A Webometric Analysis of selected Institutes of National Importance Websites in India

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Abstract   It has been experienced that web based information resources have great role to play in academic and research activities. Keeping this fact in view information professionals are largely depending upon the web based information resources. A huge amount of data in every subject stream is available on different websites. Internet is a network of networks carrying information on almost any subject under the sun. Everybody today would like to be on internet because of wealth of information that lies there to be exchanged. And, with its global connections and millions of users, the internet is world's biggest electronic library and publish gathering place, which contain a vast amount of information. Information professionals and users face a number of challenges in networked information resources and service environment. But problem is only one that how to retrieve desired information. Many attempts were made and solution comes as 'webometrics'. In this paper an attempt has been made to describe this concept.

Keywords   Webometrics, Bibliometrics, Internet, Information Resources, UGC, Institutes of National Importance websites.

1. Introduction

"The web as a way of life" states that Internet users have come to rely on the vast amount of research and information content available, and often consult the web before making dramatic life changing decisions[1]. Web resources are apple of information professional's eye due to its value added services to meet their current and diversified information needs. In the World Wide Web (WWW), the web pages are the entities of information, with hyperlinks from them acting as citations. Quantitative analysis on the WWW is being carried out in the same way, as is tradition in citation databases. As information on web increases towards entropy, it's needed to apply some theory/metrics (measurement) to develop new methods, modeling techniques and metaphors to examine this emerging complex network. Through webometrics (by Almind and Ingewersen in 1997)[2] study one can observe that how users actually react and use specific web document. The web is in out of control in growth, which means opportunities exist where good system architecture and diligent analysis can be applied for everyone's benefit. On the basis of the study and conception the definition of webometrics is, "The webometrics study is based on quantitative measurement indirectly includes the qualitative aspect also – of structure, use of information resources and

technologies on WWW drawing on bibliometric and info metric approach"[3].

In the wake of globalization, the planners and top administrators are giving emphasis to revise the strategies in the higher education to manage up with the changing paradigm, redefining the education system to compete with the global requirements. The globalization has made a remarkable impact on academic education system and Internet is the constant source of energy for the institute to make its facilities and opportunities available globally. In order to achieve the goal, there is a need to have websites of each academic institute in order to perform well and stay in the competition. People come to a website to get information. Therefore, the primary goal of the institute's website is to prove information to its users. Prospective students may use institute website for choosing for their admission, to find out a particular course offered. Current students may look for semester examination schedule and results. Some students may download application form and prospectus. Some faculty members may search for job vacancy and benefits. Institute websites are increasingly used for wide variety of purposes like attracting new students, online library catalogue. In the case of research, institute website can broadcast existence research and promote individual achievement of individual, research group, departments and institutions as a whole.

Therefore, there is a high requirement to know the web presence of universities in general and Institute of national importance in particular. It is also required to measure the web impact through various WIFs using appropriate webometric indicators in order to enhance its efficiency through

optimizing web content, analysis and re-designing.

Ingwersen proposed the concept of Web Impact Factor to measure the impact of website. Most studies in the web impact of academic web sites have been carried out for data sets of university websites or department websites for departmental interlinks. The relationship between web impact measures and other measures like hyperlinks to organizations and research performance through peer-reviewed ratings or publication impact. Although some studies reflect that there is no signification correlation between general WIF and research rating for Australian universities[5] but Thelwall[6] showed that there is a high correlation between research ratings and four different WIFs calculated from several source domains for UK universities.

The web presence can be measured with the help of search engine's advanced facilities. Here, we have taken the help of Yahoo!, AltaVista and Google wherever required. The webometric analysis can be performed through the number of Webpages, number of rich files, number of inlinks and self-links. It can also be appropriate to see the number of Internet users, percentage of literacy, number of hosts, ICT literate and high-speed broadband facilities. Since students, teachers, institutions, government and general public are interested to know the rankings of institutes. The reputation of institutes cannot be precisely measured by numbers. It would be very difficult to get a comprehensive and reliable data set for qualitative ranking. An attempt has been taken in this study to rank selected institutes of national importance with the help of appropriate webometric indicators.

