

Web 3.0, Design Trends and Content Assessment of IITs (Indian Institutes of Technology) Library Websites of India

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Abstract:

Library services have been pretentious by information and communication technology devices in the new age. They have enabled libraries to offer an extensive list of services accessible by users at ease. Among the most vital web-based locations where resources and information are shared is a library website. Library website design, content and web 3.0 at 23 Indian Institute of Technology (IITs) are the central topics covered by this investigation. The library website content at Indian Institute of technology (IIT) websites was assessed employing 67 measures divided under 10 categories that were based upon earlier website evaluation. IIT library sites can be made more user -friendly and resourceful by improving accessibility, updating materials, adding digital resources and including Web 3.0 tools.

Keywords: Library Website, Web 3.0, Content analysis, IITs Library website, Library services.

1. Introduction:

A library is the most essential element of any institution and is necessary for its growth and development. Its hard copy and digital collection must be both extensive and carefully curated in order to gather the desires of users. The major objective of a public library is to offer high level of services that fosters satisfaction among the users. An outstanding library experience is derived from the collection and grades of services offered by the library. Librarianship has shifted from traditional frameworks to digital environments due to advances in information and communication technology (ICT). One of these remarkable developments is the construction of library websites which first emerged in the 1990s. These serve as important tools for marketing their services and information particularly to users who do not have easy access to the library. Websites for libraries are indispensable tools of communication in this modern era, linking users and library services. [1]

The development of ICT has altered the manner in which people acquire knowledge as the rate of information expansion shifts globally. As the primary sources of information in an institution, the website of the library needs to ensure that the content is not only accurate but also sufficient and current. The collection, services offered, available facilities, accompanying administrative aid, and policies related to content updates of a library determine the richness

of its website content. A library or information website should be able to communicate clearly and comprehensively regarding policies, the nature of services provided, operating hours, and resources made available. Content as the most crucial piece of a website should always be accurate and represent the organization accordingly, attracting users rather than repelling them. [2]

1.1 Overview of Indian Institutes of Technology (IITs):

India has now 23 Indian Institutes of Technology (IITs) which are located in the following places: Bombay, Dhanbad, Delhi, Dharwad, Gandhinagar, Kanpur, Kharagpur, Madras, Guwahati, Roorkee, Hyderabad, Patna, Bhubaneswar, Ropar, Jodhpur, Indore, Mandi, Varanasi, Tirupati, Palakkad, Goa, Jammu, and Bhilai. These institutions aim to satisfy the increasing demand for trained technical manpower in the country. These institutions are administered by Institutes of Technology Act of 1961 which defines them as “Institutions of National Importance” along with their powers, responsibilities, and organizational structure. Every IIT's academic repository encompasses undergraduate engineering and technology programs, master's and doctoral specializations in engineering, science and interdisciplinary stratas alongside various other affiliations. Furthermore, they carry out sponsored, applied, and fundamental research. As of now, IIT's degree offerings include B.Tech, B.Arch, M.Sc, M.Des, M.Phil, M.Tech, MBA, and PhD. Some of the national level entrance examinations for admission include the B.Tech AIEEE, the GATE exam for masters in engineering, and JAM for master's in science. [3]

Table 1: List of Indian Institutes of Technology (IITs) of India

Sr · N o.	Institute Name	Library Website	State/UT
1	Indian Institute of Technology (BHU) Varanasi	https://iitbhu.ac.in/cf/lib	Uttar Pradesh
2	Indian Institute of Technology (Indian School of Mines) Dhanbad	https://library.iitism.ac.in/	Jharkhand
3	Indian Institute of Technology Bhilai	https://www.iitbhilai.ac.in/index.php?pid=library_service	Chhattisgarh
4	Indian Institute of Technology Bhubaneswar	https://library.iitbbs.ac.in/	Odisha
5	Indian Institute of Technology Bombay	https://www.library.iitb.ac.in/	Maharashtra
6	Indian Institute of Technology Delhi	https://library.iitd.ac.in/	Delhi

