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Evaluation of Medical College Websites of North East India: A Webometric Study

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Abstract: Webometric attempts to measure the World Wide Web to gain insight into the number and types of hyperlinks, the structure of the World Wide Web, and the patterns of its usage. This study is confined to the medical colleges affiliated under National Medical Council (NMC) in the North-eastern states of India. It was shown that 7 medical colleges were established before the year 2000 and 8 medical colleges were established after the year 2000. The most common preferred domain is (.in). The website of Sikkim Manipal Institute of Medical Sciences has the highest domain authority while the Diphu Medical College & Hospital came at the lowest. In the case of page authority, the both websites of Regional Institute of Medical Sciences and Sikkim Manipal Institute of Medical Sciences have secured the highest rank while on the other hand, the Diphu Medical College & Hospital have the least rank on page authority. The study also shows that Diphu Medical College & Hospital ranks highest securing 1.63 WIF and 0.81 R-WIF and also indicates the overall positive relationship between R-WIF and WIF which reveals that there is a greater inclination of closeness and strong relationship between the two.

Introduction

Information plays significant role in education and research. Library as source of knowledge and gateway of knowledge, disseminate information to its clients through different channels. Technology changes traditional mode of information systems to web-resources. Medical institutions are the ones producing vast and new methods in clinical trials and practices. Most of the peers in education and research prefer electronic devices to access information as they are handy and precise. They want to adjust themselves to meet the latest technology in accessing dynamic electronic resources. In this changing scenario of information dissemination, website drastically supersedes printed information and become most important source of information in digital era.

Websites as information source

A website is a set of related web pages, images, videos or other computerized resources that are addressed to a common Uniform Resource Locator (URL) that contain only the domain name, or the IP address, and the root path ('/') in an Internet Protocol-based network (Babu, Jeyshankar & Rao, 2010). Barikzai (2009) opined that website is a part of technology which enables institutions and companies to easily advertise their profiles in the cheapest form with rest of the world. Institutional websites provide various aspects of essential information about the university prospective and current students, present faculty, researchers, employers, alumni, etc. They also mirrored the institution's activities, tradition and reputation. Website speed is a critical determinant of the website's prosperity. Website performance is estimated utilizing various assessments. Such measurements may change from one site to another according to prerequisite.

Website has become one of the main information resources of any organisations as it contains different information items. It is a combination of two words, 'web' and 'metrics' where web being the short form of World Wide Web (WWW) and metrics as measurement. Website is therefore a collection of digital documents, videos, images and other related digital assets which addressed to relative common Uniform Resource Locator (URL). Hence, website contents and visibility are different from one to the other depending upon the organisations which result needs of quality measurement with standard metric system called webometrics.

Webometrics

Webometrics attempts to measure the World Wide Web to gain insight into the number and types of hyperlinks, the structure of the World Wide Web, and the patterns of its usage. Chellappandi & Vijayakumar (2018) stated that the key field of contemporary research in library and information science relied mostly on the measurement process. The current development of bibliometrics, scientometrics, webometrics, and informetric in library and information science can understand related ideas from different fields of knowledge. The area of activity and what webometrics includes may, in a wider sense, be characterised as (a) website content analysis, (b) web technology analysis, (c) web usage analysis, and web link structure analysis. Researches in this field imply creation of new discoveries based on analyses of numbers and types of hyperlinks, structure of the World Wide Web, and patterns of usage of the web as a mass communication medium and exchange of information. Hence,

Webometrics is a quantitative analysis of network phenomena, including link analysis, network citation analysis, search engines, etc.

Review of Literature

One of the most important components of research is review of literature. To fill the research gap, researcher has to know the gap by studying related research area. Noruzi (2006) discuss how the Web Impact Factor (WIF) has been developed and applied and highlights the advantages of the WIF where it was specified that the WIF is one effective tool for measurement of relative visibility of any company or organisation on the web and provides novel insights for retrieval process on the web. It envisages web site's evaluation by measuring their relative importance and can provide comparison on the same field or country's domains. It was suggested that the WIF is specifically useful for quantitative comparison on intra-country, application beyond this (i.e., to inter-country assessment) has little value and that it is important to ensure that the comparison of web sites should stick to a particular category. Jankoski & Makela (2011) opined that College and university websites are an undeniably mainstream medium to present information about institution and student performance to faculty and staff as well as to potential students, their families and policy makers. One-way institutions can react to steady calls to be more impending about students' gain from attending college is to make this information accessible via their institution website. Suksida & Santiworarak (2017) aims to evaluate the total number of backlinks, number of page view, duration of visit average times and bounce rate of Thailand University's website to discovering connection between number of backlinks, page view average, visit durations times, percentage of bounce rate and impact ranking of webometric. Information access becomes very handy and quick nowadays due to advanced technology than former times. Website is one tool for organizing information and assembled as a platform for displaying information to outsiders. Website content is very important because the content itself will explain everything which organization presented. Educational institution website intended to maintain trust from people.

