A case study of Web Content Accessibility of 15 top-ranked Universities of India

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Research Article

Keywords: Information and Communication Technologies, Digital Accessibility, WCAG Guidelines, GIGW Guidelines, NIRF

Posted Date: August 24th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-813366/v1>

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Abstract

Accessibility of websites are very important for making it web-based information for persons with disabilities which further reinforced by COVID-19 pandemic. Web Content Accessibility Guidelines (WCAG) has been developed by World Wide Web Consortium (W3C) and accordingly Guidelines for Indian Government Websites (GIGW) has also been developed. In this case study we studied the home page of websites of 15 top ranked Higher Education Institutions of India ranked by National Institutional Ranking Framework (NIRF), started in 2016 for availability of basic accessibility features. The ranking used is of latest one i.e. of 2020. Qualitative observation has been made of the home page of each 15 universities and the NIRF website. Eleven fundamental accessibility features were taken in to account. Results revealed that most of these top15 ranked universities lack even basic accessibility feature making their websites inaccessible for persons with disabilities. Options like font size, screen reader, high contrast text also were not found on may website of top-15 universities. The website of NIRF had no basic features out of 11 considered in the study indicating a very poor condition of digital accessibility features of website of top ranked universities which needs urgent attention to achieve equity and inclusion as promised in NEP 2020.

Main Text

Internet and technology play an important role in human life now a days. It has been penetrated in all the human activities. During the past few years, Internet has been expanding and it is now challenging to identify the potential of Internet usage(Khanna & Kaur, 2019; Martins et al., 2017). Out of several internet of things, websites play pivotal role in getting any information for a source related to education employment, governance, commerce, healthcare, investment banking etc(Akram & Sulaiman, 2019). It is internet which has made our life smoother, easier and highly informative. Whenever one wish to know about any thing one need to search on any search engine like google or some other and it gives millions of results related to that within a couple of seconds. This property of internet and internet-based information system like websites of the sources of information has made the world a global village where most of the information is available for internet users through a variety of devices either through computer or through mobile or through tablet and many more having just an internet connection. It has been estimated that more than 3 billion people approximately 40% of the global population) have access to the Internet(Naughton, 2016). Many a times the first impression about an organization is based on its website(Ismailova & Kimsanova, 2017) and websites are a tool for inter and intra-organizational communications(Astani & Elhindi, 2008) and are usually a primary medium of information sharing(Ismail & Kuppusamy, 2018; Lawrence & Giles, 1999; Potter, 2002) because of their quality like effectiveness, efficiency, and engagement(Keller, 2008). In present scenario students are mostly dependent on Information and Communication Technology (ICT) systems of the higher education institution(Arulogun et al., 2020) which became more pivotal during COVID-19 period.

Profound impact of ICT on education systems has been reported across the world (Renes & Strange, 2011). ICT tools have made their presence in education system regardless of the nature of education

either informal, formal or non-formal. It has given educational opportunities to everyone who is interested and brought out the education from several boundaries of geography, time, pace and so on. ICT is presented as a panacea for all contemporary education and training problems (Martin, 2008). The technology has been advancing rapidly recently and it has become necessary to use technology in the education sector. Because of this, some researchers believe that it is the time now to re-organize the education sector (Cavus, 2015).

The ongoing radical changes in Information and Communication Technologies has transformed entire education systems (Arulogun et al., 2020; Cavus, 2015; Guri-Rosenblit, 2005; Renes & Strange, 2011; Stošić, 2015; Weidlich & Bastiaens, 2018). Even since its emergence, ICT tools brought up new generation of learning (Guri-Rosenblit, 2005) which is further reinforced dramatically by COVID-19 pandemic situation during which ICT tools were widely used for education across the world (Dhawan, 2020; Dwivedi et al., 2020; Thomas & Rogers, 2020). The major benefit of ICT tools-based learning is the convenience to use i.e., using ICT tools one can get one's studies anywhere and everywhere. It makes it easier for learners to replay or replicate the content, to store the content and to retrieve the content with more ease. In modern era of education the application of modern educational ICTs have a major role to play (Oladokun & Aina, 2011).

