Information Research Communications, 2026; 3(2):157-167.
https://inforescom.org

Research Article

Digital Content Assessment of Academic Library Websites: Evidence from NIRF (2024) Ranked Pharmacy Institutions in India

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ABSTRACT

Background: Due to the rapid advancement of internet and communications technologies, academic users have changed their perception of finding relevant information within a few clicks. The importance of library websites/webpages has made library users one of the prime venues to find information within one unified window to multiple resources in an academic environment. **Objectives:** To purpose the study to access the extent and quality of web elements present in academic library website/webpages of 'NIRF' ranked pharmacy institutes that were listed in 2024 of the National Institutional Ranking Framework (NIRF) that was adopted by the Ministry of Education, Government of India., based on predetermined criteria. **Methodology:** The study was confined to the analysis of 85 library websites out of the top 100 institutions; the remaining fifteen institutions were excluded due to the absence of dedicated library webpages/websites or the availability of only minimal library information. Based on prior research, a standardized set of parameters was identified and structured into a checklist for the systematic evaluation of the selected websites. **Results:** The study reveals marked inconsistencies in the structural design, visibility, and functional integration of pharmacy library websites. Although core resources such as print and electronic collections are widely represented, direct homepage access, independent web platforms, and the adoption of content management systems remain limited. Advanced research support tools, reference management systems, federated search facilities, and mobile applications show minimal implementation. Furthermore, inadequate Web 2.0 integration, insufficient essential service information, and limited content updates collectively indicate weak emphasis on user-centric design and digital innovation. **Conclusion:** This study assists librarians and web developers in optimizing their websites so that users can quickly locate relevant resources, services, and information in general.

Keywords: Web Content Analysis, Content Evaluation, Library Websites, Webpage, Web 2.0, NIRF, India.

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Received: 04-03-2026;
Revised: 21-04-2026;
Accepted: 19-05-2026.

INTRODUCTION

In the contemporary digital environment, academic libraries have increasingly aligned their services with evolving user expectations by establishing a sustained and structured online presence, which has become a 'sine qua non' for higher education institutions (Jange, 2014). Library websites function as primary access points to information resources and services, providing an interactive and accessible interface for users to explore and engage with library collections (Madhu and Kannappanavar, 2024). The overall effectiveness of these platforms depends substantially on their usability, navigational clarity, information architecture, and functional design. Content analysis offers a systematic framework for evaluating these dimensions by examining the organization of information, accessibility features, search functionality, multimedia integration, and aesthetic design components (Kumar and Verma, 2018; Al-Qallaf and Ridha, 2019). Such evaluation enables the identification of strengths, gaps, and areas requiring enhancement to better meet user needs.

Within the Indian higher education landscape, institutions contribute significantly to national development across diverse academic streams. The National Institutional Ranking Framework (NIRF), administered by the Ministry of Education, ranks institutions under defined parameters: Teaching, Learning and Resources; Research and Professional Practice; Graduation Outcomes; Outreach and Inclusivity; and Peer Perception across multiple disciplinary domains (Kappi *et al.*, 2021). Pharmacy education, recognized as a critical discipline within the health

DOI: 10.5530/irc.3.2.17

sciences and characterized by its industry-oriented orientation in India, occupies a prominent position within this framework (Naik and Biradar, 2021). In the 2024 ranking cycle, 467 pharmacy institutions participated, of which only the top 100 were ranked based on composite scores derived from prescribed criteria. Although prior research has examined library websites of NIRF-ranked institutions in domains such as medical, engineering, and universities, limited scholarly attention has been directed toward pharmacy institutions. Accordingly, the present study investigates the content and structural features of library websites/webpages of NIRF-ranked pharmacy institutions in India, with particular emphasis on their role in representing and promoting library resources, services, and facilities within the web environment.

LITERATURE REVIEW

Devi and Verma, (2017) suggested in their study that NITs of northeast Indian libraries need to maintain dedicated websites and incorporate multimedia files to attract users. The websites must be updated at frequent intervals and provide number of visitor statements on their respective websites.

Seshaiah and Rekha, (2019) evaluated web presence of 245 engineering college library webpages of Andhra Pradesh. The analysis resolved that majority of library webpages have information pertaining to library collections, hours and electronic resources. The least updated information was found updated information, FAQ's, web 2.0 applications, digital library and feedback facility.

Al-Qallaf and Ridha, (2019) studied and examined the design, navigation, web content, services, and web 2.0 features of 110 academic library websites of Gulf Cooperative Council (GCC) countries. The author suggested that since the majority of academic users are from the Google generation, it is critical to develop more 'millennial-friendly' websites that enable rapid and easy access to 'Web-based services and content-rich information'. Similar study was conducted by Hugar, (2019) to examine the engineering college library websites of situated in Goa state. The purpose of study was to guide the librarians to design and develop unique library websites with information rich websites with adequate resources and services for their respective libraries and also provide links to other IIT libraries. Ukwattage (2019) analyzed the instructional guides present on the health science library websites of Sri Lanka to support academic teaching, learning, and research activities. It was found that none of the library websites under scope provided instructional guides when compared with international library websites in similar fields.

