

[Home](#)[Table of Contents](#)[Titles & Subject Index](#)[Authors Index](#)

Webometric analysis of Iranian medical universities according to visibility, size and rich files

Roghaye Tafaraji

School of Health, Ardabil University of Medical Sciences, Ardabil, Iran. Daneshgah street, Ardabil, Iran. E-mail: r.tafaraji@arums.ac.ir

Iman Tahamtan

Health Information Management Research Center, Hormozgan University of Medical Sciences, Bandar Abbas, Iran. First of Nabovat minicity, opposite of Workers Welfare Community, First of Imam Hossein Blv., Bandarabbas, Iran. E-mail: iman.tahamtan@gmail.com

Masoud Roudbari

Department of Health Biostatistics, School of Public Health, Iran University of Medical Sciences, Tehran, Iran. No. 8, Shahid Yasemi Street, Valiasr Avenue, Vanak square, Tehran, Iran. E-mail: m_roudbari@yahoo.co.uk

Shahram Sedghi (Corresponding Author)

1- Department of Librarianship and Medical Information, School of Health Management and Information Science, Iran University of Medical Sciences, Tehran, Iran. NO. 8, Shahid Yasemi Street, Valiasr Avenue, Vanak square, Tehran, Iran. E-mail: sedghi.s@iums.ac.ir;

2- Health Management and Economics Research Center, Iran University of Medical Sciences, Tehran, Iran.

Received September 7, 2013; Accepted June 25, 2014

Abstract

The purpose of this paper is to present the findings of a webometric analysis of web sites of medical universities of Iran. This study was conducted in September 2012 using Majestic SEO, Google, Yahoo and Bing search engines. The number of web pages, external inlinks, rich files and the total rank for 43 universities with active exclusive web sites were calculated. Findings indicated that Tehran University Medical Sciences with 220453 web pages, 887545 external inlinks, and 14495 rich files ranked as the first and Jiroft University of Medical Sciences had the lowest rank in the study. Findings indicated a significant relationship between the webometric

rank and the university rank in Iranian Ministry of Health. This study indicated that the use of rich files can give a better and more reliable view of university rankings. There are few studies focusing on the indicators such as rich files. The present study; however, is one of the few studies that used rich files to examine and analyze the university web sites. The paper would provide information to eliminate the barriers to improve web sites of medical universities in Iran.

Keywords

Webometric; Visibility; University ranking; Web Impact Factor; Rich files; Iran; External inlinks; Size; Web sites

Introduction

The World Wide Web (WWW) is a complex system and this is one of the widely used services on the Internet. The Web is a gigantic data repository and this is a facilitator for information acquisition and retrieval over the past decades suggested in the literature (Lu Joo & Wolfram, 2011). The constant development of Web has encouraged the researchers to understand its properties, nature and characteristics (Lu Joo & Wolfram, 2011). The aim of webometric analysis is to study various aspects of the Web including its structure, organization, topology, functions, characteristics, interconnections and development (Noruzi, 2004). In recent years, various techniques and concepts have been introduced to study and rank the web sites. An important concept introduced by Ingwersen (1998) is the Web Impact Factor (WIF) that indicates the ratio between the number of external inlinks to a web site and the number of web pages in the web site. Noruzi suggested that “*The WIF provides quantitative tools for ranking, evaluating, categorizing, and comparing web sites, top-level domains, and sub-domains*”. WIF like other indicators has some shortcomings, as this is not a perfect measurement for knowing the quality and even the quantity of web sites from a country (Noruzi, 2006); however, substantial studies used WIF as the main indicator for Web ranking.