7	Indian Institute of Technology Dharwad	https://www.iitdh.ac.in/knowledge-resource-and-information-library	Karnataka
8	Indian Institute of Technology Gandhinagar	https://library.iitgn.ac.in/	Gujarat
9	Indian Institute of Technology Goa	https://iitgoa.ac.in/central-library-of-iit-go/	Goa
10	Indian Institute of Technology Guwahati	https://www.iitg.ac.in/lib/	Assam
11	Indian Institute of Technology Hyderabad	https://library.iith.ac.in/	Telangana
12	Indian Institute of Technology Indore	https://library.iiti.ac.in/	Madhya Pradesh
13	Indian Institute of Technology Jammu	https://library.iitjammu.ac.in/index.html	Jammu and Kashmir
14	Indian Institute of Technology Jodhpur	https://library.iitj.ac.in/	Rajasthan
15	Indian Institute of Technology Kanpur	https://pkklib.iitk.ac.in/	Uttar Pradesh
16	Indian Institute of Technology Kharagpur	https://library.iitkgp.ac.in/	West Bengal
17	Indian Institute of Technology Madras	https://cenlib.iitm.ac.in/	Tamil Nadu
18	Indian Institute of Technology Mandi	https://library.iitmandi.ac.in/	Himachal Pradesh
19	Indian Institute of Technology Palakkad	https://iitpkd.ac.in/library	Kerala
20	Indian Institute of Technology Patna	https://library.iitp.ac.in/	Bihar
21	Indian Institute of Technology Roorkee	https://mgcl.iitr.ac.in/	Uttarakhand
22	Indian Institute of Technology Ropar	https://www.iitrpr.ac.in/library/	Punjab
23	Indian Institute of Technology Tirupati	https://www.iittp.ac.in/CentralLibrary/	Andhra Pradesh

2. Literature Review:

The content of the Indian Institute of Technology (IIT) and library sites is the main focus of this study. Over the years, many studies have assessed library sites that use purposes and other assessment criteria, but very few people have looked specifically at the content. Relevant literature on related studies is reviewed in sections that follow.

Sahoo S., Panda K. C. (2019), evaluated the web content analysis of IITs Library Websites. This paper's primary goal is to examine and assess the web contents and navigability of the IITs library websites using internationally accepted assessment standards. It also provides pertinent recommendations for enhancing or modernizing the library websites. 18 IIT libraries in India were surveyed using a 100-item checklist. The websites of the IIT libraries were examined and assessed in August of this year, and they were checked once more between September 10 and September 25, 2019. Three (16.7%) of the eighteen IIT library websites received a lower score than the rest, indicating that none of the websites met all of the study's criteria. [4]

Devia Krishna and Verma Manoj Kumar (2018) studied the content analysis based evaluation of library websites. The websites of the libraries at IITs and NITs have been ranked using 172 parameters and a 5 point mark system. Two variables, "Yes" and "No," along with a conditional and additional scenarios added in accordance with the requirement, make up a comprehensive criterion. The current study was conducted on the websites of the 19 IITs and 29 NITs' libraries. According to the study, out of all the engineering institutions included in the analysis, the IIT Kanpur library website had the highest score point, while NIT Agartala had the lowest. [5]

Majumdar Sandip (2012) studied the Web 2.0 Tools in Library Web Pages: Survey of Universities and Institutes of National Importance of West Bengal. Use of web 2.0 tools and technologies to improve library services is the main focus of this article. Many Western Bengalian universities and online survey of library sites from institutions of national importance. It provides a fast Runown of Web 2.0 tool such as Podcast, Wiki, Blog and RSS Feed. To better understand the current status of the library's web services, many important questions are brought based on data analysis. [6]

Ratha Bhupendra, Joshi Leena, and Naidu G.H.S. (2012) studied webometric studies of IIT libraries websites. The study examines the layout and design of IIT library sites, which indicate remarkable variation in important areas such as user support services, hyperlink volume, image status and use on website and entire websites, status and use, and remarkable variation in passive links and web pages. Finally, it looks at the general design and structural makeup of these libraries' websites. [7]

3. Objectives of the Study

The special goals of this research are:

- To check websites and web pages for libraries at the IITs (Indian Institute of Technology).
- To determine which library services and resources are offered through these web pages.
- To suggest increasing web pages and websites for IIT libraries.

4. Methodology:

The data for this study was collected from the websites of the IITs libraries with an observation technique and examination method. A checklist was created as a means of gathering information. The contents of the IIT library network were analyzed using 67 criteria divided into 10 titles based on the evaluation before netting. Intensive examination of the IIT Library's websites also received information on the size of web pages.

Table No.1 shows 23 Indian Institute of Technology (IIT) Libraries, whose web material is subject to this study. Using Microsoft Excel, the data collected was arranged and shown in a table form after examining library sites selected at different times.