Kumar and Yadav (2020) studied the efficiency of the top ten NIRF-ranked Indian university library portals in 2019. Researchers prepared a weighted checklist based on previous studies with four main headings (general information, library collections, services, and social web technologies) and scored them in the categories of excellent, good, average, and poor. Based on the evaluation of the websites, none of the websites obtained scored in the 'excellent' class; only one website obtained scored in the 'good' class between 60 and 80%. Ambika and Ganesan, (2020) content analysis of NACC-accredited 26 engineering college library websites of Bangalore and ranked the website based on the obtained score. The analysis found information that engineering college library websites are not at satisfactory level and needs improvements in overall characteristics. Only 3 websites stood under the score of excellent under predefined criteria. Ullah, (2021) used the content analysis method to evaluate the 45 medical library websites in Pakistan. The overall results found the development of medical library websites was in its infancy and missed most of its important features while communicating with the users (Appendix 1).

Rafiq *et al*., (2021) examined the quality of the library websites of QS World's top-ranked 50 medical university libraries to explore the services, resources, information dissemination tools, and training opportunities provided to library users. The study revealed that the majority of library websites provided basic information about libraries, subscribed resources, and services. Social networking sites like Facebook, Twitter, Instagram, YouTube, and LinkedIn were most popular among the medical libraries to disseminate the latest information to its users. "Patron-driven acquisition" was the least commonly used service by the users, and only 40% of them are using mobile apps. Dhule (2021) have valuated the library websites of the top 30 ranked law institutes in the 2021 edition of the NIRF ranking process. The author selected standard criteria for evaluating library websites based on studies. Each library website was thoroughly scanned with the help of an online survey and observation technique. The analysis resolved out of 30 libraries 19 libraries were found under external webpages as their library websites; the remaining 11 libraries have dedicated websites. It was found that all selected websites have information pertaining to reference services, reprographic services, reading rooms, and links to web OPAC. The majority (72.5%) of websites have basic information about library, contacts, working hours, and library staff, and the majority (70%) of websites have information and links to legal databases (SCC online, Lexis Nexis, Manupatra, Westlaw, and Hein online). Similar study was conducted by Komal and Sonkar, (2021) to examine the web presence of library websites of the top ten NIRF-ranked medical institutes in India. The data was collected through online survey from respective websites to know availability of contents. The analysis resolved that the overall content found on the websites under study is not satisfactory, and the selected websites should completely restructure the websites with the latest information. Verma, (2011) evaluated quality and quantity indicators (usability and usefulness) on library websites from selected research centers in India. As per the analysis, the library websites in India are lagging behind compared to international standards in terms of methodologies

and techniques. The content and information available on library websites in India are not up to the mark, and regular updates are lacking.

Indira, (2022) used the content analysis method to evaluate the 68 college library websites that are affiliated to Mahatma Gandhi University from Kerala State, India. The study resolved that only 50% of the libraries of have active library websites with live web OPAC link and provision of access to e-resources. Pervez and Haridasan (2022) examined the web-based resources, services, and facilities offered by the library websites of the Indian Institute

Appendix 1: List of College Library Websites Selected for the Study.