The Websites of universities play a major role in communication with stakeholders as are the easiest way to find out any information, to communicate and get responses on queries, to get information related to examination etc. and whether it is instructional aspects, curriculum transactions, student's support, grievance redressal, examination or assignment submission, a student has to be ICT friendly now in post-COVID-19 pandemic system.

Usually there are certain advantages for internet users whereas many disadvantages are experienced by non-users of internet either due to non-availability of internet or due to inaccessible format of the web-based information. For those non-users who could not use internet despite of its availability, like persons with disabilities, the solution is to improve accessibility of internet-based information system by using ICT based tools otherwise persons with disabilities will experience a type of digital divide (Dobrinsky & Hargittai, 2006) which could be described as discrepancies in rates of physical access to computers and the Internet between people with and without disabilities (Gorski & Clark, 2002) or sometimes referred to as digital exclusion (Macdonald & Clayton, 2013) which could be reduced by making the internet and the information available over internet in an accessible format based on universal design principles to a maximum possible extent. Persons with disabilities form a larger group of non-users of internet due to inaccessible formats of web-based information. In fact websites are very powerful sources of information and has become daily life of individuals but for its non-users due to any reason, the internet offers only limited value due to barriers in accessibility of the websites (Kurt, 2019).

As far as education and educational institutions either school education or higher education are concerned their websites provides an excellent platform for information dissemination (Kuppusamy & Balaji, 2021). The COVID-19 situation across the world introduced the power of information and

communication technology in education across the globe. Web based mediums were and are widely used now in education in general and in higher education in particular to continue the education of students during this time of pandemic. The educational scenario has been changed globally due to pandemic and education will be more and more ICT oriented in post-pandemic period also. Technological advancements have created a conflict between traditional and modern educational systems and modern systems have been forcing traditional educational systems to change with time (Glahn & Gen, 2002).

As universities have an important role to play in higher education, these must be equipped with ICT tools and the information of the university need to be disseminated through the websites. Making websites of the universities a great resource of information is recent trend in the area now whereas accessibility of these information for persons with disabilities based on the principles of universal design is still a big question. The accessibility of web pages is among one of the very important criteria for disseminating information to a wider group of audience (Aizpurua et al., 2016; Ismail & Kuppusamy, 2018) as accessibility and universality are essential aspects of web-based mediums (Ballesteros et al., 2015; Ismail & Kuppusamy, 2018; Ribera et al., 2009). As a unified system web accessibility could be defined as

"all people, particularly disabled and older people, can use websites in a range of contexts of use, including mainstream and assistive technologies; to achieve this, websites need to be designed and developed to support usability across these contexts"(McConnell et al., 2014; Petrie et al., 2015).

There are several international standard guidelines available for making the web-based information accessible among which the guidelines developed by World Wide Web Consortium (W3C) popularly known as Web Content Accessibility Guidelines (WCAG) is very common and popular across the world and universally adopted guidelines (Al Lily et al., 2020; Ballesteros et al., 2015; Ismail & Kuppusamy, 2018, 2019; Ribera et al., 2009). The goals of web accessibility is to provide usable web information and services to maximum users including persons with disabilities but in spite of the availability of such guidelines and legal measures, Web Accessibility remained a challenge (Vollenwyder et al., 2019). As websites of higher education institutions of India are very rich in information for stakeholders, the accessibility analysis of higher education institution's websites is of great concern in order to evaluate these websites whether these are disabled-friendly and as per the promise of RPWD Act 2016 and NEP 2020 (Minsitry of Law and Justice, 2016; NEP, 2020). It is also important because large number of students in India are enrolled in higher education institutions (Ismail & Kuppusamy, 2019).

