LIBRARY WEBSITES EVALUATION OF HIGHER EDUCATIONAL INSTITUTES (HEIS) OF INDIA: A WEB ANALYSIS

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Abstract *The study aims to examine the performance of top twenty library websites of higher educational institutes of India. The study had evaluated Ahrefs Rank, Referring Pages, Referring Domain, Back Links and Crawled Pages of select library websites. The study has focused on two objectives and hypotheses. Ranking Web of University, July 2017 have been considered for top twenty higher educational institutes of India. Ahrefs, a web analyzer has been considered for the study. The data collected from Ahrefs has been analyzed and tabulated to reveal the findings in accordance with the desired objectives. One way ANOVA and Spearman's RHO Correlation were used for statistical analysis. IIT Kharagpur library website secured the first position whereas TIFR, Mumbai library website secured the last among the twenty library websites.*

Keywords: *Web Analyzer, ANOVA-Test, Pearson Correlation, P-Value, F-Value, Suo Motu Disclosure*

INTRODUCTION

The World Wide Web has become the popular communication tool for accessing and sharing information on the internet. The easiest way for disseminating and communicating the information is through the publication on the websites. Website helps in accessing the universe of knowledge across the globe (Babu, Kumar & Gopalkrishnan, 2009). Website has the capability to bring a paradigm shift in higher education through rapid technological advancements leading to shift from information society to knowledge society ("Towards Knowledge Societies," 2002). Libraries are no exception when it comes to the requirement of the websites. The development of library website was started way back in the 1990s. As soon as Mosaic, the world's first web browser, was released in 1993 academic health science libraries began developing websites (Brower, 2004). Library website acts as an open forum for the community. The well equipped library website is the mirror of the library and its services (Konnur, Rajani & Madhusudhan, 2010). Library website has changed both the means of communicating with the users and the nature of the service itself, along with the entire set of professional tools used by the librarians. It is a digital gate to library services and resources (Salisbury & Griffis, 2014). Library websites are specifically being used in abundance by different kind of users within and outside the campus as well (Arshad & Ameen, 2015). A well updated library website should provide online information about traditional library collections and services, access provision to online resources, performing information services online, guide and educate users, communicating space management for library users (feedback and lodging complains), promoting the library and its website (Mierzecka & Suminas, 2016). Library website should communicate library mission statement and allows better understanding to the stakeholders (Kuchi, 2006). The library website is the primary source of information for their users. The important part of any website is that, it should be up-to-date and information should be easily accessible (Verma & Devi, 2016). Various institutions have developed their library websites that provides information regarding various facilities, resources and services offered to their users in order to fulfil their information requirements. From above discussion it is clear that library websites have become an absolute necessity. It is essential to critically assess the quality of library websites to meet its needs (Dragulanescu, 2002). To assess the websites webometric tools and techniques are required.

WEBOMETRICS AND WEB ANALYZERS

Almind and Ingwersen (1997) coined the term 'Webometrics'. According to them, "The application of informatics methods

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to World Wide Web (WWW) is also called webometrics". Thus, informatics is the research into information in a broad sense and is not only limited to scientific communication whereas webometrics is the approach which covers research of all network based communication using informatics or other quantitative measures. Bjorneborn and Ingwersen (2001) outlined a concept in new directions of webometrics for performing knowledge discovery and issue tracking on the web, partly based on bibliometric methodologies used in bibliographic and citation databases. However, they provided the definition of webometrics in their paper entitled, "Towards a basic framework for webometrics" which was published in 2004. As per this definition, webometrics is the study of quantitative aspects of the construction and use of information resources, structures and technologies on the web drawing on bibliometric and informetric approaches. Webometrics involves the study of the web through which one could analyze the number of hyperlinks, their type and structure of the hyperlinks, website usage and effectiveness.

Web Analyzers are webometrics techniques used for evaluating websites. They evaluate those indicators which couldnot be evaluated by human eyes. Thus, they help to get insights into the performance of the website. Web analyzers assist in optimizing site performance by eliminating navigational bottlenecks, identifying best sources of acquisition and help to gauge traffic. They also provide a list of errors that were detected on web pages, get valuable reports and statistics about the websites. There are a number of online web analyzers to evaluate websites. They keep a track on the websites and their problems. They also investigate backlinks, broken links, external and internal links, page speed, load time, mobile compatibility, domain age, keyword consistency, Search Engines Optimization (SEO) tools, hit counts, etc. ("Web Analytics Definitions - Digital Analytics Association," 2007). Some of the web analyzers are Sitebeam, GT Matrix, Ahrefs and Woorank. The study evaluated top twenty HEIs of India through Ahrefs.