NIRF Rank	College Name	Library URL
1	Jamia Hamdard	http://www.jamiahamdard.ac.in/LibrayInformationSystem/faculty-pharmacy-library.html
2	Birla Institute of Technology and Science, Pilani	https://library.bits-pilani.ac.in/
3	JSS College of Pharmacy	https://jssuni.edu.in/jssaher/college-of-pharmacy-ooty/cpo-library-and-information-center.html
4	Institute of Chemical Technology	https://www.ictmumbai.edu.in/DisplayPage.aspx?page=qandItemID=eq
5	JSS College of Pharmacy	https://jssuni.edu.in/jssaher/college-of-pharmacy-mysuru/library-and-information-center-facilities.html
6	Panjab University	https://library.puchd.ac.in/
7	Manipal College of Pharmaceutical Sciences, Manipal	https://www.manipal.edu/mu/campus-life/around-campus/campus-facilities/libraries/libraries-kmc-manipal.html
8	National Institute of Pharmaceutical Education and Research Mohali	https://niper.gov.in/lic.htm
9	SVKM`s Narsee Monjee Institute of Management Studies	https://www.nmims.edu/library
10	S.R.M. Institute of Science and Technology	https://www.srmist.edu.in/library/
11	Amrita Vishwa Vidyapeetham	https://aimslibrary.stacksdiscovery.com/
12	National Institute of Pharmaceutical Education and Research Raebareli	https://niperraebareli.edu.in//library.html
13	National Institute of Pharmaceutical Education and Research Ahmedabad	https://niperahm.ac.in/niper-a-library/
14	Delhi Pharmaceutical Sciences and Research University	https://dpsru.edu.in/dpsruLibrary
15	Lovely Professional University	https://www.lpu.in/academics/libraries.php
16	Jadavpur University	https://jadavpuruniversity.in/about/facilities/library/
17	Chitkara University	https://library.chitkara.edu.in/
18	Chandigarh University	https://www.cuchd.in/student-services/libraries.php
19	Babasaheb Bhimrao Ambedkar University	http://gbl.bbau.ac.in/
20	Amity University	http://auup.amity.edu/infra-library.aspx
21	Central University of Punjab	https://cup.edu.in/library.php
22	National Institute of Pharmaceutical Education and Research Kolkata	http://www.niperkolkata.edu.in/library.aspx
23	I. S. F. College of Pharmacy	http://isfcp.org/i/infrastructure-and-facilities/
24	Maharishi Markandeshwar (Deemed to be University)	http://www.mmambala.org/facilities/library.php
25	Annamalai University	http://aulib.annamalaiuniversity.ac.in/
26	Banasthali Vidyapith	http://www.banasthali.org/banasthali/wcms/en/home/library/campusilib/index.html
27	Central University of Rajasthan	https://www.curaj.ac.in/library

NIRF Rank	College Name	Library URL
28	Shoolini University of Biotechnology and Management Sciences	https://research.shooliniuniversity.com/infrastructure
29	Sri Ramachandra Institute of Higher Education and Research	https://library.sriher.com/?pos=3
30	Birla Institute of Technology	https://www.bitmesra.ac.in/Show_Other_Department?cid=1anddeptid=130
31	National Institute of Pharmaceutical Education and Research Hajipur	https://www.niperhajipur.ac.in/library-and-information-centre/
32	AU College of Pharmaceutical Sciences, Andhra University	https://www.andhrauniversity.edu.in/library.html
33	Poona College of Pharmacy, Pune	http://elib.bvuict.in/moodle/course/view.php?id=37
34	Nirma University	https://pharmscilibrary.nirmauni.ac.in/
35	Maharshi Dayanand University	http://mdurohtak.ac.in/library/lib_libraryprofile.html
36	SVKM's Dr. Bhanuben Nanavati College of Pharmacy	https://bncp.ac.in/Infrastructure/M__11
37	N.G.S.M. Institute of Pharmaceutical Sciences	https://ngsmips.nitte.edu.in/library.php
38	KLE College of Pharmacy, Belgaum	https://klepharm.edu/library.php
39	Dibrugarh University	https://dibru.ac.in/library/
40	Maharaja Sayajirao University of Baroda	https://www.hmlibrary.ac.in/
41	Integral University	https://library.iul.ac.in/
42	Punjabi University	http://www.punjabiuniversity.ac.in/Pages/Page.aspx?dsenc=Library
43	Parul University	https://paruluniversity.ac.in/libraries
44	Gandhi Institute of Technology and Management	https://library.gitam.edu/
45	Suresh Gyan Vihar University	https://www.gyanvihar.org/library
46	Galgotias University	https://www.galgotiasuniversity.edu.in/p/campus-life/library
47	Rashtrasant Tukadoji Maharaj Nagpur University	https://rtmnuopac.libsys10.in/home/dashboard
48	L. M. College of Pharmacy	https://sites.google.com/site/lmcplibahmedabad/home
49	Guru Ghasidas Vishwavidyalaya	https://www.ggu.ac.in/CentralLibrary.aspx
50	R. C. Patel Institute of Pharmaceutical Education and Research	http://rcpatelpharmacy.co.in/library/
51	Mohan Lal Sukhadia University	http://www.uclmlsu.org/
52	Sri Padmavathi Mahila Visvavidyalayam	https://spmvvlib.wordpress.com/
53	Smt. Kishoritai Bhoyar College of Pharmacy	https://skb.edu.in/index.php?option=commonpageandRID=7anddepid=3
54	Kumaun University, Nainital	https://www.kunainital.ac.in/about-ku/infrastructure-and-facilities/central-library
55	Acharya Nagarjuna University College of Pharmaceutical Sciences	https://www.nagarjunauniversity.ac.in/colleges/pharma/library
56	Vels Institute of Science Technology and Advanced Studies (VISTAS)	https://www.library.velsuniv.ac.in/
57	Nandha College of Pharmacy	https://nandhapharmacy.org/library-3/
58	Krishna Vishwa Vidyapeeth	https://kvv.edu.in/library/
59	M.S. Ramaiah University of Applied Sciences	https://www.msruas.ac.in/facilities/fph-library
60	Sharda University	https://www.sharda.ac.in/library
61	Gujarat Technological University	https://www.gtuelibrary.edu.in/