2. Web Evolution

Longitudinal or evolutionary studies take snapshots of the Web over a period of time and compare the results, looking for important trends. There are two types: those that study the results of search engines and those that monitor the Web directly. An example of direct monitoring is the study of Koehler, who monitored a set of pages existing in 1996 on a weekly basis until February 2001, using a program to download and analyze the pages[4]. The pages came from the random Uniform Resource Locator (URL) generator facility offered by a search engine of the time (Web-Crawler). He found that pages of different types had very different longevities. For example, in commercial sites, navigational page type tended to be periodically updated, but content pages were more likely to remain unchanged for long periods of time. Interestingly, the opposite was true for academic pages: content pages were the more likely to be repeatedly updated. A trend for increasing stability over time was also found: an old collection of pages should experience less change than a new one. Two large computing companies have combined to produce a very large-scale, but short-lived, longitudinal study through direct crawling[5]. The data set was 151 million pages, which were downloaded weekly for 11 weeks from December 2002 to February 2003. The experiment produced some interesting

results, including: trivial changes to documents that did not affect their contents (e.g., HTML tag changes) were very frequent; and large documents changed more frequently than small documents. Less surprisingly, the amount of change in pages was significantly affected by the page's top level domain, and pages that changed frequently were likely to continue to change frequently.

A different type of longitudinal investigation is that of Bar-Ilan and Peritz, who studied the evolution of the results sets of search engines for queries for the word ''informetrics'' from 1998 to 2003[6]. They found that almost half of the pages in the results lists disappeared or changed between consecutive data gathering stages: 1998, 1999, 2002, and 2003. These results were in fact more stable than for general web pages, which may indicate that academic information tends to fluctuate less in search engines than other kinds. Nonwebometrics research has also conducted longitudinal studies in the sense of tracking the loss of information on the Web. For example, Veronin tracked the attrition-rate of health web sites and Casserly and Byrd analyzed the disappearance of URLs cited in academic papers[7]. The latter study touches a point that is fundamental to academia. If an article's cited resources disappear from the Web, does this undermine the credibility of its findings? Finally, Web evolution has become an active research topic in computer science, under the name of Web dynamics[8]. This research area typically uses mathematical modeling and large-scale experiments over the Web to derive results that would be useful aids to algorithm design, for example, to help search engine ranking algorithms.

3. Higher Education in India

Higher Education in India is one of the largest and oldest systems of higher education found anywhere in the world. As of now there are 320 Universities, of which nearly 131 are of Affiliating Universities. Besides there are deemed universities, institutions of national importance, institutes and over 15500 colleges. Together they offer a wide range of degree and diploma programs across the length and breadth of the country. While universities, deemed universities and institutions of national importance are largely autonomous institutions entitled by law to design, develop and offer programs which they consider relevant and appropriate for the national needs, the colleges and institutes are expected to be regulated by the universities with which they are affiliated or associated with. Give the wide reach and variety of institutions and programs of higher education, a number of professional, coordinative and regulatory bodies and councils have also been established to ensure balanced and healthy growth of higher education in the country. Given below are the broad National Qualification Framework presently in vogue in the country.

3.1. UGC – University Grants Commission

The UGC, however, was formally established only in

November 1956 as a statutory body of the Government of India through an Act of Parliament for the coordination, determination and maintenance of standards of university education in India. In order to ensure effective region-wise coverage throughout the country, the UGC has decentralised its operations by setting up six regional centres at Pune, Hyderabad, Kolkata, Bhopal, Guwahati and Bangalore. The head office of the UGC is located at Bahadur Shah Zafar Marg in New Delhi, with two additional bureaus operating from 35, Feroze Shah Road and the South Campus of University of Delhi as well.

3.2. Deemed Universities

List of Institutions which have been declared as Deemed to be Universities (As on 23rd June, 2008) under section 3 of the UGC Act 1956 by Ministry of Human Resource Development, Government of India, along with their MHRD/UGC approved Off-Campus(s)/ Institution(s) under Ambit/Off-Shore Campus(s). Number of Deemed Universities is: 172 (source http://www.ugc.ac.in/inside/deemeduniv.html)

3.3. UGC Affiliated colleges

The University Grants Commission (UGC) provides financial assistance to eligible colleges which are included under Section 2(f)* and declared fit to receive central assistance (UGC grant) under Section 12 (B)** of UGC Act, 1956 as per approved pattern of assistance under various schemes. The number of colleges included under Section 2(f)/12(B) of UGC Act 1956 as on 31.3.2006 is 6014. Out of these, 5449 colleges have been declared eligible to receive central assistance, including UGC grants under Section 12(B)** of UGC Act 1956. Remaining 565 colleges are recognized under Section 2(1) of UGC Act 1956 but not yet declared fit for receiving central assistance as they do not fulfill the conditions laid down for such status.