Majhi & Das (2019) explained that website is an electronic data mass of information. The different web impact factors, scores and positioning of the sites of high courts in India were featured in the study. The study also reflects other significant yields like page size of the sites, access speed score of sites, load time and every day page use of the site. The webometric devices like Alexa, Google page rank, Neil Patel SEO analysis, Google search

engine and SocScibot4 are utilized for gathering information assortment and developing In-link, Out-link and mapping visualisation of the sites. Jeysankar (2019) undertake Webometric evaluation which includes 125 deemed universities in India. The researcher recognized and categorised the four Domain names like State Universities, Central Universities, Deemed Universities and Private Universities. It was discovered that, out of 21 states, Tamil Nadu has a majority of 28 (22.40%) universities, it is followed by Maharashtra 21(16.8%). The study measures the Internal Link, External Link, back link and Size of the website. The study shows that the numbers of backlinks are very little comparing to a number of internal and external link. It was recommended that the websites of deemed universities seek to attract greater external links and effect component by introducing novel and innovative online sources and providing the updates of news and research information. Stephen (2019) indicates that Webometrics was one of the procedures developed during mid-1990s concerning the quantitative parts of data and often being confused with other arising fields such as Netometrics, Webometry, Internetometrics, Cybermetrics and Webometrics among others. This was because of the way that every one of these strategies was originated from bibliometrics. Webometrics visibly demonstrated that the statistical analysis utilized in scholastic writing can likewise be applied to the study of the World Wide Web and under controlled conditions promising outcomes can be acquired. Webometrics is concerned with estimating parts of the web sites, pages, portions of website pages, words in pages, hyperlinks, web internet searcher results. Webometrics is enormous and effectively open wellspring of data, there are boundless opportunities for estimating larger scale of the number of web pages, the number of web sites, the number of blogs or on a smaller scale.

Significance and scope of study

Website has become the main source of information for accessing different information for any organisations. Web contents significantly may impress its users to know the services and functionaries of the organisation. The quantitative analysis of web link structure and content analysis becomes pertinent for each websites with the growth of information evolution. The study is confined to the medical college affiliated under National Medical Council (NMC) in the North-eastern state of India. Websites is a very important tool for potential updates with regard to information broadcasting, to know the summary and details about the institutions history and current status and can saves time by providing easy retrieval to enquiries. The list of college included in the study was listed below:

Table 1: List of Medical College in North-east India under NMC

| S. No. | Name of Institution | State | Websites |
|--------|--|-------------------|---|
| 1 | Gauhati Medical College & Hospital | Assam | http://www.gmchassam.gov.in/ |
| 2 | Diphu Medical College & Hospital | Assam | https://dmcassam.in/ |
| 3 | Assam Medical College & Hospital | Assam | https://www.assammedicalcollege.in/ |
| 4 | Silchar Medical College & Hospital | Assam | http://www.smccassam.gov.in/ |
| 5 | Jorhat Medical College & Hospital | Assam | http://jorhatmedicalcollege.in |
| 6 | Fakhruddin Ali Ahmed Medical College & Hospital | Assam | http://www.faamcassam.co.in/ |
| 7 | Tezpur Medical College & Hospital | Assam | http://tmcassam.org/ |
| 8 | TomoRiba Institute of Health & Medical Sciences | Arunachal Pradesh | https://www.trihms.org/ |
| 9 | Jawaharlal Nehru Institute of Medical Sciences | Manipur | http://jnims.nic.in/ |
| 10 | Regional Institute of Medical Sciences | Manipur | http://www.rims.edu.in |
| 11 | North East Indira Gandhi Regional Institute of Health and Medical Sciences | Meghalaya | http://www.neigrihms.gov.in/ |
| 12 | Zoram Medical College | Mizoram | https://zmc.edu.in |
| 13 | Sikkim Manipal Institute of Medical Sciences | Sikkim | https://smu.edu.in/ |
| 14 | Tripura Medical College & Dr BRAM Teaching Hospital | Tripura | http://www.tmc.nic.in/ |
| 15 | Agartala Government Medical College | Tripura | http://agmc.nic.in/ |

