WEBSITES OF PHYSICAL EDUCATION INSTITUTIONS IN INDIA: A WEBOMETRIC ANALYSIS

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ABSTRACT

This research paper deals with an analysis of the websites of Physical Education courses offered by multi faculty profile institutions of NCTE in India. The work examines, number of Web Page, Total Link, Self Link, External Link and Back Link. Further calculations on Simple Link Web Impact Factor, Self-Link Web Impact Factor, External Link Web Impact Factor and Revised Web Impact Factor were done and ranking of 189 websites of physical education institutions recognized by NCTE. Online statistics software VassarStats-Pearson correlation coefficient (r) was used to establish the closeness or association in ranking based on RWIF and SWIF. Also, SocSciBot 4.0 has been used for creating link topology. The study results revealed mainly five aspects, 1) Top-level domain of '.ac.in' is employed more with 66 (34.92%). 2) imple Web Impact Factor (Website Quality), University of Allahabad-Prayagraj was in the first position with 3060.00. 3) Revised Web Impact Factor (Website Popularity), Bharathiar University-Coimbatore, is at the top with 671.96. 4) Pearson Correlation Coefficient (r) value is '-0.0176' by means 'Weekly Negative Correlation'. 5) Link Topology, Websites of NCTE-recognized Physical Educations were well connected. This study will be useful to Library and Information professionals, librarians, faculty members, students and researchers in the LIS field as well as in the Physical Education field.

Keywords: Webometrics, Informetrics, Websites, Website Analysis, Web Analysis, Website Study, Webometric Tools, Website Ranking, Website Contents, Physical Education, Web Impact Factor, Link Analysis, Web Page, Self-Link, External Link, Back Link, Link Topology, SoSciBot, Pajek, India.

1. Introduction

Webometrics or internetometrics deals with the analysis of websites. A number of web pages, images and videos together form a website. Webometrics is an expansion of bibliometrics. This area of webometrics study covers web page content analysis, weblink structure analysis, web usage analysis and web technology analysis. Websites of institutions has several advantages. There are a number of studies on websites of different type of institutions, but those on Physical Education institutions in India are almost nil. The author analysed the websites of Physical Education and Sports Universities in 2017 (Bakkiyaraj, 2017). But the growth of Physical Education institutions in India are high in the recent years and thus arises the need for another study which is done in a different angle – the Web Impact Factor analysis.

There are 189 recognised Physical Education courses offered in multi-faculty profile institutions in India (https://www.ncte.gov.in). Among this half (52.38%) are in the private management sector. Those in the government aided college sector are less (24.34%). Almost 80% of the Indian states and union territories are offering physical education courses. Uttar Pradesh has the maximum (40.21%) institutions. Ladakh and Jammu and Kashmir state has no courses or institutions under NCTE.

A region-wise distribution of institutions is given in fig.1. NCTE has four regions, among which north region has the maximum number (57.67%) of institutions. Jammu and Kashmir is not officially included in the website of NCTE.