3.4. AICTE – All India Council for Technical Education

Technical education in India contributes a major share to the overall education system and plays a vital role in the social and economic development of our nation. In India, technical education is imparted at various levels such as: craftsmanship, diploma, degree, post-graduate and research in specialized fields, catering to various aspects of technological development and economic progress. The beginning of formal Technical Education in India can be dated back to the mid 19 th Century. The major policy initiatives in the pre-independence period included appointment of the Indian Universities Commission in 1902, issue of the Indian Education policy resolution in 1904 and the Governor General's policy statement of 1913 stressing the importance of Technical Education, the establishment of IISc in Bangalore, Institute for Sugar, Textile and Leather Technology in Kanpur, N.C.E. in Bengal in 1905 and Industrial schools in several provinces. Significant developments include:

● Constitution of the Technical Education Committee of the Central Advisory Board of Education (CABE) of 1943;

● Preparation of the Sergeant Report of 1944; and

● Formation of the All India Council for Technical Education (AICTE) in 1945 by the Government of India

All India Council for Technical Education (AICTE) was set-up in November 1945 as a national level Apex Advisory Body to conduct survey on the facilities on technical education and to promote development in the country in a coordinated and integrated manner. And to ensure the same, as stipulated in, the National Policy of Education (1986), AICTE be vested with statutory authority for planning, formulation and maintenance of norms and standards, quality assurance through accreditation, funding in priority areas, monitoring and evaluation, maintaining parity of certification and awards and ensuring coordinated and integrated development and management of technical education in the country.

The Government of India (Ministry of Human Resource Development) also constituted a National Working Group to look into the role of AICTE in the context of proliferation of technical institutions, maintenance of standards and other related matters. The Working Group recommended that AICTE be vested with the necessary statutory authority for making it more effective, which would consequently require restructuring and strengthening with necessary infrastructure and operating mechanisms. Pursuant to the above recommendations of the National Working Group, the AICTE Bill was introduced in both the Houses of Parliament and passed as the AICTE Act No. 52 of 1987. The Act came into force w.e.f. March 28, 1988. The statutory All India Council for Technical Education was established on May 12, 1988 with a view to proper planning and coordinated development of technical education system throughout the country, the promotion of qualitative improvement of such education in relation to planned quantitative growth and the regulation and proper maintenance of norms and standards in the technical education system and for matters connected therewith. The purview of AICTE (the Council) covers programmes of technical education including training and research in Engineering, Technology, Architecture, Town Planning, Management, Pharmacy, Applied Arts and Crafts, Hotel Management and Catering Technology etc. at different levels.

3.4.1 The AICTE comprises of nine Bureaus, namely

- Faculty Development (FD) Bureau
- Undergraduate Education (UG) Bureau
- Postgraduate Education and Research (PGER) Bureau
- Quality Assurance (QA) Bureau
- Planning and Co-ordination (PC) Bureau
- Research and Institutional Development (RID) Bureau
- Administration (Admin) Bureau
- Finance (Fin) Bureau
- Academic (Acad.) Bureau

3.5. Institute of National Importance

An Institute of National Importance, in India, is defined as

one which serves as a pivotal player in developing highly skilled personnel within the specified region of the country/state. Only a chosen few institutes make it to this coveted list and are usually supported by the Government of India or even international institutes to develop centers of excellence in research, academics, and other such elite schools of education. In India, all of the IIT, NITs, AIIMS, NIPERs, ISIs and some other institutes as Institutes of National Importance. It is also proposed to add to the list IIMs, IISERs, IIESTs and the new AIIMS under PMSSY scheme of GOI once they are empowered by the Government of India by enacting an act in the Parliament. The admission to these institutes is solely through highly competitive examinations like the CAT/IIT-JEE/JMET/ AIEEE/ NIMCET etc.

3.5.1. Indian Institutes of Technology (IIT)

Indian Institute of Technology Kharagpur, www. iitkgp.ernet.in
Indian Institute of Technology Bombay, Mumbai, www. iitb.ac.in
Indian Institute of Technology Kanpur, www.iitk.ac.in
Indian Institute of Technology Madras, Chennai, www. iitm.ac.in
Indian Institute of Technology Delhi, New Delhi, www. iitd.ac.in
Indian Institute of Technology Roorkee, www.iitr.ac.in
Indian Institute of Technology Guwahati, www.iitg.ac.in
Indian Institute of Technology Patna, www.iitp.ac.in
Indian Institute of Technology Hyderabad, www.iith.ac.in
Indian Institute of Technology Bhubaneswar, www. iitbbs.ac.in
Indian Institute of Technology Gandhinagar, www. iitgn.ac.in
School of Planning and Architecture, New Delhi, www. spa.ac.in

