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Content Management Analysis of Indian Institutes of Science Education and Research (IISERs) libraries: A Comparative Study.

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ABSTRACT

This study aims to discover the most suitable framework used by the libraries in institutes of Higher education. Design/methodology/approach – We have adopted the online survey method to analyze the services and resources which are being offered. The study also emphasizes the usability of resources. A deep immersed checking has been done to check the hypertext links given at each IISER Library's website in form of percentage and natural numbers. While making observation broadly six research questions have been formulated covering of all areas of knowledge management, the study tried to find suitable answers to formulated questions. The analysis also explored the similarity and differences of services at all seven IISERs Libraries. The social networking websites are become second arm of any organization which are engage in community based services, it is interesting how main library website increasing its presence in public domain using social networking tools. Findings – The findings comprise that although the targeted community of libraries and organizational structure are the same yet there major differences in the website structure of all seven libraries. A complete harmonization might provide better services to patrons. Research limitations/implications – The study is based on the observation method hence the concrete conclusions are not possible. The Links at websites are dynamic in nature and change frequently with time and need. An online free web checker tool has been used to analyze the links that may provide false results some time. This study is exploratory and no respondents have been contacted consequently generalization is ambiguous. Practical implications – The study can help web developers and Librarians to restructure their web content page to provide more flexibility to the targeted academic community.

Keywords-

Library, Digital Library, Digital repository, Academic integrity, Plagiarism, Academic Honesty. RSS, Blogs, Tagging, Research Management, Citation and Indexing.

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INTRODUCTION

Indian Institutes of Science Education and Research (IISERs) across India keep a significant place in academics. The innovative technological advancement made them leaders in the area of research and innovation. In recent years, beyond the course curriculum, the IISER institutions across India have included that knowledge disciplines which were not an integral part of the academics skeleton earlier. Being an essential partner of the academic system, libraries of these institutions need to be strengthened to provide services to its members.

In India, the Indian Institutes of Science Education and Research (IISERs) keeps national importance which promotes research and innovation in engineering and applied sciences. This organization was established in 2010 by an act of Parliament, to provide a quality education through campuses situated across India. Seven institutions are working under this organisation. These institutes are speeded over many cities such as Pune, Kolkata, Mohali, Berhampur (Orissa), Tirupati, Kolkata, and Bhopal. Not only does it provide education and research to students and associated academicians but it also plays a fundamental role in providing scientific solutions to all associated bodies nationally and internationally, which includes the government department, research organizations and labs etc.

IISER Institutions in India

Name	Short Name	Year of Establishment	City / Town	State/UT	Website
IISER Berhampur	IISER-BPR	2016	Berhampur	Odisha	www.iiserbpr.ac.in
IISER Bhopal	IISER-B	2008	Bhopal	Madhya Pradesh	www.iiserb.ac.in
IISER Kolkata	IISER-K	2006	Kalyani	West Bengal	www.iiserkol.ac.in
IISER Mohali	IISER-M	2007	Mohali	Punjab	www.iisermohali.ac.in
IISER Pune	IISER-P	2006	Pune	Maharashtra	www.iiserpune.ac.in
IISER Thiruvananthapuram	IISER-TVM	2008	Thiruvananthapuram	Kerala	www.iisertvm.ac.in
IISER Tirupati	IISER-T	2015	Tirupati	Andhra Pradesh	www.iisertirupati.ac.in

Objective of Study

The all Indian institute of Sciences education and research are having good libraries. They all serve the academic community through the latest information management tools and have developed the content management portals which is integrating various information management sources such as databases, e-journals, e-resources, print and non-print resources etc. Although the serving community for all the member institutions is the same up to a great extent yet their libraries website organisational structure is very different. The location and course curriculum and information need draw great influence in the development of a website, yet a minimum set of a protocol is required so that harmonisation in information management can be established. The purpose of this study is to discover the minimum set of protocols which a technological institution's library should adopt. The other aim of the study is to detect those areas in which improvement can be applied.