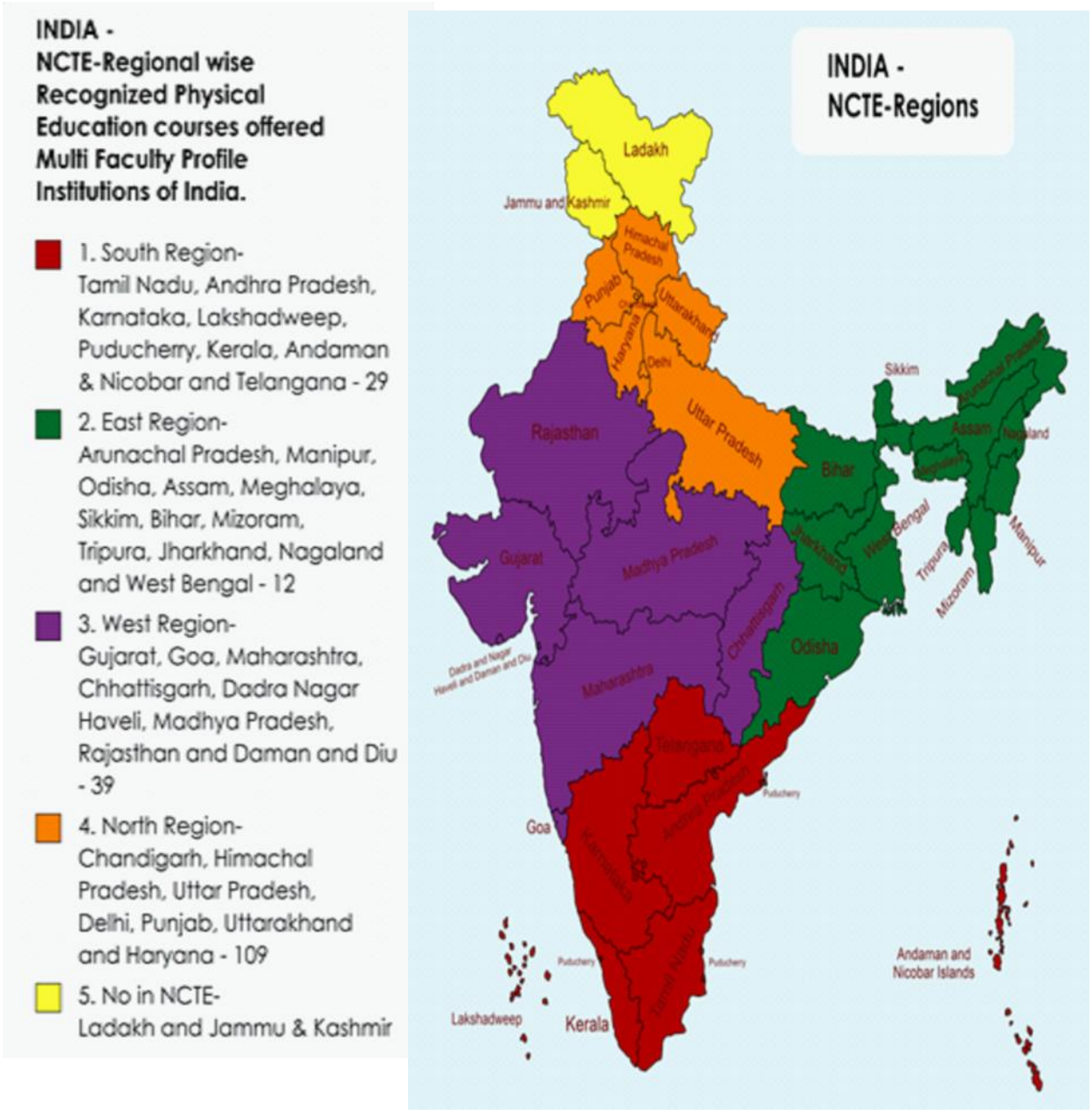

Fig.1. Region-wise Distribution of Physical Education Multi-Faculty Profile Institutions

2. Review of Literature

A webometric study of top ten NIRF university websites in India has been studied by Meghwal (2023). Web presence of Divyangjan institutes in India has been studied by Mail et al. (2023). The study by Wahyuningrum, et al. (2021) investigated R-WIF of seven universities in Timor Leste and their academic sites' relative standing. The study by Jeyshankar (2019) examined the website of 125 deemed of State Universities, Central Universities, Deemed Universities and Private Universities in India. The study calculated the Internal Links, External Links, Back Links and Size of the Websites. The work done by Jalal (2019) analysed the website links structure for 23 IITs to discover sources of information. The study discussed the problems of search engine and its limitations in website links analysis. Analysed purposes of links structure for this study using SocSciBot4.0 and Pajek4. The work also covers the historical aspect and approaches of links analysis. Websites of IISERs in India was studied by Manoj (2018).