REVIEW OF LITERATURE

Pechnikov and Nwohiri (2012) debated about the web space built on a set of the University Websites of Nigeria. Bee-Bot Crawler was used to scould the target websites in order to create a database of external hyperlinks. The investigation revealed a weak set of official websites of Nigerian Universities. The only web communicator to the university websites was National Universities Commission of Nigeria. The study concluded with some recommendations to the management and IT experts of Nigerian Universities. It was suggested that all the Nigerian Universities should switch to the use of edu.ng as their Top Level Domains. Web resources of Nigerian Universities should recognize in search engines for further improvement in connectivity of the academic web space.

Jeyshankar, Sujitha and Valarmathi (2013) took websites of ICMR institutes for their study. They calculated web page size, WAVE Web AIM Accessibility Error; various search engine performances, the difference between pages in various time intervals and a number of rich files. The paper also presented the Link Network Diagram of ICMR Institutes using Pajek software. The paper concluded that there was a necessity of global level scaling of all the tools which were used for website evaluation and further ensured the website designer to design according to the parameters.

Tafaroji, Tahamtan, Roudbari and Sedghi (2014) studied webometric analysis of websites of Medical Universities of Iran. The study was conducted in September 2012 using Majestic SEO software and search engines like Google, Yahoo, and Bing. The number of web pages, in links and rich files were calculated for the forty-three Universities. Findings indicated a significant relationship between webometric universities ranking in Iranian Ministry of Health. The study further depicted that the use of rich files could be effective and shows a more reliable view of Iranian Medical Universities ranking. The research paper emerged with some suggestions to eliminate the barriers and improve websites of Medical Universities in Iran.

Mohammed, Garba and Umar (2016) discussed content of the library websites of 10 universities of Nigeria. A checklist was developed and analyzed during various intervals in the month of December, 2013. Data was presented in a tabular form in MS Word. It was found that physical holdings of these library websites were adequate. The study concluded some suggestions which were that there should be improvement in the librarian's skills in website development and enhancement of library curriculum in library schools to include website development.

Verma and Brahma (2017) explore the websites of ten central universities in North East India. The study calculated the link pages, the number of web pages and analysis the WIF of these universities. It was observed that the Tezpur University occupied first place with the highest Domain and Page authority, external equity passing links and total external links. While Mizoram University leads with the highest internal equity passing links, total equity passing links, total internal links and total links. It was found that

the WIF of Mizoram University occupies at top position with 83.54 SWIF, 52.731 WIF and 30.80 EWIF among other Central Universities in North East India.

RANKING WEB OF UNIVERSITIES (RWU)

Ranking Web of Universities (RWU) evaluates websites of universities of the world since 2004, by the Cyber Metric Lab Spanish National Research Council (CSIC). It is one of the largest academic website ranking of Higher Educational Institutions (HEIs) of the world. It provides ranking twice a year i.e.in January and July. The study has considered the library websites of the first twenty Higher Educational Institutions (HEIs) of India as ranked by the RWU in July 2017.

Institute Ranking as ranked by the RWU

Table 1: List of Top Twenty Institutions of India

Name of the University	Institutional Ranks
Indian Institute of Technology Bombay	1
Indian Institute of Technology Kanpur	2
Indian Institute of Technology Madras	3
Indian Institute of Technology Delhi	4
University of Delhi	5
Tata Institute of Fundamental Research	6
Indian Institute of Technology Kharagpur	7
Anna University	8
Panjab University	9
Indian Institute of Technology Roorkee	10
Banaras Hindu University	11
Jawaharlal Nehru University	12
Indian Institute of Technology Guwahati	13
VIT University	14
Aligarh Muslim University	15
Jawaharlal Nehru Centre for Advanced Scientific Research	16
University of Pune	17
University of Calcutta	18
International Institute of Information Technology Hyderabad	19
NIT Calicut	20

AHREFS

Ahrefs is a powerful SEO tool. It can test - Referring Domain, Referring Pages, Back Links, Crawled Pages and Ahrefs Rank. The detail of these tests is as follows.

5.A. Referring Domain - Referring Domain is a unique domain with a hyperlink pointing to a URL. A domain could have multiple referring pages and back links.

5.B. Referring Pages - Referring Pages are the number of pages with a hyperlink pointing to a URL. Referring Pages could have multiple links.

5.C. Back Links - The number of hyperlinks pointing to a URL are known as Back Links.

5.D. Crawled Pages - Ahrefs 'Crawled Pages Report' is a cloud based tool. It crawled all the pages of a website and analyse website architecture for common SEO issues.

5.E. Ahrefs Rank - Ahrefs ranking is a domain's rating relative to all the other domains on internet.