The big move towards disability rights and towards digital accessibility consequently, the enactment of United Nations Convention on Rights of Persons with Disabilities (UNCRPD) 2006 is a mile stone in world's history. The article 9 of UNCRPD deals with accessibility issues in general and includes provisions of accessibility of web-based resources and information in particular. It recommends that

"States Parties shall also take appropriate measures to promote access for persons with disabilities to new information and communications technologies and systems, including the Internet and to promote the design, development, production and distribution of accessible information and communications

technologies and systems at an early stage, so that these technologies and systems become accessible at minimum cost” (UNCRPD, 2006, Article 9, Section g & h).

As India is also among one of the signatories of UNCRPD 2006, on very first day when it was open for signature, it enacted RPWD Act 2016, which came into force in 2017 in which Government of India made provisions for digital accessibility for persons with disabilities. The Rights of Persons with Disabilities Act 2016, section 42 mentions that

The appropriate Government shall take measures to ensure that:

- i. all contents available in audio, print and electronic media are in accessible format;*
- ii. persons with disabilities have access to electronic media by providing audio description, sign language interpretation and close captioning;*
- iii. electronic goods and equipment which are meant for everyday use are available in universal design (RPWD Act, 2016).*

In addition to all these, as the purpose of WCAG is to benefit all including persons with disabilities which is organized around the four core principles: Perceivability, Operability, Understandability and Robust (WCAG 2.0), it has been adapted by many countries and so is by India. The government of India has developed Guidelines for Indian Government Websites version 2.0 in accordance with WCAG 2.0, which has been prepared by National Informatics Centre (NIC), the second edition of which is released in 2019. GIGW (2019) defines Web-Accessibility as

“Web accessibility means that people with disabilities can also perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web. It encompasses all disabilities that affect access to the Web, including visual, auditory, physical, speech, cognitive, and neurological disabilities” (GIGW, 2019).

Further GIGW 2019 affirms that the websites and apps should be designed and developed in such way that they are accessible by all people, whatever may be their hardware, software, language, culture, location, or physical or mental ability. The GIGW 2019 has taken in to account not only the World Wide Web Consortium’s (W3C’s) Web Content Accessibility Guidelines (WCAG 2.0), but also the provisions of Rights of Persons with Disabilities Act 2016 (GIGW, 2019).

Following the international development of ranking of higher education institutions (El Gibari et al., 2018), Government of India, Ministry of Education (then Ministry of Human Resource Development, MHRD) started an institutional ranking framework called National Institutional Ranking Framework (NIRF) in order to rank the higher education institutions in India based upon several qualitative as well as quantitative parameters. The National Institutional Ranking Framework (NIRF) was approved by the MHRD and launched on 29th September 2015 (Mukherjee, 2016; NIRF, n.d.). As per the information available on NIRF website, this framework proposed a methodology to rank higher education institutions across the country and is based on overall recommendations of a committee of academicians set up by

MHRD with the objective to devise a mechanism of identification of the broad parameters for ranking (Mukherjee, 2016; NIRF, n.d.). In 2016 when it was initiated and it covered parameters under the five-fold domains which were Teaching, Learning and Resources; Research and Professional Practices; Graduation Outcomes; Outreach and Inclusivity and the stakeholder's Perceptions respectively. The first such ranking of Higher Education Institutions (HEI) of India was released in April 2016 and further it was made mandatory to carry out this activity every year with few changes in sub parameters but the major domains remain the same. Later on, NIRF started giving an overall rank as well as discipline specific rank too to the institutions (NIRF, n.d.).

Objectives of the study:

Gradually the study of accessibility of universities websites has gained attention of researchers across the world (Astani, Marzie; Elhindi, 2008; Ismailova & Kimsanova, 2017) and also it has gained attention of few researchers in India (Ismail & Kuppusamy, 2018) but studies focusing accessibility of websites of top ranked universities in India are very few and were not found much in contemporary literature. Many such studies were carried out across the world and it has become a central point of research after WCAG guidelines but very few or no such studies were found which carried out considering top ranked universities in India. In addition, most of such studies were quantitative in nature and carried out using automated accessibility tools for checking the accessibility features of a website which provides a very technical reports on errors. Present study is unique as manual check of accessibility features have been carried out to know whether the websites of top-15 ranked universities of India by NIRF are accessible for persons with disabilities.