The author of the present study (Bakkiyaraj, 2017) analysed Physical Education and Sports Universities websites in India. The study result indicates that Lakshmibai National Institute of Physical Education websites had better ranking among the Physical Education and Sports Universities in India. A joint study by Varadharajulu and Dhanavandan (2017) did an analysis of Web Impact Factor (WIF) of the websites of state universities in Kerala. Manoj (2017) in another study analysed the websites of Sainik Schools of India. The indicators such as number of web pages, in links page and self links pages were studied and ranked the websites based on Web Impact Factors (WIFs). The study used the Spearman's Rank Correlational coefficient for determine the two types of rankings. This study results have much closeness or association with each other's website. Bolarinwa and Utulu (2012) examined the methods of Watson Addy web architecture tests of 50 Nigerian universities websites. Many more webometric studies, even though found in data bases are not included here for want of space.

3. Objectives of the Study

The main objective of this study is to analyse the websites of NCTE recognized Physical Education courses offered by Multi Faculty Profile Institutions in India. The specific objectives are;

i) To study the types of top-level domain of NCTE recognized websites of Physical Education Multi Faculty Profile Institutions in India.

ii) To assess the web-based indicators such as total number of webpages, total number of links, number of self-links, number of external links, and number of incoming links in these institutions.

iii) To calculate Simple links WIF (Web Impact Factor), Self-links WIF, External links WIF and Revised WIF of the institutions under study.

iv) To rank, NCTE recognized websites of Physical Education institutions based on the SWIF (Website Quality) and RWIF (Website Popularity).

v) To establish the Pearson correlation coefficient between R-WIF (Website

Popularity) and SWIF (Website Quality) of the institutions selected.

vi) To generate a link topology among all the NCTE recognized websites of Physical Education institutions.

4. Methodology

For this work, data of the National Council Teacher Education (NCTE)-recognized Physical Education courses offered by Multi Faculty Profile Institutions were collected from the NCTE-official website (https://ncte.gov.in) on June, 2022. There are 189 recognized Physical Education institution websites and these were selected for this webometrics study. Each website address was then cross verified by the researcher through online search. The details of the indicators, software and website address are given in table 1.

Table 1
List of Web-based Indicators, Software and Website Address

S.No.	Web-based indicators	Software	Website Address
1	Website Page size (in bytes)	Small SEO Tools	https://smallseo.tools/
2	Number of Web Pages (NWPs)	Tools	
3	Total Links (TLs)	WebConfs.com	https://www.webconfs.com
4	Self Links (SLs)		
5	External Links (ELs)		
6	Back Link or Incoming Links (ILs)	ahrefs	https://ahrefs.com

The software such as Small SEO tools, WebConfs.com and ahrefs provided comprehensive details, about website page size (bytes) and the number of Web Pages, Total Links, Self Links, External Links and incoming links of the 189 Institutions were taken up for this study. The method used for this study is simple calculation and the rank is based on Simple Link Web Impact Factor, Self-Link Web Impact Factor, External Link Web Impact Factor and Revised-Web Impact Factor.

VassarStats online Statistics software(http://vassarstats.net) (Pearson correlation coefficient (r) was used to establish the association in ranking based on Simple Link Web Impact Factor and Revised-Web Impact Factor. SocSciBot 4.0 (http://socscibot.wlv.ac.uk/) has been used for this Work, in addition to find out a microstructure of web relationship within Institutions website. Another tool, used for visualization of links relationships, is Pajek3.1. This powerful visualization tool is embedded with SocSciBot. The information flow chart for visualizing the network diagram can be explained in Figure 2.

WWW ⟶ SocSciBot ⟶ SocSciBot Tools ⟶ Pajek ⟶ Diagram

Fig.2. Information Flow Chart for Building the Network Diagram.