OBJECTIVES

1. To evaluate the features of select library websites through Ahrefs.
2. To measure the rank of select library websites.

HYPOTHESES

$H_0$1 There is no significant relationship between Institutional websites ranking with respect to Ahrefs Ranking of the select library website.

$H_0$2 There is no significant difference among indicators of Ahrefs of the select library websites.

RESULTS OBTAINED THROUGH AHREFS

Results obtained through Ahrefs are as follows. The following data has been collected from Ahrefs. This includes Referring Domain (RD), Referring Pages (RP), Back Links (BL), Crawled Pages (CP) and Ahrefs Rank (AR) of select library websites.

Table 2: Results Obtained Through Ahrefs for Library Websites of Select Institutions

Library Website URL	RD	RP	BL	CP	AR	Rank
library.iitkgp.ernet.in	162	11004	11121	494	5684	1
library.iitb.ac.in	214	7984	8003	63	18722	2
Cenlib.iitm.ac.in	266	30193	30280	119	23042	3
pkklib.iitk.ac.in	8	63	63	5	23183	4
crl.du.ac.in	395	15880	16265	12023	34629	5
library.iitd.ac.in	118	929	997	112	37518	6
annauniv.edu	56	35691	49541	137	55795	7
jnu.ac.in	93	161	184	109	65245	8
www.iiit.ac.in/institute/images/library	1094	31818	6363	52718	84869	9
lib.unipune.ac.in/	31	163	174	62	103040	10
caluniv.ac.in/libraries/library.html	12	84	84	2	134895	11
mgcl.iitr.ac.in	132	566	759	70	135170	12
library.puchd.ac.in	96	272	290	93	138214	13
vit.ac.in/academics/libraryoverview/1library	2821	113202	203598	10918	139944	14
bhu.ac.in	41	121	127	143	145660	15
iitg.ac.in	8	18	18	79	186267	16
amu.ac.in/amulib.jsp?did=10066	2069	20265	28410	16855	240259	17
jncasr.ac.in	1277	15806	17371	13496	323302	18
library.nitc.ac.in	8	298	298	66	382381	19
tifr.res.in	174	2918	3832	632	12596448	20

DISCUSSION AND FINDINGS

VIT Library Website has the highest number of Referring Domain i.e. 2821 and IIT Madras and IIT Guwahati Library Website has the lowest number i.e. 8. IIIT Hyderabad Library Website has maximum number of the Crawled Pages i.e. 52718 whereas University of Calcutta Library Website has found the minimum number of Crawled Pages i.e. only 2. Again, VIT Library Website has the highest number of Backlinks i.e. 203598 and IIT Guwahati Library Website has the lowest number i.e.18. Once again, VIT Library Website has highest number of Referring Pages i.e. 113202 and IIT Guwahati Library Website has the lowest number i.e. 18.

DESCRIPTIVE STATISTICS

Table 3: Statistical Analysis of Ahrefs Results

Statistics					
	Referring Domain	Referring Pages	Back Links	Crawled Pages	Ahrefs Rank
N	20	20	20	20	20
Mean	453.750	14371.800	18888.900	5409.8000	743713.3500
Median	125.000	1923.500	2414.5000	115.5000	118967.5000
Std. Deviation	772.317	26146.365	45483.186	12406.726	2791689.643
Minimum	8.00	18.00	18.00	2.00	5684.00
Maximum	2821.00	113202.00	203598.00	52718.00	12596448.00

NONPARAMETRIC CORRELATION BETWEEN THE RANKS

Hypotheses

$H_0$1 There is no significant relationship between institutional websites ranking with respect to Ahrefs ranking of the select library websites.

Table 4: Correlation Analysis of Ahrefs Results

Correlation				
			Rank among the twenty library websites	Rank
Spearman's RHO	Rank among the twenty library websites	Correlation Coefficient	1.000	.617**
		p-value	.	.004
		N	20	20
	Rank	Correlation Coefficient	.617**	1.000
		p-value	.004	
		N	20	20

**. Correlation is significant at the 0.01 level (2-tailed).

On using Spearman's RHO Correlati3on, positive significant relationship between the ranks among the twenty library websites was inferred (0.617). The null hypotheses has been rejected and alternative hypothesis has been accepted, as the p-value is less than .01 (level of significant).

