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Library Services During COVID-19: A Usability Analysis of Websites of the Central University Libraries in India

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ABSTRACT

Academic library websites are considered an integral tool for disseminating libraries' information, resources, and services. It also encourages users to interact and use library resources and services remotely. The spread of COVID-19 and the nationwide lockdown shifted the education system to an online mode of teaching and learning. The present study aims to analyse the usability criteria of the Central Universities' library websites, the availability of various facilities & services provided during the pandemic, to know the mode of information dissemination during the pandemic, andthe preventive measures undertaken by the Central University library websites to combat the Corona Virus.The study reveals that Aligarh Muslim University and the Central University of Orissa have adopted all possible means and modes to provide information to its users to combat the struggles during the pandemic through their library websites. However, certain Central University websites like the Central University of South Bihar have provided the least services for their users during the pandemic. The study also highlighted the essential steps initiated by the selected libraries to fulfill the information needs of their users, and those services may be opted by others to meet the post-lockdown needs.

Keywords: Usability analysis; Website analysis; Library website; Library services

1. INTRODUCTION

Websites are one of the primary information sources in today's world. Having a no-error, accurately functioning, and updated website benefits the organisation. The library websites act as powerful tools to access and utilise library and information services over the internet throughout the globe[1]. The occurrence of COVID-19 bound many countries to implement lockdown to minimise the spread of the virus and resulted in economic and social consequences. The nation wide lockdown was forced during March and April 2020 to fight COVID-19, and the whole education system was shifted to an online mode of teaching and learning. The institutions were in lockdown, and students were taking online classes from their residences without any study or reference materials.

Maximum University Libraries were physically closed for users, so the libraries reallocated their resources, updated their websites, and focused more on online resources and services. The library websites were the only way through which the users were connected with their learning resources[2].

The library website acts as a gateway of information for all library-related services; print turned digital and online resources and services[3]. Due to its importance, there is a need for every library to develop and maintain user-friendly library portals to cope with the information needs of their users.

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The purpose of the present study is to analyse the usability criteria of the selected Central Universities' library websites, the availability of various facilities & services that may be provided during the pandemic, know the mode of information dissemination during the pandemic, and the preventive measures undertaken by the Central University library websites to combat the Corona Virus. Dadhe & Dubey.[4] explored the various facilities and services offered by IIT Libraries' websites during the COVID-19 pandemic based on the contents and information published on their websites.

An Act of Parliament establishes the Central Universities in India,and they are under the purview of the Department of Higher Education in the Ministry of Education, Government of India. Central Universities in India are recognised by the University Grants Commission (UGC), which draw their power from the University Grants Commission Act of 1956. As per the information available on the Department of Higher Education, Ministry of Education, Government of India website (https://www.education.gov.in/en/central-universities-0), there are 40 Central Universities across India, and the same is included in the present study.

2. WEB USABILITY ANALYSIS

The term 'usability' was frequently used in the 1980s, and there are many ways to make a product or service usable. We may say that usability is how easy an object or service is to use; therefore, website usability is a mechanism that refers to

techniques for measuring and improving ease of use during the design and final process. Nielsen, S.[5] explained that usability has five attributes: learnability, efficiency, memorability, low error rate or easy error recovery, and satisfaction.

Usability can also be related to usefulness and useableness[6]. The International Organisation for Standardisation (ISO) defines usability of a product as "the extent to which specific users can use the product to achieve specified goals with 'effectiveness,' 'efficiency' and 'satisfaction' in a specified context use."

The Website usability studies help in understanding and determining the status of the quality of the web portals[7]. Aziz, *et al.*[8] indicated that "the usability can be used to validate the Website to see how it performs. When analysing a website, typical factors to be considered are the way the information is organised and presented, and how to access and navigate the informative structure of the website for usability so that a set of guidelines to assist in determining design and usability".

3. LITERATURE REVIEW

Many studies have been conducted in this area; some were selected for the present study.

Aziz, *et al.*[9] used the WEBUSE Method, which consists of twenty-four usability criteria in the study of website services. In their research, they found that the usability of the web portal for user satisfaction is mainly acceptable in terms of the user interface design category, and some people are still uncomfortable with the look of the portal. The portal providedthe current information about COVID-19. Kurniawan, Edi, and Syahputra, Abdul Karim[10], in their usability study of ASAHAN COVID-19 Web Portal via the SUS method, explored that based on SUS Score results made on the web portal COVID-19, the Website is acceptable but still not usable and recommended that the portal still needs to be developed back to a better stage.

Yu & Mani [11], in their study of 157 Association of Academic Health Sciences Libraries member institutions, found that 90 per cent of the selected Libraries declared closures and transitioned their services and instruction to the online environment.

Fawareh, & Al-Bardeen[12], in their investigation of E-learning Websites' found usability issues during the COVID-19 pandemic, and they analysed the factors that affected theusability and identified the most critical factors related to usability. Condic, K.[13],in their study, found that most of their selected libraries displayed COVID related services, opening status, and working hours on their library's websites. During this time of uncertainty, libraries mustclarify their COVID policies on their websites.

Aryal & Balan[14], in their study of the technical information systems module for distance learning during the COVID-19 pandemic, revealed that the technical module of an information systems course could be successfully delivered during a pandemic in a remote session and they found that there was a decline in the student's performance. The output of their study helps the information systems program with its evaluation and to improve its course delivery during a pandemic.

4. OBJECTIVES OF THE STUDY

The objective of the present study is to evaluate and find out the usability of the selected libraries'websites based on facilities and services that may be provided during the COVID-19 pandemic on their web portals:

- To analyse the web usability of the Central Universities' library websites
- To detect the availability of web-based library facilities & services in the Central Universities during the pandemic
- To know the mode of information dissemination during the pandemic in selected Central University libraries
- To display the status of preventive measures undertaken by the Central University libraries to combat the corona virus.