4.1. Web Impact Factor

Web Impact Factors (WIF) is measure of the standard number of webpages on WWW of a website, which has been linked, a point. (Noruzi, 2006).

Type of Web Impact Factors and Calculation Method

1. The Simple Web Impact Factor (SWIF)

$$SWIF = \frac{\text{Total Links}}{\text{Total web pages}}$$

The ratio of links means the number of pages of internal and external links.

2. The Self Web Impact Factor (SLWIF)

$$SLWIF = \frac{\text{Total Self-Links}}{\text{Total web pages}}$$

The ratios of self-links are number of pages within a Website.

3. The External Web Impact Factor (ELWIF)

$$R\text{-}WIF = \frac{\text{Total External Links}}{\text{Total web pages}}$$

The ratio of links made from external sites to the target website, to the number of pages at a website.

4. The Revised Web Impact Factor (R-WIF)

$$R\text{-}WIF = \frac{\text{Total In -Links}}{\text{Total web pages}}$$

The ratio of R-WIF is number of links of a website received from other websites.

The above are the method of calculation of the different type of Web Impact Factors (Ingwersen, 1998).

4.2. Top-Level Domain, Webpage and Webpage size

A domain address is a text form of the IP address is alternative series of digits in computer network. This was created by ARPANET (Halvorson, et al. 2012).

A webpage is a "page" of the World Wide Web (WWW), generally in HTML formats and with hypertext link, to enable navigation from one webpage to another webpage (Zhu, et al. 2007).

Specific Uniform Resource Locator is the size of webpage or website (URL) (Jalal, et al. 2010).

5. Data Analysis and Interpretation

The present study applied Web Impact Factor method to 189 physical education institution websites and is given in table 2. Since the list runs to more than ten pages, only the first 15 are given here. A complete list is available with the authors.

Table 2
Details of NCTE recognized Physical Education Institutions of India

S.No	Institution Name & Place	Short Name	St/Ut	Mgt	Rgn	Estd	Website Address
1	Adoni Arts and Science College-Kurnool	AASC	AP	PT	SR	1962	http:// www.adonicollege.com/
2	Adikavi Nannaya University-Rajahmundry	AKNU	AP	SU	SR	2006	http://aknu.edu.in
3	Sri Padmavathi Mahila Visvavidyalayam-Chittoor	SPMV	AP	SU	SR	1983	http://www.spmvv.ac.in
4	Andhra University-Visakhapatnam	AU	AP	SU	SR	1926	https://andhra university.edu.in
5	Sri Krishnadevaraya University-Anantapur	SKU	AP	SU	SR	1981	http://skuniversity.ac.in
6	Acharya Nagarjuna University-Guntur	ANU	AP	SU	SR	1976	http://www.anu.ac.in
7	Dravidian University-Chittoor	DU	AP	SU	SR	1997	http://www. dravidianuniversity.ac.in
8	Rajiv Gandhi University-Doimukh	RGU	AR	CU	ER	1984	https://new.rgu.ac.in
9	Dibrugarh University-Dibrugarh	DU	AS	SU	ER	1965	https://dibru.ac.in
10	Tapindu Institute of Higher Studies-Patna	TIHS	BR	PT	ER	2007	https://www. tihspatna.com/
11	Millat Teacher's Training College-Bhowara	MTTC	BR	PT	ER	1991	http://www.millattt college.org/
12	Vipra Arts Commerce and Physical Education College- Raipur	VACPEC	CG	PT	WR	1996	http://vipracollege.org/
13	Seth R. C. S. Arts & Commerce College-Durg	RCS	CG	PT	WR	1964	http://www.rcs college.com/
14	PT. Harishankar Shukla Memorial College- Raipur	PTHSMC	CG	PT	WR	1995	https://harishan kargroup.com/
15	Mansa College of Education- Bhilai	MCE	CG	PT	WR	2002	http://www.mansa college.com/

Abbreviations: St/Ut – State/Union Territory; Mgt. – Management; Rgn. – Region;
Estd. – Established Year;

5.1 Domain Name

There are nine types of domains (see table 3) in the websites of these 189 institutions. Among this the domain '.ac.in' is the top-level domain employed in 66 (34.92%) of the websites.