Table 5: Correlation Between the Library Indicators

Correlation						
		Referring Domain	Referring Pages	Back Links	Crawled Pages	Ahrefs Rank
Referring Domain	Pearson Correlation	1	.871**	.869**	.156**	-.080**
	p-value		.000	.000	.000	.000
	N	287436	287436	287436	287436	287436
Referring Pages	Pearson Correlation	.871**	1	.989**	-.063**	-.117**
	p-value	.000		.000	.000	.000
	N	287436	287436	287436	287436	287436
Back Links	Pearson Correlation	.869**	.989**	1	-.179**	-.088**
	p-value	.000	.000		.000	.000
	N	287436	287436	287436	287436	287436
Crawled Pages	Pearson Correlation	.156**	-.063**	-.179**	1	-.071**
	p-value	.000	.000	.000		.000
	N	287436	287436	287436	287436	287436
Ahrefs Rank	Pearson Correlation	-.080**	-.117**	-.088**	-.071**	1
	p-value	.000	.000	.000	.000	
	N	287436	287436	287436	287436	287436

**. Correlation is significant at the 0.01 level (2-tailed).

On using Pearson Correlation, it was inferred that the Correlation of Referring Domain with Referring Pages and Back Links were highly positive with the Correlation Coefficient of 0.871 and 0.869 respectively. While Referring Domain has been poorly correlated to Crawled Pages with the Coefficient of 0.156 and negatively correlated to Ahrefs Rank with the Correlation Coefficient of -0.80. Referring Pages has been found out be highly correlated to Back Links with the Coefficient of 0.989, while poorly and negatively correlated to the Crawled Pages and Ahrefs Rank with Coefficient of -0.063 and -0.117, respectively. Back Links has been found out be negatively correlated to Crawled Pages and Ahrefs Rank with the Coefficient of -0.179 and -0.88, respectively. Crawled Pages were found out to be negatively correlated to the Ahrefs Rank with the Coefficient of -0.071.

$H_0$2 There is no significant difference among indicators of Ahrefs of the select library websites.

Test Applied - One way ANOVA

Table 6: Test Applied - One way ANOVA

Low		Rank			F-value	p-value
		Average	High			
Referring Domain	**Mean**	193.83	541.88	596.17	.466	.635
	Median	188.00	94.50	107.50		
	Standard Deviation	132.20	988.89	873.05		
Referring Pages	**Mean**	11008.83	22744.63	6571.00	.704	.508
	Median	9494.00	419.00	1608.00		
	Standard Deviation	11156.38	39574.23	9055.94		
Back Links	**Mean**	11121.50	32624.13	8342.67	.587	.567
	Median	9562.00	524.50	2065.00		
	Standard Deviation	11207.36	71146.74	11883.34		
Crawled Pages	**Mean**	2136.00	8013.63	5211.83	.360	.703
	Median	115.50	101.00	387.50		
	Standard Deviation	4846.70	18457.26	7793.39		
Ahrefs Rank	**Mean**	23796.33	107146.50	2312386.17	1.414	.270
	Median	23112.50	118967.50	281780.50		
	Standard Deviation	11492.45	34850.75	5038890.74		

Using one way ANOVA, it was found out that there is no significant difference between the ranks with respect to these parameters. The null hypothesis is accepted because p-value is greater than 0.05 (level of significant).

SUGGESTIONS

By placing links in the right place would reduce duplication of links. It would further reduce the size and could improve link number. Individual links could be grouped under broad categories so that user could access the pages in single click. There should not be any broken or duplicate links. Abbreviations and Acronyms should be spelled out wherever required. This would improve the aesthetics of site and ease to use. Also, important links should be placed at the top of the page because when page gets loaded the user would look at the top of the page first. Link Management served as an essential part for maintaining the website. Web pages should be written in proper html based texts so that search engines could able to scroll the website easily and the overall visibility of the website would increase. The web pages should have appropriate headings. Information provided on these web pages should be in a structured way with improved user interface. The library website should be tested by Web Analyzer on regular intervals. Design and content of the library website should be consistent i.e. heading size; font choice, colouring, button styles, spacing, design element and photo choice should be in an optimized state. Librarian should be given proper training regarding content strategy and evaluation processing of their library websites.

CONCLUSION

IIT Madras, IIT Guwahati and University of Calcutta had scored the least score in all the above tests. These library websites needs a good amount of improvement to enhance their scores in near future. Good score of website improve the ranking of the institution. Web Analyzers should be used time to time by various institutes so that their performance could be appraised. Librarians should be actively participating in evaluating their library websites after a due course of time. All the required information should be available on the library website. As per the Guidelines of Suo Motu disclosure under Section 4 RTI Act 2005, *"Every* public *authority should provide as much information suo motu to the public through various means of communications so that the public have minimum need to use the Act to obtain information. Internet being one of the most effective means of communication, the information may be posted on the website"*. Thus, library websites are supposed to disseminate each and every information widely and in a manner which is easily accessible to the users. The dissemination of relevant and user friendly information would increase the score of the library websites and further improves the ranking of their institution.

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