5. Data Analysis:

5.1 Accessibility of Library Webpage/Website:

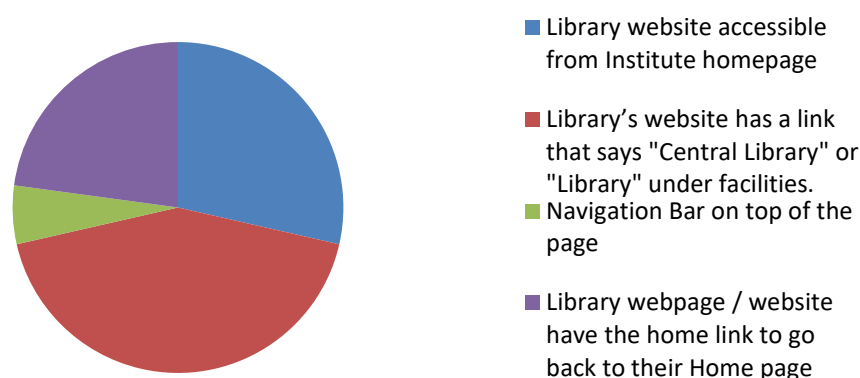
In digital and paperless age, access is required. Direct links of main material should be included on the website of each institute's website. This guarantees that users will require very little effort to get relevant information.

The observation of access to websites and web pages in the NIT library is shown in Table 2. According to the study, 15 NITs have classified their library link under "Facilities" or "Quick Links", which means that users will have to undergo several levels to detect resources.

Table 2: Accessibility of Library Webpage/Website

S. No	Accessibility of Library Webpage/Website	No. of IITs (N=23)
1	Library website accessible from Institute homepage	10 (43.48%)
2	Library's website has a link that says "Central Library" or "Library" under facilities.	15 (65.22%)
3	Navigation Bar on top of the page	2 (8.70%)
4	Library webpage / website have the home link to go back to their Home page	8 (34.78%)

Accessibility of Library Webpage/Website



5.2 Webpage Classification by Design Factor:

Foundation website design to develop a successful online platform is design. A well -designed website should have large elements such as heading, font style, text and graphics, easy navigation and fast loading time.

Table 3 focuses on six specific criteria to highlight the design elements of the IIT library's websites. According to the study, all 23 IIT library networks use a regular website format. In addition, only six IIT libraries Gandhinagar, Indore, Jammu, Kanpur, Kharagpur and shopping websites provide data on the number of visitors.

Table 3: Webpage Classification by Design Factor

S. No	Criteria	Frequency (N=23)
1	Website loads quickly	23 (100.00%)
2	Clear Headings	23 (100.00%)
3	Website easy to navigate	23 (100.00%)
4	Font size is suitable	23 (100.00%)
5	Balance between text and graphics	23 (100.00%)
6	Number of visitor	6 (26.09%)

5.3 Website language:

According to the study, the language priorities of the IIT library sites are shown in Table 4. All 23 websites at the IIT library are available in English. On the other hand, materials in many languages including Hindi and other regional languages are available in five IIT libraries: Bombay, Goa, Jodhpur, Kharagpur and Roorki.

Table 4: Website language

S. No	Criteria	Frequency (N=23)
1	Website Translates to Multilingual	5 (100.00%)

2	English language website	23 (100.00%)
3	Hindi and other language website	5 (100.00%)

5.4 Statement of Responsibility:

Information on the details of the responsibility provided by different IIT libraries is shown in Table 5. There are three different criteria in this category. Only 19 of IIT have provided the information of all three criteria. IIT Dhanbad library provided the information of Contact number and E-mail. IIT Bhilai and Guwahati libraries provided the only postal address information. IIT Dharwad library provide the only contact number.