5. METHODOLOGY

The scope of web content analysis is not new nowadays. Due to the rapid popularity of the study of web content analysis, there isplenty of literature available on web content evaluation or webometric analysis. These studies are based on pre-designed parameters and rely on the previous studies,which are prettyvisible suchas a study conducted by Pareek & Gupta[15] titled "Information about Services and Information Resources on Websites of Selected Libraries in Rajasthan", Devi & Verma[16] titled "Content analysis based evaluation of library websites", and Dadhe & Dubey[4] titled "Library Services Provided During COVID-19 Pandemic: Content Analysis of Websites of Premier Technological Institutions of India" and Dhar & Gayan[17] titled "A Webometric Study of Selected International Library Association Websites: An Evaluative Study", etc.

5.1 Study Design, Participants, and Tools Used

The 40 Central University Library Websites (As per the Department of Higher Education, Ministry of Education, Government of India (source: https://www.education.gov.in/en/central-universities-0), detailed list is at Table 1, of India are selected for the present study. Based on earlier studies, a total of 42 parameters/checklists are prepared (Table 2), and keeping in view the above conceptual framework, the parameters are grouped under four major categories as General website attributes, Website Content, and Searching, Website Design and Management techniques, and Information and Services were pertaining to COVID-19. The present study did not depend on any pre-planned designed methodology. Instead, it investigates the selected library websites, and for bias-free and easy data analysis, the available and/or non-available parameters were structured in two variables, i.e., Available=1 and Not Available=0.

The present study is based on the content, information, and services available from 02nd January 2022 to 05th February 2022 on the selected University's Library websites. Due to the temporary nature of information on the web, only those information and services are included in the study which is listed on the library's websites during the selected time.

An online tool from Pingdom Website Speed Test (i.e., https://tools.pingdom.com) is used to know the page load time of the selected library websites. The data (Page-load time in

Table 1. Detailed list of the selected Central Universities

Name and address of the Central Universities	Abbreviation used	Year of establishment
Aligarh Muslim University, U.P.	AMU	1920
Assam University, Assam	AUS	1994
Babasaheb Bhimrao Ambedkar University, U.P.	BBA	1996
Banaras Hindu University, U.P.	BHU	1916
Central University of Gujarat, Gujarat	CUG	2009
Central University of Haryana, Haryana	CUH	2009
Central University of Himachal Pradesh, Himachal Pradesh	CUHP	2009
Central University of Jammu, Jammu	CUJM	2009
Central University of Jharkhand, Jharkhand.	CUJH	2009
Central University of Karnataka, Karnataka	CUKR	2009
Central University of Kashmir, J&K	CUK	2009
Central University of Kerala, Kerala	CUKE	2009
Central University of Orissa, Odisha	CUO	2009
Central University of Punjab, Punjab	CUPN	2009
Central University of Rajasthan, Rajasthan.	CURJ	2009
Central University of South Bihar, Bihar	CUSB	2009
Central University of Tamil Nadu, Tamilnadu	CUTN	2009
Dr. Harisingh Gour Vishwavidyalaya, Madhya Pradesh	DHGV	2009
Guru Ghasidas Vishwavidyalaya, Chhattisgarh	GGU	2009
Hemwati Nandan Bahuguna Garhwal University, Uttarakhand	HNBG	2009
Indira Gandhi National Open University, New Delhi	IGNOU	1985
Jamia Millia Islamia, New Delhi	JMI	1962
JawaharLal Nehru University, New Delhi	JNU	1969
Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya, Maharashtra	MGAH	1997
Manipur University, Manipur	MUM	2005
Maulana Azad National Urdu University Telangana	MANU	1998
Mizoram University, Mizoram	MZU	2000
Nagaland Universit, Nagaland	NUN	1994
North Eastern Hill University, Meghalaya	NEHU	1973
Pondicherry University, Puducherry	PUK	1985
Rajiv Gandhi University, Arunachal Pradesh	RGU	2007
Sikkim University, Sikkim	SUG	2007
Tezpur University, Assam	TUS	1994
The English and Foreign Languages University, Telangana	EFLU	2007
The Indira Gandhi National Tribal University, Madhya Pradesh	IGNTU	2007
Tripura University, Tripura	TUA	2007
University of Allahabad, U.P.	UOA	1887
University of Delhi, Delhi	UOD	1922
University of Hyderabad, Telangana	UOH	1974
Visva Bharati, Shantiniketan, West Bengal	VBS	1951

Table 2. Parameters used in the present study

Category	Parameters used
1	Representation of General website attributes of the Central Universities.
	Separate Library Website/Domain name
	Library Link on institute Home Page
	Link of E-Resources on Library website
	Link of Open Access Resources on Library Website
	Multi-lingual options
	Contact us link on the library homepage
	Library rules and regulations
	Library news and updates
	Link to Web OPAC
	Use of SNS
2	Display of Website Content and Searching options.
	User-friendly language and clearly visible contents
	Page titles are explanatory
	Contents on the webpage are systematically arranged and ordered
	Major headings are clear and descriptive
	The library website has appropriate help functions
	Search box on the homepage
	Site search is working and easy to access
3	Distribution of Website Design and their Management Techniques.
	Images have appropriate ALT tags
	Ads and pop-ups are unobtrusive
	Flash and add-ons are used carefully
	Texts on the webpage are readable and proper aligned
	Websites are responsive to multiple browsers
	Page load time **
	Mobile responsive design
4	Depiction of information and services pertains to COVID 19.
	Link of Resources related to COVID – 19
	Special services provided during COVID - 19
	Trial access of databases/e-resources/services information on the website
	Information on the wave of penalty on overdue/renewal of books due to Lockdown.
	Information regarding Plagiarism check.
	OPAC/Single Window search
	Online research support tools
	Organization of virtual events
	Remote access to available e-resources
	SOPs/tutorials for online Information searching and scholarly writing
	SOPs/tutorials for Technological Initiatives
	Virtual Reference/Ask Librarian
	Display of SOPs issued by Governments
	Working hours during COVID
	Information regarding restriction on certain services due to COVID
	Display of Safety measures for library workforce.
	Display of SOPs to minimize the spread of COVID-19
	Display of UGC Initiatives during COVID-19 for online teaching & learning like: SWAYAM, etc