NIRF Rank	College Name	Library URL
62	Anurag University	https://anurag.edu.in/library/
63	Dr. Vishwanath Karad MIT World Peace University	https://mitwpu.edu.in/life-wpu/library
64	Bombay College of Pharmacy	https://www.bcp.edu.in/College_Library.aspx
65	Guru Nanak Institute of Pharmaceutical Science and Technology	https://www.gnipst.ac.in/pharmacy/about-library.php
66	Bundelkhand University	https://www.bujhansi.ac.in/en/page/library-facilities
67	Y. B. Chavan College of Pharmacy	https://www.ybccpa.ac.in/Department/Deptindex.aspx?page=aandItemID=gkandnDeptID=o
68	KIET Group of Institutions: KIET Group of Pharmacy	https://www.kiet.edu/KIET%20KRC%20Overview
69	Sri Venkateswara College of Pharmacy	http://svcop.in/library.html
70	Bharati Vidyapeeth College of Pharmacy	https://copkolhapur.bharatividyapeeth.edu/index.php/infrastructure/infrastructure-library
71	Arulmigu Kalasalingam College of Pharmacy	http://www.akcp.ac.in/library.htm
72	B. S. Abdur Rahman Crescent Institute of Science and Technology	https://library.crescent.education/
73	Sam Higginbottom Institute of Agriculture, Technology and Sciences	https://shuats.org/webwapp/central_library.asp
74	Acharya and B M Reddy College of Pharmacy	https://www.acharya.ac.in/library
75	Vishnu Institute of Pharmaceutical Education and Research	https://viper.ac.in/amenities/infrastructure/library
76	Kakatiya University	https://kakatiya.ac.in/university-library
77	Vinayaka Mission's Research Foundation	https://www.vmmckkl.edu.in/library
78	Uka Tarsadia University, Bardoli	https://www.utu.ac.in/Library/index.html
79	Shri Vishnu College of Pharmacy	https://www.svcp.edu.in/library/
80	Dr. B. C. Roy College of Pharmacy and Allied Health Sciences	https://bcrcp.ac.in/library
81	CMR College of Pharmacy	https://cmrcp.ac.in/library-2/
82	P. E. Society`s Modern College of Pharmacy	https://www.mcop.org.in/Library.aspx
83	Principal K.M. Kundnani College of Pharmacy	https://kmkcp.edu.in/library/
84	AISSMS College of Pharmacy	https://aissmscop.com/about-us/infrastructure/library-facility/
85	College of Pharmacy, Pandit Bhagwat Dayal Sharma University of Health Sciences	https://www.uhsr.ac.in/detail.aspx?artid=49andmenuid=63

of Management. Based on the analysis, IIM's library websites play an indispensable role in disseminating, communicating, and reflecting the resources in a well-defined and appropriate manner. Brahma and Verma, (2022) studied the web content of 50 national library websites in Asia to know the general information, design factors, web aids tools, statement of responsibility, currency details, webpage size, and speed, and rank the websites based on their global ranking on Alex traffic rank. The websites of the national library of Japan secured the top position among the Asian library websites on the global rank, and the least ranked website was the Cyprus national library website.

Objectives

- To examine the web presence of library websites/webpages of NIRF-ranked pharmacy institutes in India (2024 edition).
- To investigate the approaches adopted in the development of library websites/webpages of NIRF-ranked pharmacy institutes in India.
- To analyse the library collections, services, and facilities presented on the selected library websites/webpages of NIRF-ranked pharmacy institutes in India.

- To identify the Web 2.0 features incorporated into the library websites/webpages of NIRF-ranked pharmacy institutes in India.

SCOPE AND METHODOLOGY

The current study used the content analysis method to evaluate the library websites/webpages of NIRF ranked pharmacy institutes in India. The selection of only the NIRF ranked pharm institutes of India was documented from the official website of https://www.nirfindia.org/2024/PharmacyRanking.html 2024. A predefined checklist was structured based on previous literature published by Devi and Verma, (2018); Al-Qallaf and Ridha, (2019); Bharati and Madhusudhan, (2019). The present study was limited to only 85 library websites out of 100 in total. The remaining fifteen websites were eliminated due to the non-availability website/webpages or having information about their libraries within few lines. For the collection of data, online survey of websites/webpages of selected (see Annexure 1) was performed from 1st September to 31st September of 2024. The content of websites was classified into two parts to know their presence and absence in selected library websites/webpages. The collected data was entered and tabulated with the help of Microsoft Excel for interpretation (Table 1).