Table 5: Statement of Responsibility

S. No	Criteria	Frequency (N=23)
1	Postal address	21 (91.30.00%)
2	Contact number	22 (95.65.00%)
3	E-mail	21(91.30.00%)

5.5 General Information about the Library

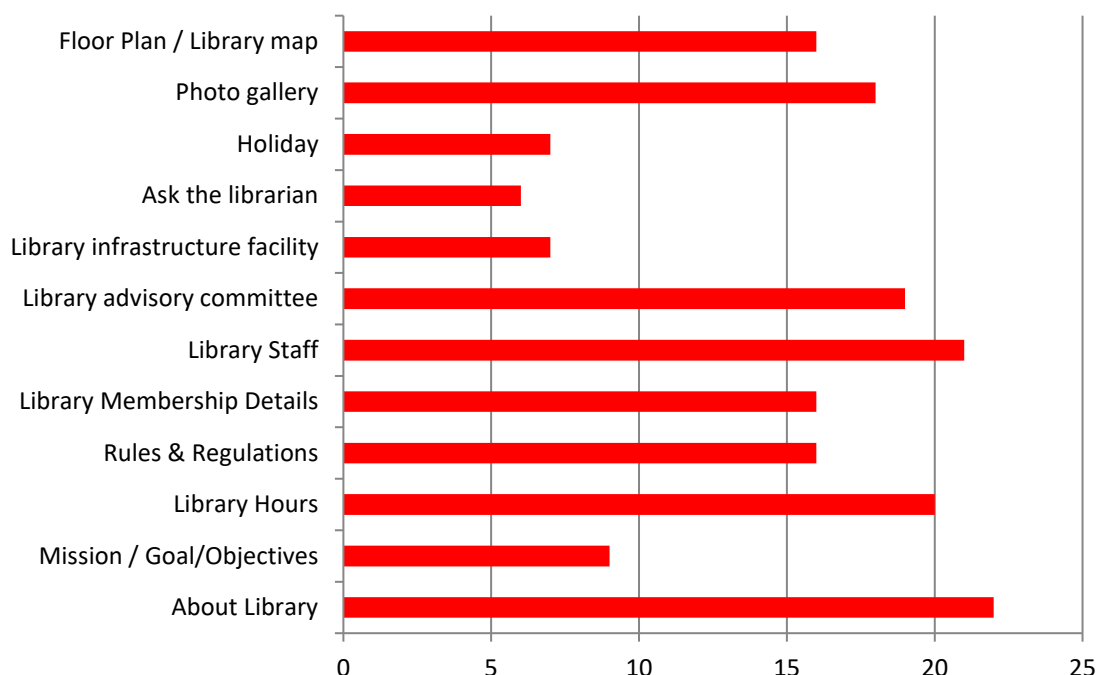
The general information found on IIT library webpages is shown in Table 6. Every institution must include a brief description of its library. IIT Hyderabad is the only IIT that has not shared about library details, whereas 22 other IITs have, according to the study. The mission, goals, and objectives of an organization are its fundamental elements. But this information has only come from nine IITs: Dhanbad, Bhubaneswar, Delhi, Gandhinagar, Jammu, Mandi, Patna, Roorkee, and Ropar. IITs Bhilai, Goa, and Kharagpur have not provided information on library hours, but 20 IITs have. Additionally, the websites of IIT Hyderabad and IIT Dharwad lack information about their library staff. While 19 IITs have library advisory committees, four—Bhilai, Bombay, Dharwad, and Hyderabad—do not have any information available. Maps or floor plans of sixteen IIT libraries have been made public. Details about membership can be found on the websites of 16 IIT libraries. These six IITs—Dhanbad, Varanasi, Bhubaneswar, Gandhinagar, Indore, and Kharagpur—offer the 'Ask a Librarian' service. On their library websites, 18 IITs have also included a photo gallery.

Table 6: General Information about the Library

S. No.	Criteria	Frequency (N=23)
1	About Library	22 (95.62%)
2	Mission / Goal/Objectives	9 (39.13%)
3	Library Hours	20 (86.96%)
4	Rules & Regulations	16 (69.57%)
5	Library Membership Details	16 (69.57%)
6	Library Staff	21 (91.30%)

7	Library advisory committee	19 (82.61%)
8	Library infrastructure facility	7 (30.43%)
9	Ask the librarian	6 (26.09%)
10	Holiday	7 (30.43%)
11	Photo gallery	18 (78.26%)
12	Floor Plan / Library map	16 (69.57%)

General Information



5.6 Library Collection:

A well-equipped library should have a huge collection of resources, whether in physical or electronic form, to make sure that information is accessible to users who require it. The details of a library's collection should be evidently provided on its official website. Table 7 presents an indication of the library collections accessible on the web pages of various IITs.

Regarding book collections, all IITs have provided relevant details on their websites except IIT Hyderabad and Madras. However, Information about Journals is missing from the websites of six IITs library, i.e. IIT Bhilai, Dharwad, Hyderabad, Indore, Madras and Patna. Reference Sources information provided on the websites of six IITs- IIT Delhi, Varanasi, Gandhinagar, Jammu, Mandi and Palakkad. Information about theses and dissertations can be found on the websites of fifteen IITs.