**To determine the page load time, an online tools i.e. https://tools.pingdom.com/ is used.

seconds) for the particular library websites were obtained thrice, and the average was taken for the best results. Those websites' page load time is more than five seconds are given 0 and are under five seconds are granted 1 point.

For quantitative measurement of the page load time, individual CU library websites' average page load time was totaled and divided by the number of selected CU libraries (i.e., 40). So, the benchmarked page load time, i.e., 5 seconds, was taken for quantitative measurement (for scoring, i.e., for more than 5 seconds = 0 and less than 5 seconds = 1), and the same is also used in the ranking of the selected library websites.

5.2 Instruments, Data Collection, and Analysis

Based on selected parameters and the services that may be provided through the selected library websites during the pandemic,the researcher visited the websites and noted the available/non-available parameters. After the raw data were collected (Available=1 and Not Available=0), the same were tabulated, analysed, and based on their gained score, the finding and ranking of selected library websites were prepared.

6. FINDINGS OF THE STUDY

Web usability and availability of web-based library facilities & services of the Central Universities' Library websites

6.1 General Website Attributes

The general website attribute evaluation (Table 3) reflects that amongst all the Central Universities, only 90 per cent of the universities have library websites whose link is provided on the homepage of each University website. Each library website delivers a direct link for the e-resources, while only 68 per cent of library websites give out the link for open access resources. Multilingual options are supported by 45 per cent of library websites, and 98 per cent of the libraries have "Contact us." The Central University library websites also disclose the library rules and regulations (90 %) and deliver the latest information

Table 3. Representation of general website attributes of the Central Universities

University	Separate library website/ domain name	Library link on institute home page	Link of E-resources on library website	Link of open access resources on library website	Multi-lingual options	"Contact us" link on the library homepage	Library rules and regulations	Library news and updates	Link to Web OPAC	Use of SNS	Total (%)
AMU	1	1	1	1	0	1	1	1	1	1	9 (90)
AUS	1	1	1	1	1	1	1	1	1	0	9 (90)
BBA	1	1	1	1	1	1	1	1	1	0	9 (90)
BHU	1	1	1	0	0	1	0	0	0	0	4 (40)
CUG	1	1	1	1	0	1	1	1	1	0	8 (80)
CUH	0	1	1	1	1	1	0	0	0	0	5 (50)
CUHP	1	1	1	1	0	1	1	1	0	0	7 (70)
CUJH	1	1	1	0	1	1	1	1	0	0	7 (70)
CUJM	1	1	1	1	1	1	1	1	1	0	9 (90)
CUK	1	1	1	1	1	1	1	1	0	0	8 (80)
CUKE	1	1	1	0	1	1	1	1	1	1	9 (90)
CUKR	1	1	1	1	0	1	1	1	1	1	9 (90)
CUO	1	1	1	1	1	1	1	1	1	1	10 (100)
CUPN	1	1	1	1	1	1	1	1	1	1	10 (100)
CURJ	1	1	1	1	0	1	1	1	0	1	8 (80)
CUSB	0	1	1	0	0	1	0	0	0	0	3 (30)
CUTN	1	1	1	1	0	1	1	1	0	1	8 (80)
DHGV	1	1	1	1	0	1	1	1	0	0	7 (70)
EFLU	1	1	1	0	0	1	1	1	1	1	8 (80)
GGU	1	1	1	0	0	1	0	1	0	0	5 (50)
HNBG	1	1	1	0	0	1	1	0	0	0	5 (50)
IGNOU	1	1	1	0	1	1	1	1	0	0	7 (70)
IGNTU	1	1	1	0	1	1	1	1	1	1	9 (90)
JMI	0	1	1	1	1	1	1	1	1	1	9 (90)
JNU	1	1	1	1	1	1	1	1	1	0	9 (90)
MANU	1	1	1	0	1	1	1	1	1	0	8 (80)
MGAH	1	1	1	0	1	1	1	1	1	0	8 (80)
MUM	1	1	1	0	0	1	1	1	1	0	7 (70)
MZU	1	1	1	1	0	1	1	1	1	1	9 (90)
NEHU	1	1	1	1	0	1	1	1	1	0	8 (80)
NUN	1	1	1	1	0	0	1	1	0	0	6 (60)
PUK	1	1	1	1	1	1	1	1	1	1	10 (100)
RGU	1	1	1	0	1	1	1	1	0	1	8 (80)
SUG	1	1	1	1	0	1	1	1	1	1	9 (90)
TUA	1	1	1	1	1	1	1	1	1	1	10 (100)
TUS	1	1	1	1	0	1	1	1	1	1	9 (90)
UOA	0	1	1	1	0	1	1	0	0	1	6 (60)
UOD	1	1	1	1	0	1	1	1	1	0	8 (80)
UOH	1	1	1	1	0	1	1	1	1	1	9 (90)
VBS	1	1	1	1	0	1	1	1	1	0	8 (80)
Total (%)	36 (90)	40 (100)	40 (100)	27 (68)	18 (45)	39 (98)	36 (90)	35 (88)	25 (63)	18 (45)	