RESULTS AND DISCUSSION

Accessibility

Prior research highlights the importance of prominently placing the library link on an institution's homepage to enhance accessibility and user navigation. The analysis of NIRF-ranked (2024) pharmacy institutions indicates that 21.18% of library links were positioned under "Facilities/Central Facilities," followed by direct homepage links labeled "Library/Central Library" (18.82%) and placement under "Infrastructure" (11.76%). Other locations included miscellaneous menus (9.41%), "Academics and Campus Life" (8.24%), "Student Corner" (7.06%), "Resources" (4.71%), the homepage footer, "Amenities" (3.53%), and "Quick Links" (2.35%). The findings reveal considerable variation and a lack of uniformity in the structural placement of library links across institutional websites.

Availability

The rapid advancement of ICT and Internet technologies has accelerated the digital transformation of libraries over the past two decades, positioning websites as integrated platforms for delivering information, resources, and services. Library websites, in particular, function as virtual interfaces that communicate institutional resources and service offerings to users. The analysis of pharmacy institute library websites reveals that 77.65% were structured as webpages embedded within the parent institutional website, while 14.12% maintained independent or dedicated library websites. Only 3.53% employed open-source content management systems such as Google Sites, Moodle, or WordPress (Poona College of Pharmacy; L. M. College of Pharmacy; Sri Padmavathi Mahila Visvavidyalayam), indicating limited adoption of autonomous digital platforms (Table 2).

Basic Information

Table 3 specifies the general information provided through the respective pharmacy library websites. The analysis found that 100% of the websites contained basic information about the library/history of the library. Following this, 65.88% of the websites provided information about the library's working days, and 64.71% offered information about the library's operating hours. 52.94% of the websites provided information on library membership, while 51.76% of sites provided information on library holidays. Library rules and regulations were found on 47.06% of the library websites, while 40.00% of websites have listed library staff details. 34.12% of the websites contained statements about the library's mission, vision, and objectives, while 23.53% featured information on library news and events.

Library Specific Details

Table 4 outlines the library-specific information presented on the pharmacy library websites. The findings indicate that 70.59% of websites provided collection statistics, while 52.94% disclosed details of the library automation software in use, including Koha, SOUL, LibSys, and other systems. Information on IT infrastructure was available on 40.00% of websites, followed by photo or video galleries (38.82%) and library infrastructure details (30.59%). Data regarding the library advisory committee appeared on 24.71% of websites, whereas only 16.47% specified the classification scheme adopted, such as DDC, UDC, or NLM. Further, 12.94% mentioned the open access system, 11.76% described the library layout, and a limited 7.06% provided

Table 1: Accessibility of Library Website/Webpage.

Criteria	Total	Percentage
Link under Facilities/Central Facilities Menu	18	21.18
Directly linked to the home page has Library/Central Library	16	18.82
In the Infrastructure Menu	10	11.76
Other way (Differentiators, Institutes, Others, About Us, Anonymous)	8	9.41
Academics	7	8.24
Campus Life	7	8.24
Student Corner	6	7.06
Resources	4	4.71
Linked in the footer of the Homepage	4	4.71
Amenities	3	3.53
Quick Links	2	2.35

Table 2: Availability of the Library Website/Webpage.

Criteria	Total	Percentage
Used a separate webpage	66	82.35
The library has a separate website	12	14.12
Used Content Management System	3	3.53

Table 3: Basic Information Regarding Libraries.

Criteria	Total	Percentage
About the Library/History	85	100.00
Library Working Days	56	65.88
Library Operating Hours	55	64.71
Library Membership	45	52.94
Library Holidays	44	51.76
Library Rules/Regulations	40	47.06
Library Staff Details	34	40.00
Mission/Vision/objectives	29	34.12
Library News/events	20	23.53

information on budget allocation, reflecting uneven disclosure of institutional library details.

Physical Collections

Print collections remain fundamental to traditional academic libraries, representing both scholarly resources and preserved intellectual heritage. These holdings typically include books, print journals, newspapers, magazines, and other physical materials aligned with curricular requirements. The analysis of pharmacy library websites (Table 5) indicates that 94.12% provided information on books and print journals. Details on back/bound volumes (57.65%) and theses/dissertations (56.47%) were moderately represented. Information on newspapers (42.35%), magazines (35.29%), special or rare collections (31.76%), and book bank facilities (24.71%) appeared less frequently. Limited disclosure was observed for technical reports (14.12%), standards (8.24%), conference proceedings (7.06%), and newsletters or bulletins (4.71%), reflecting variability in the online representation of print holdings.

Digital Collections

The emergence of electronic resources has substantially transformed information preservation, access, and dissemination in academic libraries. Unlike traditional print-based collections, e-resources encompass e-books, e-journals, databases, bibliographic tools, and multimedia content, enabling seamless, remote access to scholarly information. The analysis of pharmacy library websites (Table 6) indicates that 94.12% provided information on e-journals and e-books, while 84.06% listed electronic databases. Details regarding consortium membership and the National Digital Library of India (NDLI) were available on 43.53% of websites, and 40.00% included links to abstracting

Table 4: Information Regarding Library Specific Details.