Review of Literature:

Carvajal (2020) carried out a research on the web content accessibility of Chilean universities based on Web Content Accessibility Guidelines 2.0 (WCAG 2.0) which has been developed by World Wide Web Consortium (W3C). Home pages of websites of total 57 universities in Chile were studied. For this accessibility assessment of websites of universities in Chile, researchers used several automated accessibility checkers in which the Hyper Text Markup Language (HTML) grammar was used in web pages to determine if it allows adequate interaction with assistive products made for a person with disabilities. For further assessment of websites of universities, the researcher used W3C Markup Validation Service to check if a website contained errors in the source code making it inaccessible. The study as claimed by the author used the Web Accessibility Test (TAW), which analyses a web page based on of WCAG 2.0 and provides a detailed report with errors and warnings for each page. The assessment of web pages of universities of Chile was carried out during May 2019. It may be noted here that in such type of study for a reliable data it is important to record the time when the assessment was carried out as web-contents are subject to change with time. Results of the study revealed that in Chile, websites of higher education institutions had serious difficulties in the compliance with WCAG 2.0 AA level accessibility guidelines and shown a poor web accessibility features available over the websites of

universities. It was also observed that websites of universities were not friendly for those persons with disabilities who were the users of assistive products (Carvajal, 2020).

Similar accessibility study was carried out by Máñez-Carvajal et al. (2021) in which researchers evaluated the web accessibility of home pages of universities of Spain, Chile and Mexico. Home page of websites of top-15 ranked listed in the ranking of Webometrics served as sample for this study. This study, like the previous one carried out in Chile, used automated tools to analyse the level of compliance of websites of these universities with the WCAG 2.0 guidelines. The results revealed poor compliance with WCAG 2.0 of web sites of universities of Spain, Chile, and Mexico (Máñez-Carvajal et al., 2021).

Methodology

It was a preliminary qualitative case study on accessibility features of available on websites of universities which were ranked under top 15 by NIRF, in India in 2020. NIRF 2020 is the latest ranking as the ranking of institutions has not been released at yet for the year 2021. We carried out an observational analysis of websites of 15 universities of India ranked between 1 to 15 by NIRF in 2020. It was focused on availability of different accessibility features on websites of top -15 ranked universities. The criteria of accessibility included in this study were basic accessibility features of websites. Eleven such criteria were selected. The basis of selection of such criteria was its availability at least on one of the websites of these top ranked 15 universities. The eleven accessibility criteria were included for study of home pages of websites of these universities and the website of NIRF which are Glossary A-Z (as it helps PwDs to search the key word and what is its meaning in the particular context) Language Change (as it addresses the linguistic diversity) Screen Reader (as it helps persons with blindness and low vision to speak out the content of the website), Font Size (help students with low vision to read) High Contrast Text (helps students with various eye problems) Font Colour (helps students with visual problems and colour blindness enabling them to read the content) Text Spacing (helps students with visual problems and other such conditions) an accessibility statement (helps all students about what accessibility features are available over the website), Skip to Main Content (helps students with disabilities in accessing necessary information only), Search (helps all students to search desired content using keywords) and finally Site Map to know what is given and where it is give on the website as an information has no use if one does not know what is available over the website and where it is located on the website). In such studies the time frame is very important as the web site, its features, lay out and contents are subject to change any time. Present study was carried out between 15th July to 15th August 2021 and a screenshot of the home page of each 15 top ranked universities was taken to keep the record. The similar was done with the home page of the website of the NIRF also. No automated accessibility checker was applied for the study rather a qualitative check was made on basic accessibility features as per GIGW guidelines.