Table 4. Display of website content and searching options

University	User-friendly language and clearly visible contents	Page titles are explanatory	Contents on the webpage are systematically arranged and ordered	Major headings are clear and descriptive	The library website has appropriate help functions	Search box on the homepage	Site search is working and easy to access	Total (%)
AMU	1	1	1	1	1	1	1	7 (100)
AUS	1	1	1	1	1	1	1	7 (100)
BBA	1	1	1	1	1	0	0	5 (71)
BHU	0	0	1	0	0	0	0	1 (14)
CUG	1	1	1	1	1	0	0	5 (71)
CUH	0	1	0	0	0	0	0	1 (14)
CUHP	1	1	0	1	0	0	0	3 (42)
CUJH	1	1	1	1	1	0	0	5 (71)
CUJM	0	1	1	1	1	1	1	6 (85)
CUK	1	1	1	1	1	1	0	6 (85)
CUKE	1	1	1	1	1	0	0	5 (71)
CUKR	1	1	1	1	1	0	0	5 (71)
CUO	1	1	1	1	1	0	0	5 (71)
CUPN	1	1	1	1	1	0	0	5 (71)
CURJ	1	1	1	1	1	1	1	7 (100)
CUSB	1	0	1	0	0	0	0	2 (28)
CUTN	1	0	0	0	0	0	0	1 (14)
DHGV	0	0	0	0	0	0	0	0 (0)
EFLU	1	1	1	1	0	0	0	4 (57)
GGU	1	1	1	1	0	0	0	4 (57)
HNBG	1	1	1	1	0	1	1	6 (85)
IGNOU	1	1	0	0	1	1	1	5 (71)
IGNTU	1	1	0	1	0	1	1	5 (71)
JMI	1	1	1	1	1	1	1	7 (100)
JNU	1	1	1	1	1	1	1	7 (100)
MANU	1	1	1	1	1	1	1	7 (100)
MGAH	0	1	1	1	0	0	0	3 (42)
MUM	1	1	1	1	1	1	0	6 (85)
MZU	1	1	1	1	1	1	1	7 (100)
NEHU	0	1	0	0	0	0	0	1 (14)
NUN	1	1	1	1	0	0	0	4 (57)
PUK	1	1	1	1	1	0	0	5 (71)
RGU	1	1	1	1	1	0	0	5 (71)
SUG	1	1	1	1	1	0	0	5 (71)
TUA	1	1	1	1	1	1	1	7 (100)
TUS	1	1	1	1	1	0	0	5 (71)
UOA	1	1	1	0	0	0	0	3 (42)
UOD	0	1	0	1	0	0	0	2 (28)
UOH	1	1	1	1	1	1	0	6 (85)
VBS	1	1	1	1	1	0	0	5 (71)
Total (%)	33 (82)	36 (90)	32 (80)	32 (80)	25 (62)	15 (37)	12 (30)	

regarding any updates in the library through library news and updates (88 %). 63 per cent of the undertaken library websites manifest links to Web OPAC to add information regarding the availability for the users. Only 45 per cent of the library websites have used Social Networking Sites (SNS).

It also depicts that four Central Universities, CUO, CUPN, PUK, and TUS, have fully acknowledged the importance of general information to make the patrons fully aware of the services in the library. At the same time, Central University of South Bihar (30 %) and Nagaland University (30 %) need to concentrate more on their library webpage and website to provide better services to hand over extensive opportunities to the patron of the library.

6.2 Website Content and Searching

The parameters regarding the contents of websites and their search opportunities (Table 4), all the 40 Central Universities libraries have been trying to give out their best services to the stakeholders; however, within specific parameters, there are still some lacking. 82 per cent of the websites produce user-friendly language and engraved content visibility but have better explanatory page titles (90 %). Systemisation and arrangement of the contents of the library websites are very much essential to maintaining a standardised view of the website interface where 80 per cent of the libraries of the universities were able to cope up and also by giving descriptive and clear heading for the users to understand and access.

However, several times it is seen that some functions or services of the website are un-accessible or inoperative due to specific errors or technical issues, so to know the inoperative functions, theyprovide an extensive section as help (62 %) to the users in the website. Amongst 37 per cent of websites offer an option as a Search box to inquire about any information on the website, yet only 30 per cent of them are working correctly and have smooth access. Subsequently, library websites such as AMU, AUS, CURJ, JMI, JNU, MANU, MZU, and TUA have significantly developed their website by providing all the attributes in the contents of the websites and facilities to search for information. However, BHU, CUTN, CUH, and NEHU have the poorest display of content, which have the necessities to improve the website functions for better interface and services.

6.3 Website Design and Management Techniques

The website design clarity adopted and the management techniques to operate the library websites may vary from organisation to organisation. Certain dominant library websites (77 %) of the Central Universities have employed images with appropriate ALT tags. 95 per cent of the library website are cautious about displaying disturbing Ads and pop-ups, and the flash and add-ons are manifested too meticulously (Table 5).

There is always a need to properly align and provide readable text in the contents of a website where only 80 per cent of the library websites conscientiously agree to it. Many library websites were responsible for multiple browsers (82 %), yet only 65 per cent of library websites were sustained correctly for the mobile interface. Though, CUH (28 %) have enacted a dreadful design and maintenance system for their Website, which requires advancements to capture the users. Around half of the library websites within the Central Universities, such as AMU, AUS, BBA, and many have endorsed the essence of website design and their management techniques to deliver a sophisticated and standard outlook to the audiences.