Table 3

Domain-wise Distribution of Websites of PE Institutions

Sl.No	Types of Top-Level Domain	Total Domain	Percentage of Domain	Rank
1	.ac.in	66	34.92	1
2	.org	35	18.52	2
3	.com	30	15.87	3
4	.edu.in	21	11.11	4
5	.in	16	8.47	5
6	.org.in	11	5.82	6
7	.co.in	7	3.70	7
8	.edu	2	1.06	8
9	business.site	1	0.53	9
10	**Total**	**189**	**100**	-

5.2. Number of Web Pages and Type of Links

In the google indexed web pages, University of Mumbai (MU-Mumbai) is at the top with 61400. With regard to total links, Dibrugarh University, Assam stands first with 622754. In the case of internal links, Viswa-Bharati university, Santiniketan ranks first with 2013. When concerned with external links, Karnataka State Women's University, Viajayapura is in the top with 2011. Pondicherry University has the highest in Back Links with 2164204. Since the list occupies six pages, only the first 15 are given here (table 2). The authors can be contacted for a complete list.

Table 4

Number of Web Pages, Total Links, Self-Links, External Links and Back Links

Sl.No	Short Name and Placeof Institution	Number of WebPages	Total Links	Internal Links	External Links	Back Links
1.	PU-Pondicherry	3680	71	70	1	2164204
2.	RMVU-Coimbatore	6120	160	99	61	1479389
3.	BDU-Tiruchirapalli	10200	290	270	20	953911
4.	CU-Ajitgarh	1550	193	167	26	665456
5.	DU-Dibrugarh	29000	622754	425	19	622310

6.	SRM-Chennai	9220	96	37	59	616391
7.	MKU-Madurai	13300	260	225	35	355760
8.	MU-Mysuru	3040	154	132	22	336323
9.	BU-Coimbatore	488	161	121	40	327916
10.	MATS-Raipur	2070	277	244	33	314592
11.	AU-Karaikudi	2940	219	186	33	306537
12.	MSU-Tirunelveli	4040	85	69	16	246472
13.	MU-Mumbai	61400	345	260	85	231457
14.	AU-Noida	51000	371	323	48	213331
15.	OU-Hyderabad	7980	171	141	29	168708

5.3. Details of Different Web Impact Factor and Ranks

Among the various types of Web Impact Factors, Bharathiar University, Coimbatore ranked first in Revised Web Impact Factor with 671.96. University of Allahabad (UA) – Prayagraj occupies at the top in the case of Simple Web Impact Factor (SWIF) with 3060.00. Again University of Allahabad occupies at the top in Self-Link Web Impact Factor (SLWIF) with 1.00. Last 29 institutions in the table 5 with SLWIF being 0.000. With regards to External Link Web Impact Factor (ELWIF), Banaras Institute of Teacher's Education (BITE), Varanasi is at the top with 3.00. Here the last SLWIF being 0.000. Only 15 of them are given in table 5 and a complete list of all the 189 institutions are available with the authors.