Source: Survey data

Objectives

The objectives of this study are:

- 1) To determine the websites domain preferred by each medical college.
- 2) To assessed the domain authority and page authority of the Medical College websites in North East India.

- 3) To find out the web impact factor of each Medical College websites in North East India.
- 4) To find out the correlation coefficient between the WIF and R-WIF of the college websites.

Methodology

The selected websites were classified according to their domain type. The domain authority and page authority were collected through website domain and page authority checker WSQ (<https://websiteseochecker.com/domain>). Google search engine was chosen due to the reason that it is the most efficient among all search engines. Chakravarty & Wasan (2015) stated that Google search engine encompasses vast and safer hyperlinks with advanced search facilities as compared to other search engines. The Boolean search statement was applied to search and collect data through Google search engine. The Web Impact Factor (WIF) can be calculated by adding number of In-links and number of Selflinks extracted in Google divided by total number of web pages extracted in Google, i.e., $WIF = \frac{IL + SL}{WP}$. Pearson Correlation Coefficient formula was used to measure the relationship between the WIF and R-WIF. The data collected were based on the updates on October 22 - 23, 2021.

- For calculation of total web pages; site: www.zmc.edu.in will extract the total number of web pages indexed in the Google.
- For finding the number of self-link, site: www.zmc.edu.in AND link domain: www.zmc.edu.in can give the results
- For finding the number of In-Links, site: www.zmc.edu.in NOT link domain: www.zmc.edu.in will give the results.

Discussion and Findings

Table 2 depicts the year-wise distribution of medical college establishment year and cross tabulated with their domain type. It was shown that 7 medical colleges were established before 2000 and 8 medical college were established after 2000. The domain type (.in) has maximum usage and (.org) have the least usage.

Table 2: Distribution of Websites Domain by Year Wise Establishment

| <i>S. No.</i> | <i>Domain</i> | <i>Before 2000</i> | <i>After 2000</i> | <i>Total</i> |
|---------------|---------------|--------------------|-------------------|--------------|
| 1 | .gov.in | 3 | NIL | 3 |
| 2 | .in | 1 | 3 | 4 |

| | | | | |
|---|---------|-----|---|----|
| 3 | .org | NIL | 2 | 2 |
| 4 | .edu.in | 2 | 1 | 3 |
| 5 | .nic.in | 1 | 2 | 3 |
| | Total | 7 | 8 | 15 |

Source: Survey data

The table 3 shows the Domain and Page Authority of a given institutional websites. Domain Authority (DA) is a search engine ranking score developed by WSQ (<https://websiteseochecker.com/domain>) that forecast the probability of website ranking in search engine result pages (SERPs). Domain Authority scores range from 1-100, the higher scores pertains to greater probability of ranking. Similarly, Page Authority (PA) is a score developed by WSQ that tells how well a specific page will rank on search engine result pages (SERP). The scores range from 1-10, with higher scores corresponding to a greater ability to rank. The data in the table shows that the website of Sikkim Manipal Institute of Medical Sciences having domain authority of 40 ranks highest while that of Diphu Medical College & Hospital has the least by obtaining 10 out of a total of 100 points. In the case of page authority, the website of Regional Institute of Medical Sciences and Sikkim Manipal Institute of Medical Sciences have both secured the highest rank obtaining authority score of 45 followed by the North East Indira Gandhi Regional Institute of Health and Medical Sciences having a score of 43. Again, the least score 19 is obtained by the Diphu Medical College & Hospital.