Later on, the researchers of Cybermetric laboratory in Spanish National Research Council (CSIC) started their efforts to design, develop and compile Web indicators for analysis of academic web sites and to measure Web activity and visibility. Their efforts ultimately lead to build up a global university's ranking list. Accordingly, since 2004, Aguillo and his colleagues in Cybermetric laboratory calculated worldwide webometric ranking of universities using other parameters than WIF (Pavlina, 2012). The previous indicator, WIF takes into account both visibility (number of inlinks or external links) and size (number of web pages) in a ratio of 1:1. However, Aguillo and his colleagues suggested a technique to increase the weight of the visibility. Additionally, they added anew indicator (representing the number of rich files in a web

domain) to the size component and making a new ratio of 4:3 instead of 1:1 ratio. Later, they included new indicators such as the “Excellence” ((indicating the scientific output of a university, being part of the 10% most cited papers in their respective scientific fields) (Webometrics methodology, 2013)). in a recent paper published by Aguillo et al. (2008) from The Cybermetric Lab, the authors suggested a combined indicator for world universities ranking known as WR “that takes into account the number of published web pages (S) (25 percent), the number of rich files, those in PDF, PS, DOC and PPT format (R) (12.5 percent), the number of articles gathered from the Google Scholar database (12.5 percent,) and the total number of external inlinks (50 percent)”.

Due to the dynamic feature of the Web, rankings are changeable during the time. As lee and Park (2012) suggested, "*with the rapid development of the Internet, there is a need for assessing the public Web visibility in terms of its implications for university management, planning, and governance*". Today, the impact of universities web sites is essential. Therefore, several studies have used WIF to investigate the presence and impact of university’s web sites on Web. Iranian universities are now trying to get noticed through their web sites.

Our investigations indicate that few studies have recently investigated the web sites of Iranian universities. However, none of them have used the rich file indicator. Therefore, we decided to investigate webometric ranking of Iranian universities of medical sciences according to inlinks, size and rich files. A comprehensive review of literature indicated that the current study was the pioneering study which involved the “rich files” for ranking the universities web sites. Furthermore, we examined the relationship between webometric rank of Iranian medical universities and the recent ranking published by Iranian Ministry of Health and Medical Education (MHME).

Literature Review

There have been a number of studies investigating the structure and features of the Web all around the world, using webometric techniques. In most previous studies, the ranking was based on in link WIF, since this was a useful mean for the overall influence of a web site (Noruzi, 2006).

A number of studies have investigated the web sites of academic institutions and universities. These studies aimed to promote global access to academic knowledge and develop the academic, scientific and educational capabilities of a university as they are valuable means for Web users (Ortega & Aguillo, 2009; Nwagwu & Agarín, 2008). Improving university and academic web sites based on webometric indicators leads to more global attention on the web site of a university and helps to get a higher rank in the world universities ranking. For instance, Elgohary (2008) investigated the WIF of 99 Arab Universities from 20 countries, calculated by the

AltaVista search engine. Results indicated that more than 40 % of the Arab universities had a low Web presence. Saudi Arabian Universities were located in the top of Arab Universities in terms of their Web presence and four Jordanian were in the top ten universities with revised WIF. Islam and Alam (2011) examined the web sites of 44 private university web sites in Bangladesh using the AltaVista search engine. Findings of this study indicated that these universities did not have much impact factor on the Web and were not known internationally. Private universities in Bangladesh had higher number of web pages however; their link pages were very small in number. Jeyshankar and Ramesh Babu (2009) studied the web sites of 27 state and 18 private universities in Tamil Nadu state in India. Their findings indicated that a number of universities in Tamil Nadu had higher number of web pages though their link pages were very small and had a low simple, self-link and external link WIF.

As stated earlier, few studies have applied the indicators suggested by Aguillo et al. (2006) to investigate web sites. For instance, Vijayakumar et al. (2012) made a webometric analysis of SAARC countries. In part of the study he used Aguillo WISER formula ($WISER\ ranking = \log(\text{Visibility } 50\%) + \log(\text{Size } 20\%) + \log(\text{rich files } 15\%) + \log(\text{Google Scholar } 15\%)$). The study found that India, Pakistan and Sri Lanka obtained the highest rank. These countries also had the highest rank based on rich files (PDF, PS, DOC, PPT, XLS and RTF). A webometric study by Pavlina (2012) ranked European Universities and revealed that Aguillo et al. (2006) made some methodological mistakes, when they considered weight and the Excellency of each university in a single domain. Pavlina (2012) reported that Aguillo et al. (2006) regarded only one domain for each university when calculating its ranking. However, the total rank of prominent universities such as John Hopkins, Empirical College, and Harvard University were biased since they regarded several domains for aforementioned universities university. This study revealed that a fair application of this method could change the overall ranking of universities studied by Aguillo et al. (2006). Nevertheless, the study shows that state universities have had more visibility compared to other universities.