Table 5

Details of Different Web Impact Factors and Their Ranks

Sl.No	Institutions Short Name & Place	SWIF	Rank	SLWIF	Rank	ELWIF	Rank	RWIF	Rank
1.	BU-Coimbatore	3.03	**100**	0.01	**83**	0.08	**57**	671.96	**1**
2.	PU-Pondicherry	51.83	**18**	0.01	**83**	0.00	**119**	588.10	**2**
3.	CU-Ajitgarh	8.03	**66**	0.01	**83**	0.02	**99**	429.33	**3**
4.	SGGSWU-Fatehgarh Sahib	1.81	**121**	0.01	**83**	0.04	**80**	357.84	**4**

5.	GU-Kalaburagi	0.07	**186**	0.00	**160**	1.39	**2**	331.17	**5**
6.	RMVU-Coimbatore	38.25	**25**	0.01	**83**	0.01	**118**	241.73	**6**
7.	MATS-Raipur	7.47	**71**	0.00	**160**	0.02	**99**	151.98	**7**
8.	PU-Mohali	2.36	**108**	0.01	**83**	0.28	**18**	144.34	**8**
9.	MU-Mysuru	19.74	**40**	0.01	**83**	0.01	**118**	110.63	**9**
10.	AU-Karaikudi	13.42	**53**	0.00	**160**	0.01	**118**	104.26	**10**
11.	HNGU-Patan	15.63	**48**	0.02	**58**	0.01	**118**	101.60	**11**
12.	BDU-Tiruchirapalli	35.17	**28**	0.00	**160**	0.00	**119**	93.52	**12**
13.	SRM-Chennai	96.04	**12**	0.01	**83**	0.01	**118**	66.85	**13**
14.	SNU-Ranchi	0.02	**189**	0.00	**160**	0.07	**60**	62.78	**14**
15.	MSU-Tirunelveli	47.53	**20**	0.01	**83**	0.00	**119**	61.01	**15**

5.4. Pearson correlation coefficient:

VassarStats-Pearson correlation coefficient (r), online statistics software was used to establish the association for ranking based on RWIF and SWIF.

Formula (r) =

$$\frac{n(xy) - (x)\,y}{\sqrt{([n\Sigma x^2 - (\Sigma x)^2][n\Sigma y^2 - (\Sigma y)^2}}$$

Where n = Number of College, Σx = Total of RWIF, Σy = Total of WIF, Σxy =Sum of the product of RWIF and WIF, Σx2 = Sum of the square of RWIF and Σy2 = Sum of the square of WIF.

Table 6

Sum Values of Pearson Correlation Coefficient

N=189	$\sum X$ = 4473.48	$\sum Y$ = 9508.42
XY= 149828.2308	$\sum X^2$ =1393301.6512	$\sum Y^2$ =14653802.594
r	**-0.0176**	

r = -0.0176= This value meaning is **'Weekly Negative Correlation'.**

Hence, the value of r indicates Weekly Negative relationship between R-WIF and WIF. In other word, there is weekly negative variation or and weekly negative differences between the R-WIF and WIF.

5.5. Link Topology

The websites of physical education institutions in India are connected well according to fig.3. It is found that there is a significant web-based association among the websites of the institutions studied.

Fig. 3. Link Topology of the Websites of Physical Education Institutions in India

6. Major Findings

i) Northern region of India has the highest number of Physical Education Institutions.

ii) Among the states, Uttar Pradesh has the maximum number of institutions (40.21%)

iii) Half of the institutions are under private management sector.

iv) More than one third (34.93%) of the institutions employed the domain '.ac.in'.

v) University of Allahabad, Prayagraj occupies the first in Simple Web Impact Factor.

vi) Bharathiar University, Coimbatore is at the top in the case of Revised Web Impact Factor

vii) Value of Pearson Correlation Coefficient (r) is '-0.0176 which shows a negative correlation

viii) When Link Topology of the websites studied, it is found that the websites of all the NCTE recognized Physical Education institutions are well connected.

7. Conclusion

Webometric studies are basically employed to collect data regarding websites mainly for the purpose of website ranking. Various types of ranking methods are used here. It is seen that the websites of the physical education institutions are intensely linked together. Thus the purpose and nature of work of these institutions are related and this aspect has come to light by studying the various type of link counts. WIF is a good webometric indicator and is applied in this study to measure the standard and quality of the websites of the physical education institutions in India. More webometric studies on the physical education sector expected.

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