Criteria	Total	Percentage
Library Statistics	60	70.59
About the Library Automation package	45	52.94
IT Infrastructure in the Library	34	40.00
Photo/Video Gallery	33	38.82
Library Infrastructure	26	30.59
Library Advisory Committee	21	24.71
Technical Organization	14	16.47
Open Access System	11	12.94
Library Layout	10	11.76
Budget Allocation for the Library	6	7.06

and citation databases. Information on question banks and CD/DVD collections appeared on 35.29% of sites, followed by e-theses (30.59%) and faculty publications (25.88%). Pharmaceutical databases such as SciFinder and Reaxys were referenced by 21.18% of websites, CD-ROM databases by 16.47%, and only 1.18% mentioned e-patents, indicating uneven representation of specialized digital resources.

Research Tools and Support

Incorporating these research tools and support systems into library websites empowers users to conduct research more successfully and independently with sufficient resources. Library users can benefit from these resources, resulting in a more efficient and knowledgeable research process, making library websites an essential hub for expanding knowledge and scholarly achievements at the same time. Table 7 highlights the list of information provided by the pharmacy library websites regarding research tools and support. The analysis found that 44.71% (DrillBit-12, Turnitin-10, Unknown-6, DrillBit and Turnitin-3, Ithenticate-3, Turnitin and Urkund ouriginal -2, DrillBit and Ithenticate-1, Urkund ouriginal and Ithenticate-1) of the websites provided information regarding plagiarism detection tools. Following by, 16.47% of the websites have information on grammar checker “Grammarly”. Information regarding personalised research assistance was provided by 10.59% of the libraries. Information regarding the paraphrasing tool "QuillBot" was provided by other 10.59% of the websites. A very small proportion (1.18%) of websites have information and links to statistical software.

Reference Management Tools

Table 8 outlines five criteria used to assess the availability of reference management support on pharmacy library websites. The analysis indicates that 9.41% of websites provided information and links to Zotero, while 8.24% referenced Mendeley, and an equal proportion indicated subscription access to EndNote.

Additionally, 5.88% of websites offered citation guides, and 4.71% linked to free online citation generators. Overall, the findings suggest limited institutional emphasis on promoting reference management tools through library websites.

Services and Facilities

Table 9 presents the services and facilities highlighted on pharmacy library websites. The analysis shows that reprography services were most frequently reported (58.82%), followed by internet browsing facilities (48.24%) and remote access to e-resources (44.71%). Core services such as circulation (43.53%), reference assistance (42.35%), interlibrary loan (41.18%), and new arrivals (38.82%) were moderately represented. Current awareness services (30.59%) and newspaper clippings/document delivery (20.00%) appeared less frequently. Limited visibility was observed for RFID-enabled services (18.82%), selective dissemination of information (11.76%), bibliographic services (9.41%), referral services (7.06%), kiosk circulation (5.88%), and table of contents alerts (4.71%), indicating uneven online representation of user-centric services.

Value Added Services

Table 10 highlights the value-added services featured on pharmacy library websites. The findings indicate that 68.24% of websites provided Web OPAC access for bibliographic searching. Institutional repositories were linked on 32.94% of websites, while 15.29% offered an online book recommendation facility. Advanced or federated search options were available on 14.12% of sites to enable unified access to e-resources. A smaller proportion (7.06%) included virtual journal recommendation services, and an equal percentage provided links to download a dedicated library mobile application. Overall, the provision of advanced value-added services remains limited across institutions.

Web 2.0 Features

Table 11 highlights the presence of Web 2.0 tools on pharmacy library websites. The analysis indicates limited adoption of such interactive platforms. Blogs were the most commonly used tool, appearing on 8.24% of websites for disseminating news and updates. Google Sites was utilized by 4.71% of institutions to present library information, services, and open-access resources. Links to Wikipedia were observed on 3.53% of websites, while RSS feeds were adopted by only 2.35%, reflecting minimal integration of participatory web technologies in library web environments.

Links to Social Networking Sites

Table 12 presents the availability of Social Networking Site (SNS) links on pharmacy library websites, revealing that 17.65% of the websites primarily utilize YouTube to disseminate library tour videos and recorded lectures from their respective institutions. This is followed by 10.59% of websites linking to Facebook to provide updates on recent events and library services, while 7.06% connect to Instagram for visual promotion and user engagement. Additionally, 5.88% of the websites include links to X and WhatsApp Web to support timely communication and interaction. Overall, the findings indicate a moderate integration of SNS platforms, with a clear preference for video-based outreach through YouTube compared to other social media channels.