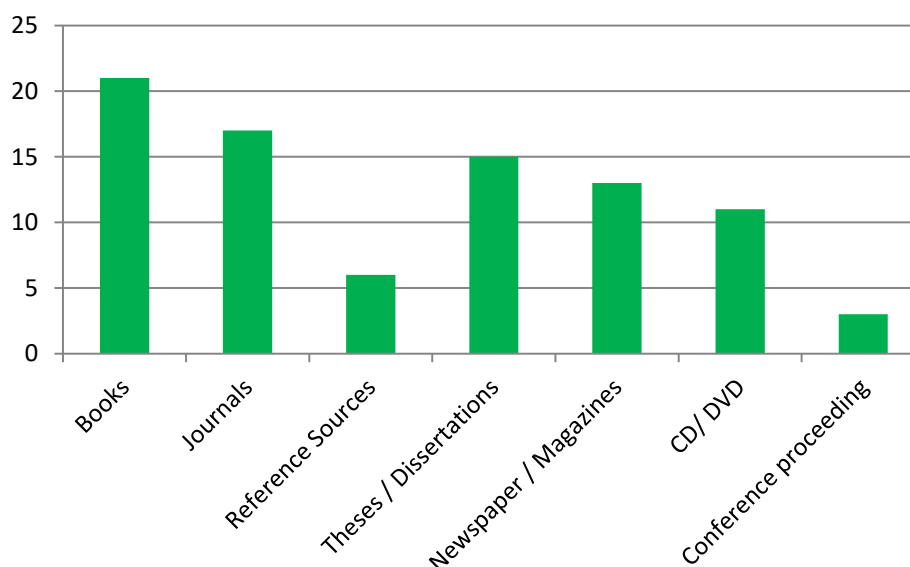
Ten IITs have not provide details regarding their newspaper and magazine collection, The availability of CD/DVD is mentioned on the websites of IIT Varanasi, Bombay, Delhi, Jammu, Kanpur, Kharagpur, mandi, Palakkad, Patna, Ropar and Tirupati. Information on conference

proceedings is available for IIT Kharagpur, Mandi and Bombay. IIT Hyderabad and Madras have not provided information regarding collection of library.

Table 7: Library collection

S. No.	Criteria	Frequency (N=23)
1	Books	21 (91.30%)
2	Journals	17 (73.91%)
3	Reference Sources	6 (26.09%)
4	Theses / Dissertations	15 (65.22%)
5	Newspaper / Magazines	13 (56.52%)
6	CD/ DVD	11 (47.82%)
7	Conference proceeding	3 (13.04%)

Library collection



5.7 Library Services:

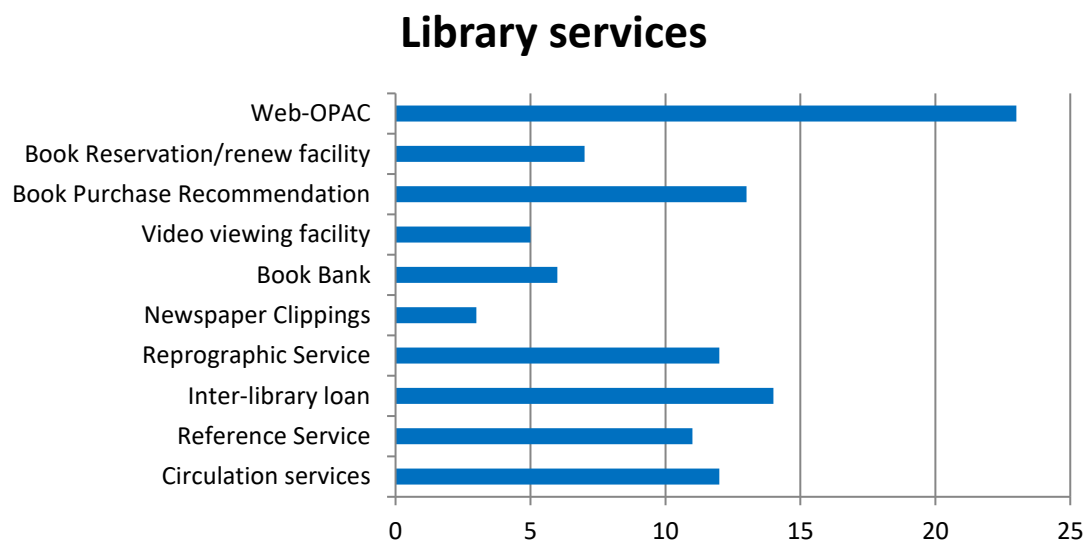
The core foundation of any library lies in the services it provides. Library services typically include reference services, reprographic services, circulation services, Interlibrary Loan (ILL), book bank services, Web OPAC and more. Table 8 presents an overview of the library services available on the official websites of various IIT libraries, covering 10 different criteria.

