like justified text, same alternative text, long alternative text, missing first level heading, skipped heading level, possible table caption, redundant link, link to PDF document, redundant title text and layout table.

Features: This type of error include different sub errors, alternative text, linked image with alternative text, Form label and language. These errors highlight the problems in content or function of an image to screen reader users or in other situations where images cannot be seen or are unavailable.

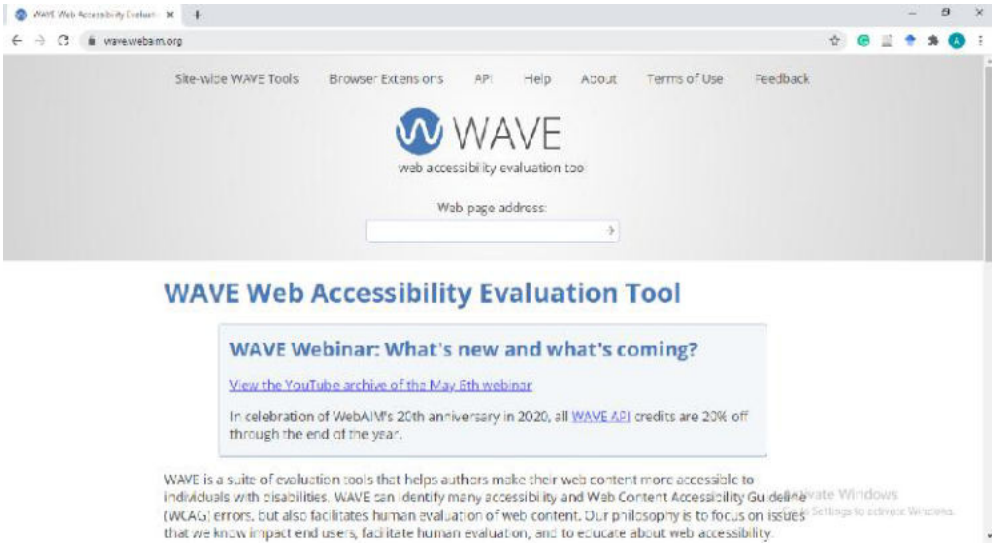


Figure 1: WAVE tool home page

Structural Element: This particular error highlights the errors including data table, table header cell, heading level, unordered list, Inline frame, Header, Navigation, search, main content, footer and aside.

ARIA: ARIA provides enhanced semantics and accessibility for web content, and ensures the correct use of ARIA role, state, or property.