Website Aids and Tools

Competent library websites integrate diverse web tools to ensure efficient service delivery and improved user experience. Table 13 analyses the availability of such features on pharmacy college library websites. The findings show that 28.24% of the websites provide keyword-based search functionality, while 27.06% include links to Google Site Maps to facilitate easy navigation and location identification. Image swap/rollover effects and email

Table 5: Information Regarding Physical Collections.

Criteria	Total	Percentage
Books	80	94.12
Print Journal	80	94.12
Back/Bound Volumes	49	57.65
Thesis/Dissertation	48	56.47
News Papers	36	42.35
Magazines	30	35.29
Special/Rare Collection	27	31.76
Book Bank	21	24.71
Technical Reports	12	14.12
Standards	7	8.24
Conference Proceedings	6	7.06
News Letters/Bulletin	4	4.71

Table 6: Information Regarding Digital Collections.

Criteria	Total	Percentage
E-Journals	80	94.12
E-Books	80	94.12
Databases	74	87.06
Library Consortium	37	43.53
NDLI	37	43.53
Abstracting and Citation Database	34	40.00
Question Banks/Papers	30	35.29
CD/DVD	30	35.29
E-Theses	26	30.59
Faculty Publications/IRINS/SheRNI	22	25.88
Pharmaceutical Databases	18	21.18
CD-ROM Database	14	16.47
Patents	1	1.18

Table 7: Information Regarding Research Tools and Support.

Criteria	Total	Percentage
Plagiarism Detection Tools	38	44.71
Grammar Checker	14	16.47
Research Assistance	9	10.59
Paraphrasing Tool	9	10.59
Statistical Software	1	1.18

Table 8: Information Regarding Reference Management Tools.

Criteria	Total	Percentage
Zotero	8	9.41
Mendeley	7	8.24
Endnote	7	8.24
Others	5	5.88
Online Citation Generator	4	4.71

Table 9: Information Regarding Library Services and Facilities.

Criteria	Total	Percentage
Reprographic Services	50	58.82
Internet Browsing (Ports and Wi-Fi)	41	48.24
Remote access	38	44.71
Circulation Service	37	43.53
Reference Services	36	42.35
ILL (Inter Library Loan)	35	41.18
New Arrival Display	33	38.82
Current Awareness Service (CAS)	26	30.59
Newspaper Clipping	17	20.00
Document Delivery	17	20.00
RFID	16	18.82
Selective Dissemination of Information (SDI)	10	11.76
Bibliographic Service	8	9.41
Referral Services	6	7.06
Kiosk	5	5.88
Table of Content (TOC)	4	4.71

Table 10: Information Regarding Value-Added Services.

Criteria	Total	Percentage
Web OPAC	58	68.24
Institutional repositories	28	32.94
Book Recommendation	13	15.29
Advanced/Federated Search Facility	12	14.12
Ask a Librarian	8	9.41
Journal Recommendation	6	7.06
Mobile Library App	6	7.06

Table 11: Application of Web 2.0 Features.

Criteria	Total	Percentage
Blog	7	8.24
Google Sites	4	4.71
Wikis	3	3.53
RSS feed	2	2.35

Table 12: Link to Social Media Sites.

Criteria	Total	Percentage
YouTube	15	17.65
Facebook	9	10.59
Instagram	6	7.06
What Up's Web	5	5.88
X	5	5.88

Table 13: Website Aids and Tools.

Criteria	Total	Percentage
Keyword Search option	24	28.24
Sitemap	23	27.06
Image Swap/Rollover effect	11	12.94
E-mail/Contact us	11	12.94
FAQ's (Frequently Asked Questions)	10	11.76
Feedback form	8	9.41
Chatbot Assistant	8	9.41
Scrolling News Bar	6	7.06
QR Code Facility	6	7.06
360-degree view/Library Virtual Tour	4	4.71
Suggestions	2	2.35

or "contact us" options are present on 12.94% of the websites, and 11.76% feature FAQs to address common queries. Feedback mechanisms and chatbot assistants are adopted by 9.41% of the websites, whereas 7.06% provide scrolling news bars and QR code facilities. Only 4.71% offer a 360-degree virtual library tour, and a minimal 2.35% include a suggestion window, indicating limited adoption of advanced interactive tools.

Currency

The currency of library websites significantly influences their usability and user satisfaction, as it reflects how regularly information and resources are updated. In this study, currency refers to the synchronization of website content with recent developments and institutional activities. Table 14 shows that 21.18% of the websites include visitor counters to monitor usage. However, only 8.24% had updated their content within the past three months, and just 4.71% displayed the date of the

Table 14: Information Regarding Currency of Library Websites/ Webpages.

Criteria	Total	Percentage
Visitors Counter	18	21.18
Page that has been updated in the past three months	7	8.24
Date of update	4	4.71

latest update, indicating limited attention to maintaining and communicating content currency.