Shukla and Poluru (2012) analyzed the presence of 173 Indian universities on the Internet. This study noted a number of critical factors improving the visibility of universities. These were: maintaining institutional repositories, promotion of open access, academic and research profile, collaboration with other universities and online communities.

Lee and Park (2012) suggested that “indicators of web visibility can function as a proxy measure of conventional university rankings”. Furthermore authors reported that universities in English-speaking countries were dominant in regarding the visibility, whereas universities from other countries were located in the periphery.

A number of studies investigated the WIFs for Iranian Universities. For example, Noruzi (2005) used AltaVista to calculate the WIFs for Iranian universities by dividing link page counts by the number of pages for each university. He suggested that Iranian university web sites had a low inlink and WIF. He recommended that due to the linguistic and geographic barriers, Iranian Universities were not popular on the Web. Aminpour et al. (2009) ranked Iranian medical universities using the AltaVista search engine and WIF as the main criteria to rank the universities. This study indicated that Iranian medical universities had a low impact on the Web. Tehran University of Medical Sciences was ranked first for size (49,300 web pages) and number of inlinks and second rank in external inlinks. This university ranked 38th regarding the WIF, while Rafsanjan University of Medical Sciences with 15 web pages and 211 inlinks was ranked the first regarding the WIF.

To conclude, the previous studies usually have used inlinks and size as the main webometric criteria. Therefore, we decided to examine another webometric indicator which was rich files to see the impact of his new indicator on webometric ranks.

Objectives

This study investigates webometric indicators of Iranian medical universities web sites and it aimed to reach the following objectives:

1. To identify the frequency and percentage of Iranian medical universities indexed by Yahoo and Bing search engines and rank them based on their web page size,
2. To identify the frequency and percentage of external inlinks of Iranian medical universities from the output of Yahoo and Bing and rank them based on the web site visibility,
3. To identify the frequency and percentage of file formats (PDF, DOC, XLS, XML and PPT) for each university web site and rank Iranian medical universities based on rich files,
4. To identify the total rank of Iranian medical universities based on webometric indicators (size, visibility and rich files), and
5. Examine the relationship between webometric rank of Iranian medical universities and the recent ranking of Iranian medical universities, published by Iran Ministry of Health and Medical Education (MHME).

Methods

We investigated the Iranian medical universities. Iranian Ministry of Health (www.behdasht.gov.ir) classified Iranian medical universities into three classes: 1st class, 2nd class, and 3rd class. This classification is based on criteria such as the scientific production of

each university (Khosrowjerdi et al., 2011). We included official web sites of all universities regardless of the ranks of the universities. In total 43 web sites were investigated as the subjects of the study. Three universities didn't have web sites, thus we excluded them from the study. We used Majestic SEO, Google, Yahoo and Bing search engines to collect the data we needed for the experiment. By the time we conducted this study; researchers have used various search engines in the past webometric studies and each of them has advantages and draw backs. The majority of webometric studies have used the advanced search options of search engines such as Yahoo. In webometric studies based on WIF, AltaVista had been the dominant search engine (Noruzi 2006; Noruzi 2005; Kousha & Horri 2004). Although search engines are essential tools for conducting webometric studies, there are potential shortcomings that limit link analysis in webometric studies (Noruzi, 2006). Thelwall (2003) emphasized that Google Page Rank is not suitable for identifying the top pages in a specific web site. Thelwall (2004) suggested that Google web search engine does not allow users to build queries with Boolean operators as Yahoo does. Google Scholar is not a common tool because it covers a wide range of items compared to scholarly databases (Aguillo, 2012). Webometric ranking uses Majestic SEO and Ahref to calculate visibility (Webometrics methodology, 2013).

As stated earlier, the current study took place in September 2012 and we used the methods explained by Aguillo et al. (2006) to investigate the web sites of Iranian medical universities.