Sample:

The sampling used for the study was purposive one and the home pages of websites of top 15 universities of India and the home page of NIRF were selected to study the accessibility features available over these websites. Based on National Institutional Ranking Framework (NIRF) 2020 available over NIRF Website, top-15 ranked universities were selected. The idea behind selection of home pages of websites of these institutions was that as these are top 15 universities of India, more and more students including learners with disabilities also will prefer them for their higher studies and in such a case it is expected from these top ranked universities or Higher Education Institutions that their websites to have more digital accessibility than that of lower ranked HEIs so that students with disabilities could also get equal opportunity to study at top ranked HEI of India without any discrimination. As a sixteenth sample the website of NIRF also included for the study assuming that a student with disability will first search the NIRF for ranking of the university prior to applying for any academic degree he/she wishes to pursue like his/ her non-disabled peers.

Data Analysis:

Most of the websites of these universities lacked the basic feature of language change option. Only 33% of websites out of 16 websites including NIRF website provides the feature of language change mostly English and Hindi. Only one university had the feature of language change more than two languages. Even the fundamental features of accessibility like High contrast text, Text Spacing, Accessibility Statement, Font Colour and Skip to main content features were available only on the websites of 6% universities indicating a serious lack in accessibility features of websites despite the enactment of Rights of Persons with Disabilities Act 2016 which came in force in 2017 and celebrating its 5th year. The access of screen reader was available on websites of only 13% universities and 26% universities under top-15 rank of NIRF provided increase in font size option. About 46% websites provided the feature of website-search and only 20% websites had a site map to navigate through. The data revealed that websites of all these top-15 ranked universities by NIRF India and the website of NIRF too failed to provide basic accessibility features for persons with disabilities and not in compliance with either WCAG 2.0 guidelines or with GIGW 2019 guidelines indicating their failure to follow basic principles of accessibility which are Perceivability, Operability, Understandability and Robust (WCAG 2.0).

Table 1 Accessibility features available over top-15 ranked universities of India

Glossory A to Z	13%
Language Change Option	33%
Screen Reader access	13%
Font Size	26%
High Contrast Text	6%
Font Colour	6%
Text Spacing	6%
Accessibility Statement	6%
Skip to Main Content	6%
Website Search	46%
Site Map	20%

Results And Discussions

It was surprising to note during the study that despite of increasing demand of digital accessibility features, there was no place of digital accessibility in overall ranking parameters of universities as developed by NIRF and the website of NIRF itself was found having no such accessibility features and concerns. A closer look on NIRF parameters revealed that the number of enrolment of persons with disabilities in universities has also not given adequate weightage in the ranking frame work. As per the criteria 4 as mentioned in NIRF titled 'Outreach and Inclusivity' which has a weightage of 0.10 only. The criteria 4-C of NIRF includes Economically and Socially Challenged Students (ESCS) and has been awarded maximum 25 marks with a formula of $ESCS = 25 \times (Necs/50)$ where Necs represents total number of students belonging to economically and socially challenged students (Ministry of Human Resource Development, 2017). The criteria 4-D included a maximum marks of 20 for facilities for only 'physically challenged' (Ministry of Human Resource Development, 2017) ignoring other types of disabilities but as per the Rights of Persons with Disabilities Act 2016 (RPWD Act 2016) there are 21 types of disabilities classified in five benchmark categories (Disability Affairs, n.d.). Although recently developed framework for open and distance learning by National Assessment and Accreditation Council (NAAC) in India has included Accessible Website as a sub indicator of accessibility feature with a weightage of 5 marks for entire accessibility features including buildings. The Criteria VII of NAAC Manual (2019) Institutional Values and Best Practices of 100 Marks includes Key Indicators 7.1 which is 'Key Values and Social Responsibilities' of 50 Marks out of which point No 84, Indicator 7.1.3 includes no of disabled friendly amnesties of 5 Marks (NAAC, 2019) but even this too does not address the poor accessibility concern of websites of Indian universities.