Major Findings of the Study

The present study was intended to study only the web content present on 85 library websites NIRF ranked pharmacy institutes of India.

- Only 18.82% of institutions provided a direct "Library/ Central Library" link on the homepage, whereas a larger proportion placed the link under indirect menus such as "Facilities" (21.18%) and "Infrastructure" (11.76%), reflecting a lack of standardization and reduced visibility.
- A majority (77.65%) of libraries functioned as webpages embedded within the parent institutional website, while only 14.12% maintained independent library websites. The adoption of open-source content management systems was minimal (3.53%).
- Basic information about the library was available on all websites (100%). However, operational details such as working days (65.88%) and working hours (64.71%) were only moderately represented, and strategic statements (mission and vision) appeared on just 34.12% of websites.
- Collection statistics were reported by 70.59% of websites, and 52.94% disclosed details of library automation software. Transparency regarding budget allocation (7.06%) and classification schemes (16.47%) was notably limited.
- Information on books and print journals was widely available (94.12%), while theses/dissertations (56.47%) and bound volumes (57.65%) were moderately represented.
- E-journals and e-books were prominently listed on 94.12% of websites, and electronic databases were reported by 84.06%. In contrast, specialized resources such as pharmaceutical databases (21.18%) and e-patents (1.18%) were minimally represented.
- Plagiarism detection tools were mentioned by 44.71% of websites, whereas grammar checking (16.47%) and paraphrasing tools (10.59%) were less frequently indicated.
- Reference management tools received limited attention, with Zotero (9.41%), Mendeley (8.24%), and EndNote (8.24%) appearing on a small proportion of websites.
- Reprography services (58.82%), internet browsing facilities (48.24%), and remote access to e-resources (44.71%) were the most frequently reported services.
- Web OPAC access was available on 68.24% of websites, while institutional repositories were linked by 32.94%. Federated search facilities (14.12%) and dedicated mobile applications (7.06%) were implemented to a limited extent.
- The adoption of Web 2.0 platforms was generally low; blogs (8.24%) were the most commonly used tool, whereas RSS feeds (2.35%) were rarely integrated.
- Among social networking platforms, YouTube (17.65%) was the most frequently linked, followed by Facebook (10.59%) and Instagram (7.06%), indicating modest engagement through social media.
- Keyword-based search functionality (28.24%) and Google Site Maps (27.06%) were moderately available, whereas advanced features such as 360-degree virtual tours (4.71%) and suggestion windows (2.35%) were rarely incorporated.
- Visitor counters were present on 21.18% of websites. However, only 8.24% had updated content within the previous three months, and merely 4.71% displayed the date of the most recent update, suggesting limited emphasis on maintaining content currency.

CONCLUSION

The rapid advancement of digital technologies has transformed academic libraries, positioning library websites as essential platforms for information access and service delivery. In this context, content analysis serves as a systematic approach to evaluate the structure, scope, and quality of information presented on library websites, enabling the identification of trends, strengths, and content gaps. The present study provides a comprehensive overview of the content features of pharmacy library websites of institutions ranked under the National Institutional Ranking Framework (NIRF). In the contemporary ICT-driven environment, where users expect instant access to information through modern devices and the internet, a dedicated and well-designed library website enhances institutional visibility, strengthens professional image, and improves user engagement through effective presentation and interactive features.

The findings indicate that only a few libraries have adopted open-source content management systems, reflecting an emerging tendency among librarians to independently develop and manage their websites. However, the majority of the evaluated

websites lack comprehensive information on collections, services, and facilities, highlighting the need for systematic improvement. To remain relevant and responsive to evolving user expectations, pharmacy libraries should incorporate emerging web technologies, including Web 2.0 tools (RSS feeds, blogs, and social networking platforms), Web 3.0 applications (semantic search tools, chatbots, AR, and VR), and advanced intelligent web features. Strengthening interactive services such as "Ask a Librarian" and structured feedback mechanisms is also essential to enhance user support and ensure continuous improvement of library website services.

ACKNOWLEDGEMENT

None.

ABBREVIATIONS

ICT: Information and Communication Technology; **NIRF:** National Institutional Ranking Framework; **OPAC:** Online Public Access Catalogue; **NDLI:** National Digital Library of India; **IRINS:** Indian Research Information Network System; **CAS:** Current Awareness Service; **SDI:** Selective Dissemination of Information; **ILL:** Inter Library Loan; **RFID:** Radio Frequency Identification; **FAQ:** Frequently Asked Questions; **SNS:** Social Networking Sites; **CMS:** Content Management System; **AR:** Augmented Reality; **VR:** Virtual Reality.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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Cite this article: Madhu S, Kannappanavar BU. Digital Content Assessment of Academic Library Websites: Evidence from NIRF (2024) Ranked Pharmacy Institutions in India. Info Res Com. 2026;3(2):157-67.