Literature review

Various studies have been imparted in the past to explore the optimum utilization of library WebPages of technical institutions. Shambhu Nath Sahoo and Krishna Kumar panda revealed the fact in his work that although libraries of IITs are good in providing academic content only 4 libraries were providing navigation links to other libraries. They also found that only 14 libraries' web portals were having proper domain names and information on legal issues such as copyright while only one website was showing the date of periodical updating. (Philosophy & Sahoo, 2019). Charlene L. Al-Qallaf & Alaa Ridha pointed out many common practices and differences of academic library websites. They examined almost 83 different web features of different library portals. The main features were design, navigation link, library service through web links etc. They found that many academic libraries have common basic navigational systems and functional web design but they have not fully utilized the potential of web-based services yet. The common characteristics of these websites were giving high priority to the digital collection while low importance to instructional tools. In his conclusion, they found that the website should be user-centric and should fulfill the needs of the mother

Institution. They also emphasized that in the present environment it should be mobile-friendly. Live chat is another flaw which needs to be maintained to fulfill the instant need of the user. Digital repositories are in great demand these days and should be part of library portals. A unique way to judge the performance of portals is imparting a usability test. (Al-Qallaf & Ridha, 2019). Wakimolo conducted a survey of library portals using graphic designs he found that no formal guideline or approval process and committee for design were determined while best practices graphic designs were being used by few librarians. He also pointed out that many of his respondents were unsure of what should be adhered to while framing graphic design for library websites (Wakimolo, 2016).

In the work "Web content and design trends of Alabama academic libraries," Wilson found that many good academic libraries are offering more online services while they are missing the basic web design and standard of Accessibility. He pointed out that websites are missing one important feature that is the multilingual content display, however, content data of the study was gathered within three clicks on the home page. According to him, many websites are developed by self-taught librarians rather than professional developers. He emphasized the awareness of library design and standards of accessibility so that in future developers could improve website design. (Wilson, 2015). Aharony conducted a study on American academic libraries. He found that libraries of academic institutions have changed their portal very much in the time frame of 2000-2010; the use of web 2.0 technology is much in demand while graphics on WebPages are getting more space on the web. Aharony recommends some essential features such as "ask the librarian", a section for frequently asked questions, site search etc. (Aharony, 2012). Qutab and Mahmood stated in his work "Library web sites in Pakistan: An analysis of content Program" that websites in developing countries are being developed to meet the organisation requirements instead of an academic promotion. They found in their study that there was a lack of categorisation of content even in top-ranked web portals. They have also pointed out that too much information on the home page should be discouraged. They have suggested that LIS schools must include the web development content in their LIS curriculum. (Qutab & Mahmood, 2009) Like Al qallaf and Ridha, Qutab and

Mahmod are also emphasized to check the usability of web portals in addition to user-centric studies. In one month, Wilson discovered so many interesting things such as the content organization of methods, multi-language reflection etc further he raised many genuine questions of usability and design of websites. His study was focused on some important research questions e.g. which link of the database should be provided, or which social media tool should be accessible through the library website, the presence of OPAC at the home page. Whether instructional (such as citation guides, or research guides) resources are published on the website or not e.g. the study was organised by Jeanne Buke's Higher Education directory and Website of Alabama College.

Research methodology

Seven institutions are functioning under the Indian Institutes of Science Education and Research (IISERs). They all are having libraries and information centers. The study explores answers to the following research questions through observation methods.

Research Question 1

How easy is it to access the Library page or Website?

The library homepage provides a first page which provides an overview of usability and accessibility. These days' users usually do not hold traffic on websites until it serves some purpose of usability hence accessing the home page through institution's website and Google indexing is also important every institution's library wants to reach audiences as many as possible in the shortest period and effort. Academicians rely on websites which are accessible, nevertheless to say if libraries are unable to understand the needs of users, then it will lose its credibility. Web accessibility means preparation and development of websites in such a way so that everybody can be accessed through a seamless way. Lack of required capabilities or competencies would further weaken the utility of the web. The preservation, navigation and interaction is the key factors while determining the easiness of the Web.(*Introduction to Web Accessibility | Web Accessibility Initiative (WAI) | W3C, 2020*).