3.5.2. Indian Institute of Science (IISc)

Indian Institute of Science, Bangalore, www.iisc.ernet.in

3.5.3. National Institute of Technology (NIT)

Motilal Nehru National Institute of Technology, Allahabad, www.mnnit.ac.in
Maulana Azad National Institute of Technology, Bhopal, www.manit.ac.in
National Institute of Technology, Calicut, www.nitc.ac.in
National Institute of Technology, Durgapur, www. nitdgp.ac.in
National Institute of Technology, Hamirpur, www. nitham.ac.in
Malaviya National Institute of Technology, Jaipur, www. mnit.ac.in/
Dr B R Ambedkar National Institute of Technology, Jalandhar, www.nitj.ac.in
National Institute of Technology, Jamshedpur, www. nitjsr.ac.in
National Institute of Technology, Kurukshetra, www.

nitkkr.ac.in
Visvesvaraya National Institute of Technology, Nagpur, www.vnit.ac.in
National Institute of Technology, Patna, www.nitp.ac.in
National Institute of Technology, Raipur, www.nitrr.ac.in
National Institute of Technology, Rourkela, www. nitrkl.ac.in
National Institute of Technology, Silchar, www.nits.ac.in
National Institute of Technology, Srinagar, www.nitsri.net
S V National Institute of Technology, Surat, www.svnit.ac.in
National Institute of Technology Karnataka, Surathkal, www. nitk.ac.in
National Institute of Technology, Tiruchirapalli, www. nitt.edu
National Institute of Technology, Warangal, www.nitw.ac.in

3.5.4. Indian Statistical Institute

Indian Statistical Institute, Kolkata, New Delhi, Bangalore, www.isical.ac.in

3.5.5. National Institute of Fashion Technology (NIFT)

National Institute of Fashion Technology, New Delhi, Mumbai, Kolkata, Ahmedabad, Hyderabad, Chennai, Bangalore, Raebareli, Shillong,kannur, patna, bhopal, Mauritius (overseas), www.nift.ac.in

3.5.6 Medical Institutes

All India Institute of Medical Sciences, New Delhi, www. aiims.edu
Post Graduate Institute of Medical Education and Research, Chandigarh, www.pgimer.nic.in   Jawaharlal Institute of Postgraduate Medical Education & Research, Puducherry, www.jipmer.edu Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow, www.sgpgi.ac.in.

4. Review of Literature

Historically, the Internet and the World Wide Web (WWW) are relatively new concepts which, upon inception, have since elicited a lot of excitement and interest from numerous scholars as illustrated by the exponential growth in literature that discusses their features, opportunities, challenges and impact. Attempts have been made to develop indicators that can be used to measure research and evaluate the performance of individuals, institutions, and countries on the Internet as a whole and more particularly, on the WWW. Westman (2001)[9] adds to this by providing librarians with resources (i.e. database-backed web pages) that they can use for the effective construction of library websites. Falk (1999)[10] argues that a library webpage is supposed to serve two functions, namely provide a means to users to access remotely available information from the library while serving as a patron's guide to the library's collections, and also as a gateway to the resources of the WWW. Saeed, Asghar, Anwar & Ramzan (2000)[11] sought to survey the use of the Internet in university libraries of Pakistan. The authors found

that university libraries in Pakistan use the Internet for reference work, classification and cataloguing, document delivery services, and subscription to online journals, etc. On their part, the Arabian Gulf libraries use the Internet to offer such services as web catalogs, web forms, orientation and training and web search engines (Ahmed, 2002)[12].

5. Objectives

The four main areas of present webometric research are:
● Web page content analysis
● Web link structure analysis
● Web usage analysis
● Web Technology Analysis

Institutes of National Importance Websites

Websites have become powerful means of communication. A website is a collection of related web pages, images, videos or other digital asserts that are addressed with common domain name or IP address in an internet protocol based network. A website is hosted on at least one web server, accessible via, the internet or a private local area network.

The growing use of internet in libraries and advent of webpage revolutionized the process of library publicity and dissemination of information pertaining to library sections, collections, staff and services. Institutes of National Importance website can disseminate wide range of information to user community and staffs through development and maintenance of its library homepage. The home page of association website can be updated as and when desired. The Institutes of National Importance home page should be aesthetic, well designed and should include all important information pertaining to institutes. It should include the details of authorities and faculty members. And also include course details, library collection and services, programs conducted and hyperlink to a notice board for important announcement and notices, circulars pertaining to students and faculty members. Forms of admission can be loaded on homepage so that they may be printed by users admission from their desktop, filled up and sent to institutes online. It should also provide hyperlinks to important documentation and information centers which maintain their web pages on internet. Home page provides all necessary information regarding the institutes, programs and library. Users connected with internet can have this information at any time and form anywhere in the world. The websites considered for this study were

Scope and Limitations of the Study

This study is limited to ten institutes of national importance websites in India. Efforts have been taken to make the study as accurate as possible. Despite the limitations of time the investigators hope that the study will fulfill the objectives. The present study focuses on the webpage content analysis of institutes of national importance and moreover study concentrates evaluation of contents and the link structures.