The web usability and availability of web-based library facilities & services of the library websites are of great concern as it attracts the users to library and showcase their available facilities and services. Based on the score, the Tripura University, Tripura gained maximum score in combine above three categories followed by Aligarh Muslim University, U.P., Assam University, Assam, Jamia Millia Islamia, New Delhi, JawaharLal Nehru University, New Delhi and Mizoram University, Mizoram.

6.4 Mode of Information Dissemination

Mode of information dissemination and status of preventive measures undertaken by the Central University libraries to combat the Corona virus.

The information and services adopted by the libraries of Central Universities provide a handful of information relating COVID-19 pandemic (Annexure I). The rigorous circulation of myths and instability of information regarding COVID-19 has forced information professionals to provide authentic information on COVID-19 by providing links to resources related to COVID-19 on the library of websites (10 %). In comparison, 12 per cent of library websites provided special services because of the pandemic. The provision of the trail for databases/e-resources is maintained by the website (57 %) to circulate the needed information to the users, and 10 per cent of the library websites provide information regarding the penalty on the overdue in the return of the issued books, about 82 per cent of Central University library websites grant quick information about the plagiarism check.

The libraries also ensure the distribution of technological/ virtual events by promoting remote access to e-resources (72 %) and online research tools for research (60 %) and also by adding specific tutorials on searching scholarly content (37 %) and various technological initiatives (35 %). OPAC/ single window search has been taken seriously by 85 per cent of libraries during the pandemic. However, the virtual reference/Ask Librarian option has been displayed by only 37 per cent. The library websites also depict and display the relevant information on Covid-19 (12 %) and Government SOPs initiated (7 %) because of the pandemic. The libraries also encourage the users by providing the link for online teaching-learning platforms like SWAYAM, etc., undertaken by UGC (75 %) has been administered, helping the patron to gain more scholarly content for research and directing to the authenticity related to pandemic-related facts.

Central University of Orissa (100 %) has credited every possible pandemic information and handling the circumstances, followed by Aligarh Muslim University (94 %) and the University of Delhi (88 %). However, the Central University of South Bihar and Guru Ghasidas Vishwavidyalaya have not provided any information or facts regarding and relating to COVID-19.

Table 5. Distribution of website design and their management techniques

University	Images have appropriate ALT tags	Ads and pop-ups are unobtrusive	Flash and add-ons are used carefully	Texts on the webpage are readable and proper aligned	Websites are responsive to multiple browsers	Page load time	Mobile responsive design	Total (%)
AMU	1	1	1	1	1	1	1	7 (100)
AUS	1	1	1	1	1	1	1	7 (100)
BBA	1	1	1	1	1	1	1	7 (100)
BHU	0	1	1	1	0	1	1	5 (71)
CUG	1	1	1	1	1	1	1	7 (100)
CUH	0	0	0	1	0	1	0	2 (28)
CUHP	1	0	0	1	0	1	0	3 (42)
CUJH	1	1	1	0	1	1	0	5 (71)
CUJM	1	1	1	1	1	1	1	7 (100)
CUK	1	1	1	0	1	1	0	5 (71)
CUKE	1	1	1	1	0	1	0	5 (71)
CUKR	1	1	1	1	1	1	1	7 (100)
CUO	1	1	1	1	1	1	1	7 (100)
CUPN	1	1	1	1	1	1	0	6 (85)
CURJ	1	1	1	1	1	1	1	7 (100)
CUSB	0	1	1	0	1	1	1	5 (71)
CUTN	1	1	1	1	1	1	0	6 (85)
DHGV	0	1	1	0	0	1	0	3 (42)
EFLU	1	1	1	0	1	1	1	6 (85)
GGU	1	1	1	1	1	1	1	7 (100)
HNBG	0	1	1	1	1	1	1	6 (85)
IGNOU	0	1	1	0	1	1	1	5 (71)
IGNTU	1	1	1	1	1	1	1	7 (100)
JMI	1	1	1	1	1	1	1	7 (100)
JNU	1	1	1	1	1	1	1	7 (100)
MANU	1	1	1	1	1	1	1	7 (100)
MGAH	1	1	1	1	1	1	1	7 (100)
MUM	1	1	1	1	1	1	1	7 (100)
MZU	1	1	1	1	1	1	1	7 (100)
NEHU	1	1	1	0	0	1	0	4 (57)
NUN	0	1	1	1	1	1	1	6 (85)
PUK	1	1	1	1	1	1	1	7 (100)
RGU	1	1	1	1	1	1	1	7 (100)
SUG	1	1	1	1	1	1	1	7 (100)
TUA	1	1	1	1	1	1	1	7 (100)
TUS	1	1	1	1	1	1	0	6 (85)
UOA	0	1	1	1	1	1	0	5 (71)
UOD	0	1	1	0	0	1	0	3 (42)
UOH	1	1	1	1	1	1	0	6 (85)
VBS	1	1	1	1	1	1	0	6 (85)
Total (%)	31 (77)	38 (95)	38 (95)	32 (80)	33 (82)	40 (100)	26 (65)	