In the digital era, people use different machines to access the web, users' priority of accessing the web might be different. It's much more dependent on the user's convenience, economic strength and band quality. In terms of access, the digital divide also plays a key role. It is a perceived restriction in knowledge access and based on prevalent notions of hardware and software availability (Lei & Zhou, 2012).

This study will find out easiness in the accessibility of the Library's home page of all seven member institutions. The study is performed on five major fundamentals of accessibility. These are 1. retrieval of Lib link through most popular search engine "Google". 2. Accessing the library website/webpage through the link available at Mother Institution's website 3. Accessing Library content page in minimal efforts (Three Clicks). 4. Whether the library has a specific URL or separate domain name for easy recall. 5. Language of Website/Webpage and language of the page. Table 1 Shows findings of observation-

Web Accessibility

Table - 1

S. NO	Category	IISER Bahram pur Library	IISER Bhopal Library	IISER Mohali Library	IISER Pune Library	IISER Thiruvananthapuram Library	IISER Tirupati Library	IISER Kolkata Library
1	Retrieval of Library link through "Google"	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Whether library Link is available at Institution's main Website	No	No	No	No	No	No	No
3	Accessibility under three clicks	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	Whether Library has a specific domain name?	No	No	No	No	No	No	No
5	Language of website/webpage	Eng	Eng	Eng	Eng	Eng	Eng	Eng & Hindi

The table-1 outcome tells us that all seven (100%) Libraries are accessible easily through popular search engine Google. 85% member libraries can be

accessed through link under dropdown menu "Facilities" while only one library (IISER - Thiruvananthapuram) can be reached at the direct link at the Home page of Institution's website. Likewise only IISER Pune library and IISER library Tirupati have specific names of libraries while all other institutions have not mentioned any proper name for their libraries. The remarkable observation is that none library has any separate URL or domain name for the library. However, library services are being offered through separate web pages associated under link "facilities" in the main web portal of parent institutions.

Research Question 2

Up to what extent Credibility of Authority and Currency stands?

Dudek has suggested a minimum of five parameters to decide the credibility of a webpage or website. These are accuracy, authority, objectivity, currency and coverage. (Dudek, 1998)

Accuracy- The responsible person behind webpage and Contact address, the purpose behind the creation of a web page.

Authority- Who published web page; whether the publisher is different than the webmaster.

Objectivity- For what purpose a web page has been made, does it fulfil all the needs of potential users.

Currency- the time of development of a website or webpage, the last updated time and date, up to what extent links are updated, are there any dead links on a web document? Is there any outdated link? Whether the URL is unique or it is part of the mother institute's library website.

Converge- is there any specific skill, browser or software is required to access web content?

On these bases of five above mentioned parameters. Table 2 is showing attributes of all seven IISER libraries

Table-2

S.No	Category	Frequency	Percentage
1	Accuracy	7	100
2	Authority	7	100
3	Objectivity	7	100
4	Coverage	7	100

Taking into consideration fundamentals such as the purpose of making web content and contact address, it has been found that all libraries (100%) have a candid approach in mentioning the objective of libraries webpage. Although contact address is one of the important attributes behind accuracy yet 85.7% libraries have mentioned institution's contact details instead of principle person for library page while 33% libraries have used librarian and other staff as the principal authority.

In all seven observed libraries, the publisher of the web page is the parent institute. Since no additional webmaster description has been given hence, it is presumed that the developer of the institute's website is also a responsible authority for library webpage. While seeking answers for “Objectivity” one needs to put a question that is “Why”. Simply seeking an answer to Why elaborate the answer to what purpose a particular website or webpage has been made. The library webpage delivers the implicated aims of library functionality by the help of balanced and biased free approach; further, these qualities provide guidelines of working in a more precious way.