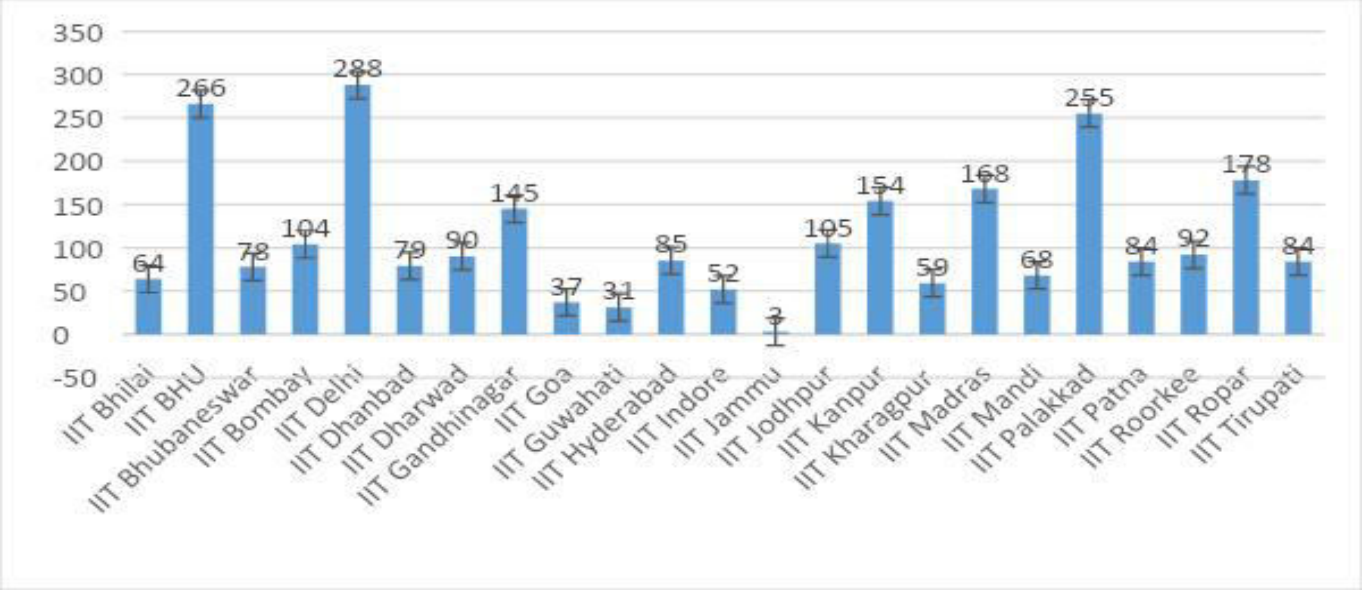
RESULT ANALYSIS

The result showed analysis of the home page of the library websites of 23 IITs with the help of WAVE, an open source website evaluation tool (table 2). The results displayed under table 2 with the types of errors analyzed on the 23 IITs library website home page is mentioned in front of each institution's name. Six inbuilt errors of WAVE namely Errors, Contrast Errors, Alerts, Features, Structural Element, ARIA evaluated for each IITs library website home page and noted under table 2. It is clearly noted the type of errors and how many errors are analyzed on different Institutions library websites home page shown in table 2. For example, IIT Bhilai library home page has 64 total errors which are sum up of 7 Errors, 3 Contrast Errors, 10 Alerts, 2 Features, 35 Structural Element and 7 ARIA. Similarly, for IIT BHU total errors evaluated 266 which included, 16 Errors, 121 Contrast Errors, 50 Alerts, 29 Features, 35 Structural Element and 15 ARIA. The graphs

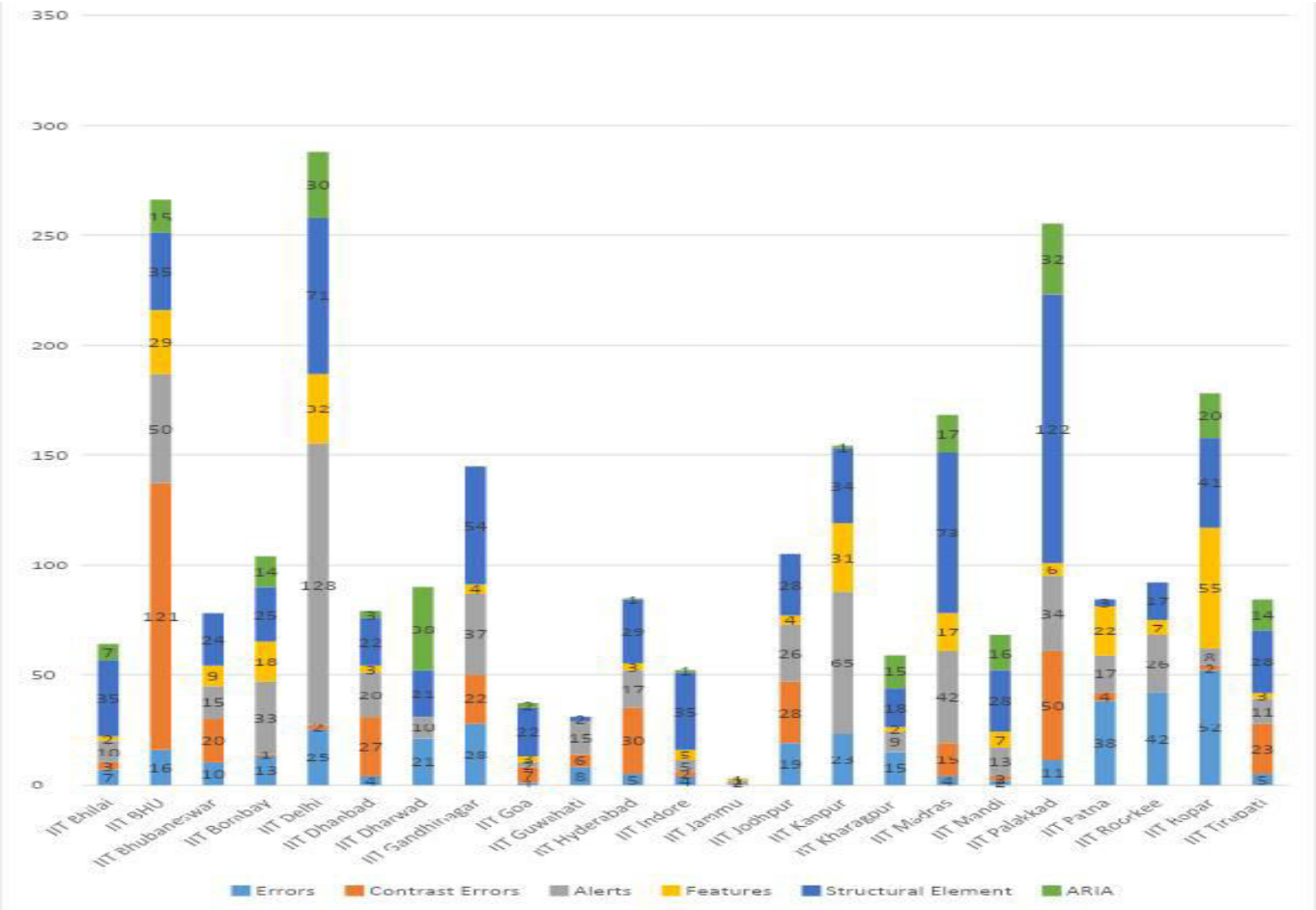
Table 2: Analysis results of accessibility of the websites home page of selected libraries.*