Table 6. Ranking of the Central University library websites

Address	Score obtained (%)	Rank
Aligarh Muslim University, U.P.	40 (95)	1st
Central University of Orissa, Odisha	40 (95)	
Babasaheb Bhimrao Ambedkar University, U.P.	34 (80)	2nd
Jamia Millia Islamia, New Delhi	34 (80)	
Mizoram University, Mizoram	34 (80)	
Assam University, Assam	33 (78)	3rd
JawaharLal Nehru University, New Delhi	33 (78)	
Sikkim University, Sikkim	33 (78)	
Pondicherry University, Puducherry	32 (76)	4th
University of Hyderabad, Telangana	31 (73)	5th
Central University of Gujarat, Gujarat	30 (71)	6th
Tezpur University, Assam	30 (71)	
Central University of Rajasthan, Rajasthan.	29 (69)	7th
Tripura University, Tripura	29 (69)	
University of Delhi, Delhi	29 (69)	
Central University of Punjab, Punjab	27 (64)	8th
The Indira Gandhi National Tribal University, Madhya Pradesh	27 (64)	
Central University of Jammu, Jammu	26 (61)	9th
Central University of Karnataka, Karnataka	26 (61)	
Nagaland University, Campus Nagaland	25 (59)	10th
Visva Bharati, West Bengal	25 (59)	
Central University of Kashmir, J&K	24 (57)	11th
Maulana Azad National Urdu University, Telangana	24 (57)	
Indira Gandhi National Open University, New Delhi	23 (54)	12th
Manipur University, Manipur	23 (54)	
North Eastern Hill University, Meghalaya	23 (54)	
Central University of Kerala, Kerala	22 (52)	13th
Rajiv Gandhi University, Arunachal Pradesh	22 (52)	
Central University of Tamil Nadu, Tamilnadu	21 (50)	14th
The English and Foreign Languages University, Telangana	21 (50)	
Hemwati Nandan Bahuguna Garhwal University, Uttarakhand	21 (50)	
Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya, Maharashtra	19 (45)	15th
Central University of Jharkhand, Jharkhand.	18 (42)	16th
University of Allahabad, U.P.	18 (42)	
Central University of Himachal Pradesh, Himachal Pradesh	17 (40)	17th
Guru Ghasidas Vishwavidyalaya, Chhattisgarh	16 (38)	18th
Dr. Harisingh Gour Vishwavidyalaya, Madhya Pradesh	13 (30)	19th
Banaras Hindu University, U.P.	12 (28)	20th
Central University of Haryana, Haryana	11 (26)	21st
Central University of South Bihar, Bihar	10 (23)	22nd

(Total parameters are 42, so the total (maximum) score is 42)

6.5 Ranking of the Central University Library Websites

Based on the gained scores of four categories, i.e., General website attributes, Website Content, and Searching, Website Design and Management Techniques, and Information and Services pertain to COVID-19, the selected Central University Library websites are ranked (Table 6) and also reflects their library website usability. The ranking has been finalised from the first to the twenty-second rank.

The library website of Aligarh Muslim University (95 %) and Central University of Orissa (95 %) has attained the first position by regulating all the possible services and requirements related to COVID-19 or on a general basis. Babasaheb Bhimrao Ambedkar University (80 %), Jamia Millia Islamia (80 %), and Mizoram University (80 %) conquered the second rank; and the third position was acquired by Assam University (78 %), Jawaharlal Nehru University (78 %) and Sikkim University (78 %) and accordingly. However, none of the university library websites has obtained the total score. They apprehended various services trial sections to uphold the loss during the pandemic through online platforms restricting physical contact. Banaras Hindu University (28 %), Central University of Haryana (26 %), and Central University of South Bihar (23 %) were the ones who attained the lowest rank, viz. 20th, 21st, and 22nd, respectively, since they provided minimum standardised maintenance of their library websites with very few services because of the COVID-19 pandemic.

7. DISCUSSION AND CONCLUSION

The internet and web portals acted as a bridge and enabled the libraries to provide services in this challenging environment. This pandemic crisis gained the importance of online services and resources like internet access is a key to education. In response, some Libraries in India can still not build and manage their web-based information portals like their website, OPACs, Remote access, etc. The outbreak of the COVID-19 virus around the globe has forced Libraries and information centers to adopt sudden and radical changes in their delivery of services. Libraries are going through difficult times due to pandemics and lockdowns and are bound to change their working style and reshape library routine working. The study conducted by Dadhe & Dubey[4] on the twenty-three IIT's Libraries' websites in which they explored the various services that may be offered by the Libraries' via their websites during the COVID-19 pandemic based on the contents and information published on their websites. In their study, they exploredthe various steps the libraries took to meet the post-lockdown needs. Sawant[18,] in their study of institutions of national importance in India, such as the Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs), and as well as non-academic research institutions having libraries found that many like IIMK Kozhikode, and IIT Delhi have issued guidelines on their websites regarding SOPs for reopening, links to e-resources, which are free due to COVID and to the open educational resources.

The above studies explored the contents and information published on their websites during the COVID-19 pandemic and explored the various steps the libraries took to meet the post-lockdown needs. In addition to that, the present study covers the usability analysis and various services the selected library may offer during the COVID-19 pandemic, and a ranking of selected libraries is prepared.

In the present study, the usability analysis of Central Universities Libraries' websites based on the services that the libraries may provide during COVID-19 is conducted. Forty-two parameters/checklists were prepared and grouped under four broad categories: General website attributes, Website Content, and Searching, Website Design and Management Techniques, and Information and Services about COVID-19.

The Universities Libraries like Aligarh Muslim University, Central University of Orissa, Babasaheb Bhimrao Ambedkar University, Jamia Millia Islamia, Mizoram University, Assam University, Jawahar Lal Nehru University, Sikkim University, and Pondicherry University have gained more than 75 per cent from the total score which means their libraries have more usability features as compared to other selected libraries websites.