All IISER libraries have focused on a “About the Library” while “Objective” of the web page could not get any separate web space, might be the objective of the webpage was partially covered in the section "About the Library". Webpage of all seven libraries has been tested with different browsers, which are being used by most of the users. The observation has been carried out on three different browsers e.g. Google Chrome, Mozilla Firefox and with Opera. All institutions' webpage seems compatible with these browsers and no significant difficulty or compatibility issue observed. Patrons of the library did

not give any guideline or advisory issued by publisher or developer found for compatible browsers or any other technical requirement.

Table 2.1

Currency

S. NO	Currency	IISER Berhampur Library	IISER Bhopal Library	IISER Mohali Library	IISER Pune Library	IISER Thiruvananthapuram Library	IISER Tirupati Library	IISER Kolkata Library
1	Date of Web page creation	No	No	No	No	No	No	No
2	Last update date and Time	No	No	No	No	No	No	No
3	Dead link/Outdated Link	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	URL is unique	No	No	No	No	No	No	No

Table 2.11

Active Links/ Broken Links

S. No	Institute	Scanned Link	Error Link	Percentage
1	IISER Berhampur Library	205	5	2.4
2	IISER Bhopal Library	242	11	4.5
3	IISER Mohali Library	91	4	4.3
4	IISER Pune Library	96	2	2.08
5	IISER Thiruvananthapuram Library	180	9	5
6	IISER Tirupati Library	122	4	03.2
7	IISER Kolkata Library	164	14	08.5

To make the credibility of web page currency is one of the major attributes which contains the answer "Are the links are up to date?" Figure 2.1 illustrates the updated links as well as broken links in between 14th November 2020 to 20th November 2020.

The state of art online broken link tool “ [Dead Link Checker](#)” has been used to count active and broken links. The table revealed that IISER Library Kolkata contains the maximum broken link (8.5%) while the IISER Library Pune has least no of broken links in its website (2.08%). IISER library Berhampur (2.4%) keeps the second position in terms of least broken links among all seven IISER libraries. IISER library Tirupati (03.2%) is third in this category followed by IISER Library Mohali (4.3%) and Bhopal (4.5%).

The library web page is part of the Parent institutions website, therefore while counting of webpage parent institutions links (Available on Library’s web page) is also checked. The percentage matrix is just showing broken links at a glance and is highly dependent on the number of links given on the webpage and corresponding broken links.

Research Question 3

Information services and resources provided by member libraries?

Table 3

	S. No	Library information services and Resources	IISER Berhampur	IISER Bhopal	IISER Mohali	IISER Pune Library	IISER Thiruvananthapuram Library	IISER Tirupati	IISER Kolkata
			Library	Library	Library			Library	Library
Information Services and Resources	1	Library OPAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2	Reference Services	Yes	Yes	Yes	No	Yes	Yes	Yes
	3	Citation and Referencing Services	NO	No	No	NO	Yes	Yes	Yes
	4	Ask the Librarian	No	Yes	Yes	No	No	No	No
	5	List of Reference tools	No	No	Yes	No	No	Yes	No
	6	Newsletter	No	No	No	No	No	No	No
	7	Plagiarism Checking services	No	No	No	Yes	Yes	No	No
	8	Document Delivery Services	Yes	Yes	Yes	Yes	No	No	No
	9	How to use Library: Tutorial	Yes	Yes	Yes	Yes	No	No	No
	10	Information about printed Magazine, Journals and Newspapers	Yes	Yes	Yes	Yes	No	Yes	No
	11	Collection information	Yes	Yes	Yes	Yes	No	Yes	Yes
	12	Frequently ask Question	Yes	No	Yes	No	No	No	No
	13	Current Awareness Services	No	Yes	Yes	Yes	No	No	No
	14	Information of library policy/Rules	Yes	Yes	Yes	Yes	No	Yes	No
	15	Library Staff description	Yes	Yes	Yes	No	No	Yes	Yes

Table 3 is showing library and information service based on 15 different elements. The study finds out that all IISER Libraries (100%) have provided OPAC link through library webpages while equal importance has been given to reference service. Only 42.85% of Libraries has given weightage on the citation. Two out of seven libraries have put feature "Ask the Librarian" in the main menu of the webpage while IISER Library Mohali has pointed out "reference tools". None library was offering Newsletter during the observation period. The services related to Plagiarism is one of the most sought services these days, 28.5 libraries have given to emphasis through the related link at