Table 3: Domain Authority and Page Authority

| <i>S. No.</i> | <i>Name of Institution</i> | <i>Domain Authority</i> | <i>Page Authority</i> |
|---------------|------------------------------------|-------------------------|-----------------------|
| 1 | Gauhati Medical College & Hospital | 32 | 38 |
| 2 | Diphu Medical College & Hospital | 10 | 19 |
| 3 | Assam Medical College & Hospital | 29 | 33 |
| 4 | Silchar Medical College & Hospital | 30 | 37 |
| 5 | Jorhat Medical College & Hospital | 30 | 28 |

| | | | |
|----|--|----|----|
| 6 | Fakhruddin Ali Ahmed Medical College & Hospital | 29 | 30 |
| 7 | Tezpur Medical College & Hospital | 27 | 33 |
| 8 | TomoRiba Institute of Health & Medical Sciences | 25 | 26 |
| 9 | Jawaharlal Nehru Institute of Medical Sciences | 30 | 31 |
| 10 | Regional Institute of Medical Sciences | 33 | 45 |
| 11 | North East Indira Gandhi Regional Institute of Health and Medical Sciences | 37 | 43 |
| 12 | Zoram Medical College | 18 | 25 |
| 13 | Sikkim Manipal Institute of Medical Sciences | 40 | 45 |
| 14 | Tripura Medical College & Dr BRAM Teaching Hospital | 33 | 35 |
| 15 | Agartala Government Medical College | 29 | 36 |

Source: Survey data

The table 4 shows the Web Impact Factor (WIF) and Revised-Web Impact Factor (R-WIF) of each websites. The data reveals that Diphu Medical College & Hospital ranks highest securing 1.63 WIF and 0.81 R-WIF; Fakhruddin Ali Ahmed Medical College & Hospital stood second securing 1.22 WIF and 0.59 R-WIF; Silchar Medical College & Hospital stood third securing 1.00 WIF and 0.49 R-WIF; while the rest of the college falls below 0 as stated in the table.

Table 4: Web Impact Factor (WIF) and Revised-Web Impact Factor (R-WIF)

| <i>S. No.</i> | <i>Name of Institution</i> | <i>Web Page indexed by Google</i> | <i>Self-Link</i> | <i>In-Link</i> | <i>WIF</i> | <i>R-WIF</i> |
|---------------|----------------------------|-----------------------------------|------------------|----------------|------------|--------------|
| 1 | Gauhati Medical | 10,30,000 | 7830 | 7770 | 0.01 | 0.01 |

| | | | | | | |
|----|---|--------------|-----------|-----------|------|------|
| | College & Hospital | | | | | |
| 2 | Diphu Medical College & Hospital | 9480 | 7720 | 7700 | 1.63 | 0.81 |
| 3 | Assam Medical College & Hospital | 99,000 | 8430 | 9230 | 0.18 | 0.09 |
| 4 | Silchar Medical College & Hospital | 4700 | 2410 | 2300 | 1.00 | 0.49 |
| 5 | Jorhat Medical College & Hospital | 10200 | 1190 | 1070 | 0.22 | 0.10 |
| 6 | Fakhruddin Ali Ahmed Medical College & Hospital | 689 | 433 | 408 | 1.22 | 0.59 |
| 7 | Tezpur Medical College & Hospital | 61,800 | 1460 | 1420 | 0.05 | 0.03 |
| 8 | TomoRiba Institute of Health & Medical Sciences | 3720 | 408 | 358 | 0.20 | 0.10 |
| 9 | Jawaharlal Nehru Institute of Medical Sciences | 25,900 | 1500 | 1060 | 0.10 | 0.04 |
| 10 | Regional Institute of Medical | 11,90,00,000 | 55,10,000 | 32,80,000 | 0.07 | 0.03 |

| | | | | | | |
|----|--|-------------|----------|----------|------|------|
| | Sciences | | | | | |
| 11 | North East Indira Gandhi Regional Institute of Health and Medical Sciences | 76,500 | 3120 | 6700 | 0.13 | 0.09 |
| 12 | Zoram Medical College | 30,80,000 | 68,300 | 55,500 | 0.04 | 0.02 |
| 13 | Sikkim Manipal Institute of Medical Sciences | 2,90,00,000 | 4,66,000 | 4,45,000 | 0.03 | 0.01 |
| 14 | Tripura Medical College & Dr BRAM Teaching Hospital | 3,01,00,000 | 2,91,000 | 1,01,000 | 0.01 | 0.00 |
| 15 | Agartala Government Medical College | 82,800 | 2580 | 1220 | 0.04 | 0.01 |

Source: Survey data

In order to determine how well the WIF and R-WIF are related, we can get the desired outcome through the correlation coefficient(r). The correlation coefficient (r) in Table 5 shows the linear relationship between two variables. The coefficient of determination represents the percent of the data that is the closest to the line of best fit. Correlation is always between -1.0 and +1.0.