Based on their gained score, the Central University of Orissa, Aligarh Muslim University, and University of Delhi Libraries have provided better library services via their websites during the COVID-19 pandemic more on their web portals. Most of the selected libraries have OPAC, information about Plagiarism Detection Software, and displayed UGC initiatives during COVID-19 for online teaching & learning like SWAYAM, NDL, etc., remote access to e-resources, etc.

These are the essential aspects that most libraries need to be considered to ease their library users. The findings of the present study reveal that library professionals have adopted various services and facilities on the websites of the Central Universities to combat the problems initiated during the coronavirus pandemic. This study also lets the webmaster, library professionals, academicians, and policymakers upgrade and alter the process of information transfer so that it will not cause any havoc even in critical situations like the pandemic.

REFERENCES

1. Letha, M.M. Library portal: A tool for web enabled information services. *DESIDOC J. Libr. Inf. Technol.*, 2006, **26**(5).
doi: 10.14429/djlit.26.5.3691
2. Rafiq, Muhammad; Batool, Syeda Hina; Ali, Amna Farzand & Ullah, Midrar. University libraries response to COVID-19 pandemic: A developing country perspective. *The J. Acad. Libr.,* 2021, **47**(1).
doi: 10.1016/j.acalib.2020.102280
3. Chakraborty, S. & Jana, S. Challenges and opportunities of academic libraries in India because of COVID-19. *Annals Libr. Inf. Stud. (ALIS)*, 2021, **68**(2), 110-118. http://hdl.handle.net/10760/42252
(Accessed on 05 February 2022).
4. Dadhe, Pooja P. & Dubey, Manju N. Library services provided during COVID-19 pandemic: Content analysis of websites of premier technological institutions of India. *Libr. Philos. Pract.*, 2020, **4445**. https://digitalcommons.unl.edu/libphilprac/4445
(Accessed on 03 February 2022).

5. Nielsen, Jakob. Usability engineering. Cambridge, Mass: Academic Pr., 1993.
6. Gluck, Myke. A descriptive study of the usability of geospatial metadata. *Annual Rev. OCLC Res.,* 1997. www.oclc.org/research/publications/arr/1997Igluck/gluck_frameset.htm (Accessed on 13 April 2022).
7. Harinarayana, N.S. An analysis of usability features of library web sites. *Annals Libr. Info. Stud. (ALIS)*, 2008, **55**(2), 111-122. http://nopr.niscair.res.in/handle/123456789/7680 (Accessed on 7 March 2022).
8. Aziz, N.S.; Kamaludin, A. & Sulaiman, N. Assessing website usability measurement. *Int. J. Res. Eng. Technol.*, 2013, **2**(9), 386-92. doi: 10.15623/ijret.2013.0209058.
9. Aziz, Faruq; Irmawati; Riana, Dwiza; Mulyanto, Joko Dwi; Nurrahman, Dede & Tabrani, Tabrani. Usability evaluation of the website services using the WEBUSE method (A case study: Covid19. go. id). *J. of Physics: Conference Series*, 2020, **1641**(1). doi: 10.1088/1742-6596/1641/1/012103
10. Kurniawan, Edi & Syahputra, Abdul Karim. Usability testing on the Asahan Covid-19 web portal using System Usability Scale (SUS). *In* Internation Conference on Social, Sciences and Infomation Technology*,* 2020*,***1**(1). doi: 10.33330/icossit.v1i1.739
11. Yu, F. & Mani, N. How American academic medical/health sciences libraries responded to the COVID-19 health crisis: An observational study. *Data Inf. Manage.*, 2020, **4**(3), 200-208. doi: 10.2478/dim-2020-0013
12. Fawareh, H. & Al-Bardeen, A. An investigation of e-learning websites usability issues during the COVID-19 pandemic: Jordan case study. *In* 2021 22nd International Arab Conference on Infomation Technology (ACIT), 2021. **1(**6). doi: 10.1109/ACIT53391.2021.9677369
13. Condic, K. Examination of academic library websites regarding COVID-19 responsiveness. *J. Web Libr.*, 2021, **15**(1), 32-45. doi: 10.1080/19322909.2021.1906823
14. Aryal, A. & Balan, S. Evaluation of a technical information systems module for distance learning during the COVID-19 pandemic. *J. Res. Inno. Teachnol. Learning*, 2022. doi: 10.1108/JRIT-11-2021-0078
15. Pareek, S. & Gupta, D.K. Information about services and information resources on websites of selected libraries in Rajasthan: A study. *DESIDOC J. Libr. Inf. Technol.*, 2012. **32**(6). doi: 10.14429/djlit.32.6.2847
16. Devi, K.K. & Verma, M.K. Content analysis based evaluation of library websites: A case study. *Annals Libr. Inf. Stud. (ALIS),* 2019. **65**(4), http://op.niscair.res.in/index.php/ALIS/article/view/21657 (Accessed on 18 July 2022).
17. Dhar, Prasenjit & Gayan, Mithu Anjali. A webometric study of selected international library association websites: An evaluative study. *DESIDOC J. Libr. Inf. Technol.*, 2022, **42**(3), 185-190. https://publications.drdo.gov.in/ojs/index.php/djlit/article/view/17772/7718 (Accessed on 18 July 2022).
18. Sawant, Sarika Siddharth. Services offered by Indian libraries during COVID-19. *Annals Libr. Inf. Stud. (ALIS)*, 2021, **68**(3). 230-237. http://eprints.rclis.org/42410/1/41395-465575955-1-PB.pdf (Accessed on 18 July 2022).
19. Ifijeh, Goodluck & Yusuf, Felicia. Covid–19 pandemic and the future of Nigeria's university system: The quest for libraries' relevance. *The J. Acad. Libr.,* 2020, **102226**. doi: 10.1016/j.acalib.2020.102226
20. Bhati, Pankaj & Kumar, Inder. Role of library professionals in a pandemic situation like COVID-19. *Int. J. Libr. Info. Stud.,* 2020, **10**(2), 33-48.
21. Yusuf, MA. Usability evaluation of University library Websites based on students preferences. 2014, https://www.academia.edu/5629266/usabili%20ty_evaluation_of_university_library_webs%20ites (Accessed on 16 January 2022).
22. Nielsen, J. Usability 101: Introduction to usability. Alertbox. 2012. https://www.nngroup.com/articles/usability-101-introduction-to-usability/ (Accessed on 16 January 2022).
23. Caglar, Ersin. Importance and usability of university websites. App and web. Accessibility Developments and Compliance Strategies. IGI Global, 2022, **1**(37). doi: 10.4018/978-1-7998-7848-3.ch001
24. Jena, Pravat Kumar. Impact of Covid-19 on higher education in India. *Int. J. Adv. Edu. Res. (IJAER),* 2020, **5**(3), 77-81. doi: 10.31235/osf.io/jg8fr
25. University Grants Commission. UGC revised guidelines on examinations and academic calendar for the universities in view of COVID-19 pandemic, 2022. https://www.ugc.ac.in/pdfnews/9037307_Press-Release-English.pdf (Accessed on 04 February 2022)
26. University Grants Commission. University Grants Commission ACT, 1956. 2002, https://www.ugc.ac.in/oldpdf/ugc_act.pdf (Accessed on 04 February 2022).
27. Rafiq, M.; Batool, S.H.; Ali, A.F. & Ullah, M. University libraries response to COVID-19 pandemic: A developing country perspective. *The J. Acad. Libr.*, 2021, **47**(1). doi: 10.1016/j.acalib.2020.102280
28. Nielsen, J. *Usability engineering*. Morgan Kaufmann, 1994.
29. Nielsen, Jakob, & Mack, Robert L. Usability inspection methods. Wiley, New York, 1994.
30. Devi, Ksh Krishna. & Verma, Manoj Kumar. Web Content and design trends of Indian Institute of Technology (IITs) Libraries' Website: An evaluation. *COLLNET J. Scientometrics Inf. Man.*, 2018,**12**(1), 165-181. doi: 10.1080/09737766.2018.1433100
31. Verma, Manoj Kumar and Brahma, Krishna.Webometric analysis of web sites of Indian Universities' with status of potential for excellence (UPE). *SRELS J. of Inf. Man.,* 2017, **54**(6), 318-326. doi: 10.17821/srels/2017/v54i6/111817
32. Young, S.W.H. Speed Matters: Performance enhancements