Library webpage. Out of seven, three libraries (42.8%) highlighted document delivery services; the same percentile is applicable with service related to library use. Maximum libraries (71.4%) have put the information about newspaper and magazine on their webpage. The common community documentation (FAQ) has not got enough webspace, only 25.8% of libraries have highlighted this feature. The mass awareness method (CAS) has got enough space as it has been providing by 42.8% library. With 71.4% data, library rules and library staff description have got good space as compare to other services

Research Question 4

Which hyperlinks and navigation are highlighted or in high priority?

Table-4

	S. No	Navigation Links	IISER Bahrapur Library	IISER Bhopal Library	IISER Mohali Library	IISER Pune Library	IISER Thiruv anthapuram	IISER Tirupat i Library	IISER Kolkat a Library	Percentage
Navigation links	1	Link to other IISER library	No	Yes	No	No	No	No	No	14.8
	2	Link to OPAC at Home page/main page of Library	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
	3	Link to Institutional Repository	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
	4	Link from Header Image or Logo	No	No	No	No	No	No	No	0
	5	Navigation to E-Books	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
	6	Link to Database (Subscribed)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
	7	Link to Open Access Database	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
	8	Link to E-Newspapers	Yes	Yes	Yes	No	No	No	No	42.8
	9	Navigation to research manager tools	No	No	No	No	Yes	No	No	14.8
	10	Link to open access journals	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
	11	Linking of NPTEL Websites.	No	No	No	No	Yes	No	No	14.8
	12	Collection information	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
	13	Linking to the National Digital Library (NDL)	No	No	No	Yes	Yes	No	No	28.5
	14	Linking to DELNET	No	No	No	No	No	No	No	0
	15	Link to Plagiarism Tools	No	No	No	No	Yes	Yes	No	28.5
	16	Link to Academic integrity Policy	No	No	No	No	No	No	No	0
	17	Link to Shodhganga	No	No	No	Yes	Yes	Yes	No	42.8
	18	Link to external Science and Research bodies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
	19	Link to tools of Social Networking websites	No	No	Yes	No	No	No	Yes	28.5
	20	Link to download Mobile apps(IF any)	No	No	No	No	No	No	No	0

Table-4 brings very interesting trends of library's connection with the outer world. Based on twenty sets of linkage, it has been found that few links such as OPAC, Institutional Repository, linkage to paid/open databases, Journals, information to collection and resources and linkage to external research bodies are prevalent and being provided by all libraries. Elements such as academic integrity policy, linking to Mobile apps, services provided by DELNET etc. have secured zero percentile despite contemporary academic expectations. The study revealed that only one library has highlighted linking to other IISER Libraries. NPTEL and awareness of research manager could not get highlighted while expected. Linking to social networking sites and shodhganga has to grab moderated space in terms of links.

Research Question 5

Which Web 2.0 tool is a priority for members' libraries? Most popular tool.?

The site which holds web 2.0 tools is a hallmark of good quality. It deeply immerses users with a content management system and gives real-time feedback. (Paramjeet K. Walia & Gupta, 2012). In a study web, 2.0 tools and their use in libraries the fact revealed about web 2.0 as influencing how people learn and access information, communicate with each other in a participative manner.

Apart from real-time community interaction, it has some added advantage which is necessary for any library to identify the need of library users.. Since web 2.0 technologies provide additional facilities such as sharing, hyper linking and tagging hence it's sharpening the method of information delivery to multiple users' simultaneously.