The study reveals that all 23 IITs have provided information about the Online Public Access Catalog (OPAC) on their library websites. Reference services are listed only eleven IITs libraries website. Reprographic services are documented on the websites of IIT Dhanbad, Varanasi, Bombay, Delhi, Gandhinagar, Hyderabad, Kanpur, Madras, Mandi, Palakkad, Ropar and Tirupati. Newspaper clipping services are provided by IIT Delhi, Kanpur and Patna libraries. Fourteen IITs—Dhanbad, Bombay, Delhi, Gandhinagar, Goa, Indore, Jammu,

Jodhpur, Kanpur, Madras, Mandi, Patna, Roorkee and Ropar have included details about their Interlibrary Loan (ILL) services. Video viewing facility is noted for IIT Delhi, Hyderabad, Kharagpur, Mandras and Mandi. Book bank services are available at 6 IITs, namely Varanasi, Bhubaneshwar, Bombay, Delhi, Indore, and Madras. Circulation services information provided by twelve IITs libraries. Book purchase recommendation services are listed only thirteen IITs libraries website and book reservation and renew facility provided by only seven IITs libraries website.

Table 8: Library services

S. No.	Criteria	Frequency (N=23)
1	Circulation services	12 (52.17%)
2	Reference Service	11 (47.83%)
3	Inter-library loan	14 (60.87%)
4	Reprographic Service	12 (52.17%)
5	Newspaper Clippings	3 (13.04%)
6	Book Bank	6 (26.09%)
7	Video viewing facility	5 (21.74%)
8	Book Purchase Recommendation	13 (56.52%)
9	Book Reservation/renew facility	7 (30.43%)
10	Web-OPAC	23 (100.00%)



5.8 E-Resources:

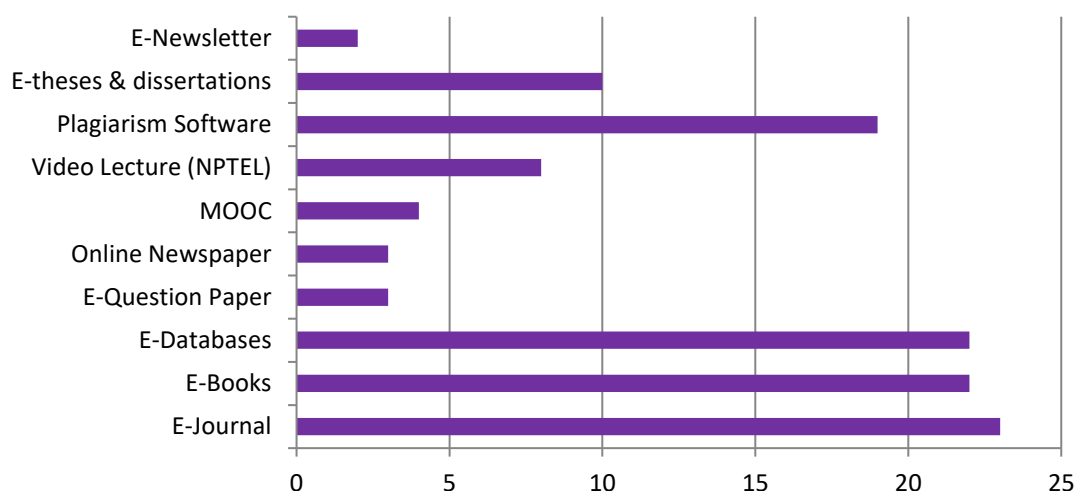
In the digital era, e-resources have become the most favorite collection amongst users. Libraries are increasingly leveraging e-resources to give seamless access to information; allowing users to retrieve content from their have desks 24/7. Table 9 presents an indication of the e-resources available on the library web pages of various IITs, categorized into 11 different criteria.