for library websites. *Weave: J. Libr. User Exp*. 2016, **1**(4).
doi: 10.3998/weave.12535642.0001.401

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His contributions to the study are conceptualization of the ideas, research design, manuscript review, revision, and overall supervision.

Annexure I

Depiction of information and services pertains to COVID-19

University	Link of Resources related to COVID – 19	Special services provided during COVID - 19	Trial access of databases/e-resources/ services information on Website	Information on wave of penalty on overdue books/renewal of book due to Lockdown	Information regarding Plagiarism check.	OPAC/Single Window search	Online research support tools	Organization of virtual events	Remote access to available e-resources	SOPs/tutorials for online Information searching and scholarly writing	SOPs/tutorials for Technological Initiatives	Virtual Reference/Ask Librarian	Display of SOPs issued by Governments	Working hours during COVID	Information regarding restriction on certain services due to COVID	Display of Safety measures for library workforce.	Display of SOPs to minimize the spread of COVID-19	Display of UGC Initiatives during COVID-19 for online teaching & learning like: SWAYAM, etc	Total (%)
AMU	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17 (94)
AUS	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	10 (55)
BBA	0	1	1	0	1	1	1	1	1	1	1	1	1	0	1	0	0	1	13 (72)
BHU	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	2 (11)
CUG	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	10 (55)
CUH	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	3 (16)
CUHP	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	4 (22)
CUJH	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1 (5)
CUJM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	4 (22)
CUK	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1	5 (27)
CUKE	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	3 (16)
CUKR	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	5 (27)
CUO	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18 (100)
CUPN	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	1	6 (33)
CURJ	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	7 (38)
CUSB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0)
CUTN	0	0	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	1	6 (33)
DHGV	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	3 (16)
EFLU	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	3 (16)
GGU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0)
HNBG	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	4 (22)
IGNOU	0	0	0	0	1	1	1	0	1	0	0	1	0	0	0	0	0	1	6 (33)
IGNTU	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	1	6 (33)
JMI	0	0	1	0	1	1	1	1	1	1	1	1	0	0	1	0	0	1	11 (61)
JNU	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	10 (55)
MANU	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2 (11)
MGAH	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1 (5)
MUM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	3 (16)
MZU	1	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	11 (61)
NEHU	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	10 (55)
NUN	0	0	1	0	1	1	1	1	1	1	0	1	0	0	0	0	0	1	9 (50)
PUK	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	10 (55)
RGU	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2 (11)
SUG	0	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	12 (66)
TUA	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	1	5 (27)
TUS	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	10 (55)
UOA	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	4 (22)
UOD	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	16 (88)
UOH	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	10 (55)
VBS	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6 (33)
Total (%)	4 (10)	5 (12)	23 (57)	4 (10)	33 (82)	34 (85)	24 (60)	21 (52)	29 (72)	15 (37)	14 (35)	15 (37)	3 (7)	3 (7)	5 (12)	3 (7)	3 (7)	30 (75)	