Although there are many web 2.0 technologies are being used by libraries, yet this study has found out seven major emerged technologies. These are Blogs, Wikis, Tagging and Social Bookmarking, RSS and Syndication, Mashups and Social networking sites, Podcasting/Audio Blogging,

Table-5

S. NO	Web 2.0	IISER Berhampur Library	IISER Bhopal Library	IISER Mohali Library	IISER Pune Library	IISER Thiruvananthapuram Library	IISER Tirupati Library	IISER Kolkata Library	Percentage
1	Ask a Librarian	NO	Yes	Yes	N o	N o	N o	No	28. 5
2	Blogs	No	No	No	N o	N o	N o	No	0
3	Wikis	No	No	No	N o	N o	N o	No	0
4	Tagging/Social Bookmarking	No	No	No	N o	N o	N o	No	0
5	RSS	No	No	No	N o	N o	N o	No	0
6	Social Networking sites	No	No	No	N o	N o	N o	No	0
7	Podcasting/Audio Blogging	No	No	No	N o	N o	N o	No	0

Since web 2.0 technology does not require any specific competencies from users hence it gives equal opportunity to web users to share ideas to rest of the world. The study revealed interesting phenomena as there are least attention on this participative technology. Only 28.5% IISER library are using “asks a librarian” digital platform while rest is untouched.

Research Question 6

What emphasis has been given on library websites about academic integrity and tools to maintain it?

Respecting the other's intellectual work by acknowledging is the central theme for any academic institution. In the time of digital world gathering information across the world is a simple task and is available on few clicks. The intellectual property includes any type of patents, copyrights, images, text, audio or video etc. in higher education educational institutions this phenomenon is more important. A researcher can adopt any type of malpractices to produce his/her work. These are mainly Plagiarism, Collusion, Paraphrasing, etc, information literacy is another

important task which needs to be given attention while carrying research project. "What to do and what not to do" is the prime responsibility of academicians including library and librarians. Many types of research particularly students usually unaware of such moral ethics and very often they do mistake in the process of research unintentionally. Consequently, the result proves devastating for all associated entities.

On July 31, 2018, the Govt. of India has issued a notification named as "Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions" and the same has been adopted by University grants commission too. According to this regulation plagiarism in any percentage and in any form is unacceptable and any such act is liable to reject with adequate punishment.

This article will explore topics covered by IISER libraries, and will explain those areas of academic integrity which need to be strengthened. Academic integrity policy, awareness of plagiarism, a plagiarism tool, Citation method, Referencing tools and punishment related to plagiarism are the key parameters in process of observation.

Table-6

S.NO	Web 2.0	IISER Berhampur Library	IISER Bhopal Library	IISER Mohali Library	IISER Pune Library	IISER Thiruvananthapuram Library	IISER Tirupati Library	IISER Kolkata Library
1	Academic integrity policy	No	Yes	Yes	No	No	No	No
2	Plagiarism tutorial	No	No	No	No	No	No	No
3	Plagiarism Tools	No	No	No	No	Yes	No	No
4	Citation Method	No	No	No	No	No	No	No
5	Referencing tools	No	No	No	No	No	No	No

Table 6 explains that only two institutions have highlighted academic integrity policy in form of library guide, though it is not enough. Interestingly only one library has highlighted the tool of plagiarism. While other associated aspects have not got privilege in web development of the library.

Conclusion

This study is based on the observation method which was carried out from 10th November to 20th November 2020. Although all precautions have been taken in process of observation yet errors are possible as human incompetence's. Furthermore, all IISERs library does not keep any separate website hence parent institutional web links encroached content sometimes which is unavoidable.

The finding of study reflects much positive aspect which all libraries are carrying. Interestingly all library are automated and having institutional repositories and the same has been pushed by UGC by many years. The area which needs to be more attentions are-

- Libraries should offer content data in the Hindi language too.
- In current knowledge world updating of links, provided at webpage should be checked periodically and need to be an update or replaced.
- Being a common curriculum, these libraries keep the almost common audience. There should be greater cooperation among libraries. The resources would be more utilized if they could develop a single gateway of resources location.
- In general Academic honesty is a common responsibility for people associated with the organization, while libraries are leading department which can disseminate honesty at the mass level. There should be more emphasis on such policy through every possible way including WebPages.
- The digital world is nothing in itself until the mass level of active participation with the organization could not be evolved. The web 2.0 technology and uses of social networking heal this gap. The Libraries should give more space to such interaction while developing WebPages for them.

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