Here the question arises even after 5 years of enactment of RPWD Act 2016, Availability of GIGW guidelines why websites of top-15 ranked institutes are still not disabled friendly and why the digital accessibility of these websites were found very poor? One answer might be that there is no proper implementation of the RPWD Act 2016 as well as GIGW Guidelines 2019. Also, digital accessibility has not been given due weightage in the ranking of universities by NIRF may be other reason but the non-compliance of NIRF website with GIGW guidelines or WCAG 2.0 guidelines seems a big reason for non-compliance with accessibility features of websites of participating universities. There may be other reasons like lack of awareness about disabilities among staff members as well as web-designers (Abuaddous et al., 2016) of universities. It has been observed in some other studies that web designers are often faced with the challenge of following web accessibility guidelines (Spyridonis & Daylamani-Zad, 2021) but on the other hand the understanding of the user experience and Web accessibility is key to design web sites (Aizpurua et al., 2016) and thus university administration in general and the web administrators in particular need to be aware of accessibility guidelines and designing the websites accordingly to ensure equity and inclusion otherwise equity and inclusion in higher education in India as promised in NEP 2020 will be a day dream only.

Although it is quite difficult for accessibility to quantify, define, or agree upon (Yesilada et al., 2015) Ensuring web accessibility not an easy task (Inal et al., 2019) but despite several tools and guidelines to help web designers in making their web sites accessible, it is unclear why so many sites continue to be inaccessible (Lazar et al., 2004). Research has shown that people with disabilities are most at risk of being excluded from access (Brophy & Craven, 2007) and are experiencing disability digital divide due to lack of accessibility features and the study of accessibility features available over websites of top-15 ranked universities of India by NIRF and the website of NIRF is not much different than that of rest of the world, poor compliance with WCAG 2.0 has been observed in different countries like China (Rau et al., 2016), Chile, Spain, Mexico (Máñez-Carvajal et al., 2021) but lack of basic accessibility features like font size, high contrast text, screen reader, language change etc over the websites of top 15-ranked Indian universities including availability of poor or no basic feature of accessibility over the website of National Institutional Ranking Framework (NIRF) is a matter of great concern for Government of India as well as the higher education regulator of India the University Grant Commission (UGC). It may be noted here that the NIRF guidelines yields zero result when the keyword 'Accessibility' and 'Disability' were searched (Ministry of Human Resource Development, 2017). Large percentages of web sites of top ranked universities in India continue to be inaccessible to people with disabilities.

In order to achieve equity and inclusion in higher education as promised in NEP 2020 there is a dire need to implement existing policies strictly and make and implement new policies if needed otherwise top ranked institutions will not have equity and inclusion for persons belonging to disabilities or socio-economic disadvantaged categories (SEDGs). First of all, the weightage given to 'Digital Accessibility' features in several accreditation and ranking framework is not adequate enough with the promise of Govt of India to provide inclusive higher education. Ministry of Education and the higher education regulator of India the UGC need to think more weightage to Inclusivity features of universities within which digital accessibility should be separated from physical accessibility.

With the development of tools of information and communication technologies, growing interest of educators has been observed about the accessibility of several websites which is very crucial in case of Higher Education Institutions (HEIs). Although the Government of India has issued Guidelines for Indian Government Website (GIGW) to make websites and web-based information more accessible for persons with disabilities, still the websites of top ranked 15 universities and the website of ranking agency of universities, that is NIRF, of India lacks basic accessibility features. Indian universities have miles to go to achieve WCAG 2.0 guidelines at 'AA' standard as promised by GIGW framework of govt of India.

Declarations

Conflict of Interest Declaration

Author declares that there is no conflict of interest.

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Figures

Figure 1

Availability of Different Accessibility Features on websites of top 15 NIRF Ranked Universities

Figure 2

Glossary A-Z

Figure 3

Availability of language change option

Figure 4

Availability of font size options

Figure 5

High contrast text option

Figure 6

Font colour change

Figure 7

Spacing option

Figure 8

Accessibility statement

Figure 9

Skip to main content

Figure 10

Website search

Figure 11

Availability of sitemap