Pearsons Correlation Coefficient

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

Where n = Number of College

$\sum x$ = Total of R-WIF

Σy = Total of WIF

Σxy = Sum of the product of R-WIF and WIF

Σx^2 = Sum of the square of R-WIF

Σy^2 = Sum of the square of WIF

Table 5: Correlation Coefficient of RWIF and WIF

| S.No. | Websites | R-WIF(x) | WIF(y) | xy | x ² | y ² |
|-------|--|----------|--------|--------|----------------|----------------|
| 1 | www.gmchassam.gov.in | 0.01 | 0.01 | 0.0001 | 0.0001 | 0.0001 |
| 2 | www.dmcassam.in | 0.81 | 1.63 | 1.3203 | 0.6561 | 2.6569 |
| 3 | www.assammedicalcollege.in | 0.09 | 0.18 | 0.0162 | 0.0081 | 0.0324 |
| 4 | www.smcassam.gov.in | 0.49 | 1 | 0.49 | 0.2401 | 1 |
| 5 | www.jorhatmedicalcollege.in | 0.1 | 0.22 | 0.022 | 0.01 | 0.0484 |
| 6 | www.faamcassam.co.in | 0.59 | 1.22 | 0.7198 | 0.3481 | 1.4884 |
| 7 | www.tmcassam.org | 0.03 | 0.05 | 0.0015 | 0.0009 | 0.0025 |
| 8 | www.trihms.org | 0.1 | 0.2 | 0.02 | 0.01 | 0.04 |
| 9 | www.jnims.nic.in | 0.04 | 0.1 | 0.004 | 0.0016 | 0.01 |
| 10 | www.rims.edu.in | 0.03 | 0.07 | 0.0021 | 0.0009 | 0.0049 |
| 11 | www.neigrihms.gov.in | 0.09 | 0.13 | 0.0117 | 0.0081 | 0.0169 |
| 12 | www.zmc.edu.in | 0.02 | 0.04 | 0.0008 | 0.0004 | 0.0016 |
| 13 | www.smu.edu.in | 0.01 | 0.03 | 0.0003 | 0.0001 | 0.0009 |
| 14 | www.tmc.nic.in | 0 | 0.01 | 0 | 0 | 0.0001 |
| 15 | www.agmc.nic.in | 0.01 | 0.04 | 0.0004 | 0.0001 | 0.0016 |
| | Total (Σ) | 2.42 | 4.93 | 2.6092 | 1.2846 | 5.3047 |

$$\begin{aligned}
 r &= \frac{15(2.6092) - (2.42)(4.93)}{\sqrt{[15(1.2846) - (2.42)^2][15(5.3047) - (4.93)^2]}} \\
 &= \frac{39.138 - 11.9306}{\sqrt{(19.269 - 5.8564)(79.5705 - 24.3049)}} \\
 &= \frac{27.2074}{\sqrt{741.255387}} \\
 &= \frac{27.2074}{27.2260057} \\
 &= 0.9993
 \end{aligned}$$

Hence, the value of r indicates positive relationship between R-WIF and WIF which reveals that there is a greater inclination of closeness and strong relationship between R-WIF and WIF. In other word, there is no much variation or and less differences between the R-WIF and WIF.

Conclusion

Out of the total 15 medical colleges in North eastern India, the domain type (.in) was mostly preferred, followed by (.gov.in), (.edu.in), (.nic.in) with the same quantity. On the other hand, (.org) have the least usage. The website of Sikkim Manipal Institute of Medical Sciences have the highest domain authority while the Diphu Medical College & Hospital came at the lowest. In the case of page authority, the website of Regional Institute of Medical Sciences and Sikkim Manipal Institute of Medical Sciences have both secured the highest rank while on the other hand, the Diphu Medical College & Hospital have the least rank on page authority. The Diphu Medical College & Hospital ranks highest web Impact factor. In case of correlation coefficient, the positive relationship between R-WIF and WIF was found which subsequently reveals that there is a strong relationship between the two.

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