Information about e-books is absent from the library websites of IIT Dharwad. Similarly, details regarding e-journals are available on the websites of all IITs. Information about e-database is not available on the websites of IIT Palakkad. Access to e-theses and dissertations is mentioned only for ten IIT. Information about e-question papers is available only on the library web pages of IIT Delhi, Khragpur and Patna. Online newspaper links are featured on the websites of IIT Bhubaneshwar, Gandhinagar and Hyderabad. MOOC information provided by IIT Delhi, gandhinagar, Jodhpur and Ropar. NPTEL Video lectures are accessible via the library websites of only eight IITs- Bombay, Delhi, Gandhinagar, Jodhpur, Palakkad, Patna, Roorkee and Ropar. Information about Plagiarism software is missing from the IIT Dharwad, Gandhinagar, Madras and Roorkee. E-newsletter information provided by only IIT Madras and Ropar. Information about other open digital library is available on the library websites of thirteen IITs.

Table 9: E-resources

S. No.	Criteria	Frequency (N=23)
1	E-Journal	23 (100.00%)
2	E-Books	22 (95.62%)
3	E-Databases	22 (95.62%)
4	E-Question Paper	3 (13.04%)
5	Online Newspaper	3 (13.04%)
6	MOOC	4 (17.39%)
7	Video Lecture (NPTEL)	8 (34.78%)
8	Plagiarism Software	19 (82.61%)
9	E-theses & dissertations	10 (43.48%)
10	E-Newsletter	2 (8.70%)
11	Other Open Digital Library	13 (56.52%)

E-resources



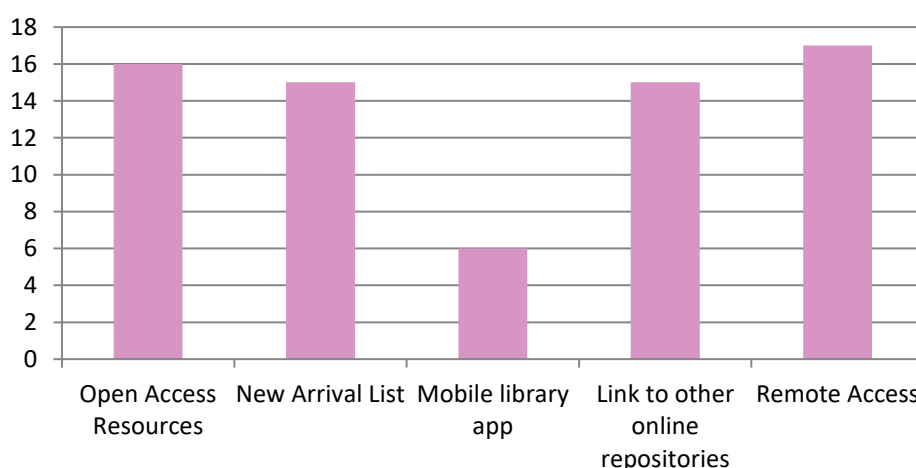
5.9 Value-Added Service:

Every institution requirement to make an effort to offer its users value-added services. This will be very helpful in drawing people to the library. Value-added services offered on IIT library websites based on five criteria are listed under Table 10. According to the study, IIT Dhanbad, Varansi, Bhubaneshwar, Bombay, Delhi, Gandhinagar, Goa, Hyderabad, Indore, Jammu, Jodhpur, Kanpur, Madras, Mandi and Ropar the list of new arrivals. IIT Dhanbad, delhi, Gandhinagar, Indore, Jammu and Jodhpur provide mobile app services. Open access resources information does not exist on the library websites of IIT Dharwad, Guwahati, Jammu, Jodhpur, Kharagpur, Kanpur and Patna. Link to repository provide by 15 IITs library website. Remote access services are not available on the websites of IIT Bhilai, Dharwad, Guwahati, Kharagpur, Ropar and Tirupati. IIT Dharwad and Kharagpur not provide by any value-added services.

Table 10: Value added services

S. No.	Criteria	Frequency (N=23)
1	Open Access Resources	16 (69.57%)
2	New Arrival List	15 (65.22%)
3	Mobile library app	6 (26.09%)
4	Link to other online repositories	15 (65.22%)
5	Remote Access	17 (73.91%)