Size (S): Number of pages calculated by Google, Yahoo and Bing search engines. For each search engine, results are presented separately and each university is given a score regarding the combined sum of the scores obtained from all three search engines as advised by Aguillo et al. (2006). The size of each domain was calculated with the following strategy: Site: example.com.

Visibility (V): Visibility is the total number of external inlinks received by a site and this can be obtained by majestic SEO search engine.

Rich Files (R): Rich files are complete and independent items in different formats (such as Adobe Acrobat (.pdf), Microsoft Excel (.xls), Microsoft Word (.doc), Microsoft PowerPoint (.ppt) and Extensible Markup Language (XML)). Number of file formats for each university was obtained on Google with the following strategy: site: example.com file type: example file format

Aguillo et al. (2006) formula for ranking of world universities on the web was used to count the total rank of Iranian medical universities web sites:

$$I(\text{total rank}) = 2R_s + 4R_v + R_r$$

Aguillo et al. (2006) suggested: *“With these results, the data were combined by the sum of the values obtained in the three categories: S, V, and R. the score values are substituted by their relative position (R) in a ranking of the domains determined according to these three parameters*

(R_s , R_v , and R_r)²⁷. The amount of R was counted in a range of 1 to 43, as forty three Iranian medical universities were investigated in current study. We calculated the total rank of Tehran University of Medical Sciences to illustrate better the above formula. Tehran University of Medical Sciences ranked first in the number of web pages (s), 1 in number of external inlinks (v) and 3 in number of rich files (r). Then, its total rank calculated 9: Total Rank= 2(1) + 4 (1) + (3) = 9.

Results

This research measured the webometric indicators of all Iranian medical universities (eight universities in 1st, twenty universities in 2nd and fifteen universities in 3rd class). Tehran University of Medical Sciences had the highest rank in the average number of web pages extracted from the three search engines and Shiraz University of Medical Sciences and Isfahan University of Medical Sciences were in the second and third ranks. Dezfoul University of Medical Sciences obtained the last position in the average of web pages (Table 1).

Table 1. University ranks based on size on Google, Yahoo and Bing

Iranian UMSs ¹ Web Site	University Name	Size			Average	Rank
		Google	Yahoo	Bing		
tums	Tehran	509000	97559	54800	220453	1
sums	Shiraz	114000	31534	40800	62111	2
mui	Isfahan	131000	16649	16300	54650	3
mums	Mashhad	81200	32058	25400	46219	4
mubabol	Babol	104000	1589	645	35411	5
sbmu	Shahisbeheshti	51600	24497	16100	30732	6
ssu	yazd	69600	11968	3680	28416	7
uswr	Behzisti	72800	3541	1680	26007	8
goums	Golestan	50000	19862	3670	24511	9
tbzmed	Tabriz	50900	8466	6100	21822	10
zums	Zanjan	30800	25277	5770	20616	11
arums	Ardabil	52300	3517	5290	20369	12
kums	Kermanshah	28800	13865	6430	16365	13
umsha	Hamedan	41200	4568	2150	15973	14
muq	Qom	34900	2709	2100	13236	15
skums	Shahrekord	32500	5084	1510	13031	16
zaums	Zahedan	32000	79	2000	11360	17

¹. University of medical sciences

qums	Qazvin	28700	42	93	9612	18
bums	Birjand	18100	5333	3700	9044	19
kaums	Kashan	19900	3125	3160	8728	20
rums	Rafsanjan	16500	6738	1950	8396	21
ajums	Ahvaz	19800	1029	1750	7526	22
kmu	Kerman	15900	2724	2730	7118	23
gums	Guilan	14200	2353	2060	6204	24
muk	Kordestan	15400	1023	1110	5844	25
hums	Hormozgan	8780	2506	3250	4845	26
semums	Semnan	9970	1534	1600	4368	27
arakmu	Arak	9630	2746	432	4267	28
umsu	urumia	7370	2101	1660	3710	29
nkums	Bojnoord	10400	178	455	3678	30
medilam	Ilam	8290	1533	1060	3628	31
lums	Lorestan	6700	1480	895	3025	32
jums	Jahrom	3210	2430	1120	2253	33
zbmu	zabol	4380	1494	556	2143	34
shmu	Shahrood	3350	1631	427	1803	35
bpums	Bushehr	3830	1013	454	1766	36
fums	Fasa	2410	1472	438	1440	37
mazums	Mazandaran	7290	4060	955	1102	38
gmu	Gonabad	2040	321	809	1057	39
medsab	Sabzevar	1650	89	175	638	40
yums	Yasouj	1260	348	263	624	41
jmu	Jiroft	437	1	89	176	42
dums	Dezful	219	2	129	117	43