Sl. No.	Name of the Library's Institution	Errors	Contrast Errors	Alerts	Features	Structural Element	ARIA	Total Errors
1	IIT Bhilai	7	3	10	2	35	7	64
2	IIT BHU	16	121	50	29	35	15	266
3	IIT Bhubaneswar	10	20	15	9	24	0	78
4	IIT Bombay	13	1	33	18	25	14	104
5	IIT Delhi	25	2	128	32	71	30	288
6	IIT Dhanbad	4	27	20	3	22	3	79
7	IIT Dharwad	21	0	10	0	21	38	90
8	IIT Gandhinagar	28	22	37	4	54	0	145
9	IIT Goa	1	7	2	3	22	2	37
10	IIT Guwahati	8	6	15	0	2	0	31
11	IIT Hyderabad	5	30	17	3	29	1	85
12	IIT Indore	4	2	5	5	35	1	52
13	IIT Jammu	0	0	2	1	0	0	3
14	IIT Jodhpur	19	28	26	4	28	0	105
15	IIT Kanpur	23	0	65	31	34	1	154
16	IIT Kharagpur	15	0	9	2	18	15	59
17	IIT Madras	4	15	42	17	73	17	168
18	IIT Mandi	2	2	13	7	28	16	68
19	IIT Palakkad	11	50	34	6	122	32	255
20	IIT Patna	38	4	17	22	3	0	84
21	IIT Roorkee	42	0	26	7	17	0	92
22	IIT Ropar	52	2	8	55	41	20	178
23	IIT Tirupati	5	23	11	3	28	14	84

*The websites home page of all the selected libraries analyzed on 24 September, 2020.



Graph 1: Total errors evaluated on library websites home page of IITs**.**



Graph 2: Errors on home page of library websites of IITs.

CONCLUSION

The website of the university library is an opportunity to improve access to all the information resources of that library. Its aim is to favor digital access from anywhere to support the immediate need for the information of the users. A library website is a gateway to display information, maintain access to information resources, and promote the use of information to achieve academic goals. Accessibility of websites is a serious issue as all the relevant information is communicated via the website. This is the best way to make the information available for the users in a well-structured and classified form. But this could have a negative effect if there are too many accessibility issues with the website. Library websites are considered very important with the extensive involvement of digital collection in academic literature, providing access to all the online resources and services of the library (Yoon, Dols, Hulscher, & Newberry, 2016). The study will help in improving the accessibility of library websites, which is a need for the future. Time to time evaluation of a website is required to update and resolve all the issues, including outdated information links, dead links etc. if any. This study will also be useful for anyone handling a website with less knowledge of web development. Further, studies can be done by using the same tool on different institution library websites and vice versa. Also, one can apply more than one tool on the same library website to compare the differences between the different tools. A study can be done by applying one or more tools to evaluate the overall accessibility of all the pages of a library website.

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