Findings of the Study

Major findings of the study are:

Home page features
● All the websites provide links to home page.
● All the websites provide about us.
● Vision and Mission is provided all the websites.
● All institutes authorities details are provided all the websites.
● Librarian and Faculty members list are provided all the websites.
● All the websites provide details about faculty members and librarians.
● Activities are provided by all institutes websites.
● Information about publication is provided by all institutes websites except AIIMS, ISICAL and MNNIT.
● Conference announcements are provided by all the websites.
● News and events are not provided by many of the websites.
● Some of the websites provide links to Consortium.
● Sitemap of website is provided by all institutes.
● Feedback facilities are provided by all IITs.

Services and Activities
● Various courses are offered by Institutes.
● Library Collection and services.
● Awards are given by Government and Endowment.
● Announcement and notices about institutes rules and regulations.
● Special Programmes are conducted

Publication
● All institutes are provide publications.
● Only IITs provide archives.
● Annual reports are provided by all the institutes.
● Only IISC provides Library journals.
● Books are published by most of the institutes.
● Newsletter issues are provided by AIIMS, IITs and IISC.
● IITs, AIIMS and PGIMER provide seminar papers.

Authority, Accuracy and Currency of websites
● All the websites provide the details of the institutes, location and also the details of web designer.
● All the websites give clear, simple and accurate information.
● The current day date is viewed in most of the institutes.
● The contact us option are given by all the institutes.

Evaluating features
● Navigating and downloading function of all the ten institute websites were good.
● The membership downloading is easy way in all the websites
● Updating of information of all the websites are excellent.

Special features
● IITs provides member login.
● Photo gallery is provided by most of the insitutes websites.

S. No.	Institutes of National Importance	Abbrevia-tions	Website Address
1	All India Institute of Medical Sciences	AIIMS	http://www.aiims.edu/
2	Indian Institute of Technology Madras	IITM	http://www.iitm.ac.in/
3	Indian Institute of Technology Roorkee	IITR	http://www.iitr.ac.in/
4	Indian Institute of Technology Delhi	IITD	http://www.iitd.ac.in/
5	Indian Institute of Technology Bombay	IITB	http://www.iitb.ac.in/
6	Indian Institute of Technology Kharagpur	IITKGP	http://www.iitkgp.ac.in/
7	Indian Statistical Institute	ISICAL	http://www.isical.ac.in/
8	Postgraduate Institute of Medical Education and Research, Chandigarh	PGIMER	http://pgimer.nic.in/
9	Indian Institute of Science, Bangalore	IISC	www.iisc.ernet.in
10	Motilal Nehru National Institute of Technology, Allahabad	MNNIT	www.mnnit.ac.in

● IITs, AIIMS and IISC provides blog in their homepage.

● Search box is provided by all the websites.

● Visiting number can be viewed in most of the websites.

Suggestions for Improvement

Based on the findings of the study, in this section an attempt has been made to suggest a few recommendations, which will help the web designer to make their website interactive, attractive and there by more user friendly. It will also be useful to users of institute of national importance website to evaluate its content, quality of information, design and organization of information. The present study made following recommendations for improvement of engineering college websites.

● Sitemap should be provided to view the overall functions easily.

● It shows majority of institutes have not mentioned the date of update in their websites. The websites must be periodically updated and the date of updating should be indicated.

● Services play an important role in judging the performance of institutes. So institutes should try to provide more services in order to energize the field.

● Feedback should be provided in order to remind the feedbacks of institutes.

6. Conclusions

The present study focuses on the webpage content analysis of institutes of national importance libraries in India and moreover study concentrates evaluation of contents not on the link structures and other research area in webometrics. It is found that general information about homepage features are more in IITs and lease in ISICAL and IISC. Faculty members and librarian details are given by all the websites. The websites is up to date only in few institutes remaining websites do not mentions time or date in the homepage. Webometric techniques are still in experimental stage in testing whether the classical bibliometric methods applied to the web are reliable and feasible means of comparing the analysis of websites.

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