Value added services



5.10 Web 3.0 Tools:

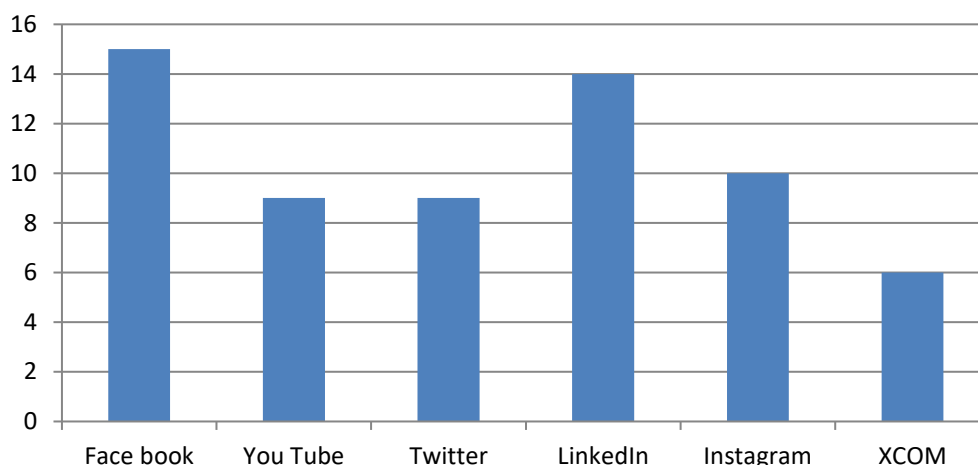
Web 3.0 tools are widely used for communication and information sharing, making it easier to reach a broader viewer. Table 11 highlights the Web 3.0 tools available on the official websites of various IITs. IIT Dhanbad, Bhubaneshwar, Guwahati, Kanpur, Indore, Madras and Mandi library websites not provide the information on web 3.0 tools. The study reveals that only

fifteen IITs library have included links to their official Facebook pages on their website. Additionally, IIT Varanasi, Delhi, Dharwad, Goa, Hyderabad, Jodhpur, Kharagpur, Palakkad and Roorkee have integrated their official YouTube channels on their respective websites. IIT Bhilai, Bombay, Goa, Jammu, Jodhpur, Khargapur, Palakkad, Patna and Tirupati offers lint to the Twitter. LinkedIn pages are featured on the websites of IIT Varanasi, Bombay, Delhi, Dharwad, Gandhinagar, Goa, hyderabad, Jammu, Jodhpur, Kharagpur, Palakkad, Roorkee, Ropar and Tirupati. That only ten IITs-Varanasi, Bhilai, Delhi, Gandhinagar, Goa, Hyderabad, Jodhpur, Kharagpur, Roorkee and Ropar have included links to their official Instagram pages on their websites. Similarly, IITs in Varansi, Delhi, Dharwad, Gandhinagar, Hyderabad and Roorkee provide links to their XCOM pages. By incorporating these Web 3.0 tools, IIT libraries enhance their digital presence and engagement with users.

Table 11: Web 3.0 Tools

S. No.	Criteria	Frequency (N=23)
1	Face book	15
2	You Tube	9
3	Twitter	9
4	LinkedIn	14
5	Instagram	10
6	XCOM	6

Web 3.0 Tools



6. Suggestions:

Based on the conclusion of this study, the following recommendations can be made to improve the design, convenience, and effectiveness of IIT library websites:

- To improve access, the website of each IIT site must have a clear direct director for library pages. The navigation line will guarantee that Guardians can find library materials with just a few clicks.
- Wide details of library teams, such as books, magazines, surveys, newspapers and reference materials, should be available on their websites. The user's busy will be increased by adding and updating information on advisory selection, infrastructure facilities and library rules and regulations.
- Book reservations, renewal services, and suggestions for book purchases should be extra to more IIT libraries. To help more people, book banks and interlibrary loans (ILL) should be expanded.
- E-resources such as E-journals E-books, plagiarism detection software, and online newspaper links should be made accessible across all IITs. Access to MOOCs, video lectures (NPTEL), and digital repositories should be prioritized.
- Social media pages such as Facebook, Instagram, LinkedIn and Twitter should be actively used by IIT libraries to improve user engagement and communication. AI interest chatbots, Virtual Library Tour and real-time HELP features are examples of interactive Web 3.0 tools that should include several libraries.
- To allow the protector to reach the library's resources from anywhere, the IIT libraries must provide external access to their digital collection. In order to activate easy access to library services, a special mobile application must be created.

7. Conclusion:

The study highlights the current status of the IIT library sites and their matches to fit modern digital library standards. Although some libraries have made great strides in creating websites

that have been organized and packed with content, there is still room for improvement. IIT library sites can be made more user -friendly and resourceful by improving accessibility, updating materials, adding digital resources and including Web 3.0 tools.

IIT libraries can increase their work as information centers and guarantee easy access to knowledge of researchers, faculty and students by implementing these proposals. To improve your online appearance, future studies can check the use of user satisfaction and the effect of web 3.0 devices in IIT libraries.

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