On the Google search engine, Tehran, Isfahan and Shiraz University of Medical Sciences, on the Yahoo search engine, Tehran, Mashhad and Shiraz University of Medical Sciences and on the Bing search engine, Tehran, Shiraz and Mashhad University of Medical Sciences had the highest ranks in size. On Google, Yasouj, Jiroft and Dezful University of Medical Sciences, and on Yahoo, Qazvin, Dezful and Jiroft University of Medical Sciences and on Bing, Dezful, Qazvin and Jiroft got the last positions. Iranian medical universities totally had 1726316 web pages on Google, 250126 on Yahoo and 225745 on Bing.

Tehran University of Medical Sciences with 887545, had the highest visibility, followed by Mashhad University of Medical Sciences and Shiraz University of Medical Sciences. Yasouj University of Medical Sciences was in the last position with 24 external inlinks (Table 2).

Table 2. Rank of Iranian medical universities based on visibility

Row	Iranian UMSs Web Site	University Name	Visibility	Rank
			Majestic SEO	
1	tums	Tehran	887545	1
2	mums	Mashhad	412326	2
3	sums	Shiraz	380589	3
4	muk	Kordestan	285059	4
5	bpums	Bushehr	240872	5
6	sbmu	Shahidbeheshti	216329	6
7	mui	Isfahan	196403	7
8	umsha	Hamedan	174146	8
9	lums	Lorestan	168063	9
10	bums	Birjand	140491	10
11	tbzmed	Tabriz	138547	11
12	arakmu	Arak	131083	12
13	umsu	Urumia	97069	13
14	ssu	Yazd	96249	14
15	mubabol	Babol	89787	15
16	zums	Zanjan	83661	16
17	goums	Golestan	80513	17
18	kmu	Kerman	73037	18
19	arums	Ardabil	71875	19
20	uswr	Behzisti	71475	20
21	muq	Qom	68159	21
22	ajums	Ahvaz	68053	22
23	hums	Hormozgan	67782	23
24	mazums	Mazandaran	62161	24
25	gums	Gilan	56506	25
26	semums	Semnan	46929	26
27	kaums	Kashan	40068	27
28	kums	Kermanshah	39973	28
29	gmu	Gonabad	35469	29
30	dums	Dezful	33318	30
31	zaums	zahedan	32034	31
32	nkums	Bojnood	31878	32
33	qums	Qazvin	28877	33

34	rums	Rafsanjan	24750	34
35	fums	Fasa	23421	35
36	skums	Shahrekord	23357	36
37	jums	Jahrom	23319	37
38	medilam	Ilam	22753	38
39	shmu	Shahrood	21465	39
40	zbmu	Zabol	20864	40
41	jmu	Jiroft	17995	41
42	medsab	Sabzevar	17596	42
43	yums	Yasouj	24	43

Table 3. Number of rich files in Iranian medical universities

Iranian UMSs Web Site	University Name	PDF	DOC	XLS	XLM	PPT	Total Number of rich files	Rank
sums	Shiraz	12800	4120	424	268	730	18342	1
mums	Mashhad	10400	3160	339	1340	606	15845	2
tums	Tehran	11900	1760	97	4	734	14495	3
tbzmed	Tabriz	9330	1360	226	497	110	11523	4
sbmu	ShahidBeheshti	7740	1480	81	1	120	9422	5
mui	Isfahan	4050	721	127	56	175	5129	6
ssu	Yazd	1490	2600	106	143	264	4603	7
kmu	Kerman	2850	829	30	0	298	4007	8
goums	Golestan	1650	1070	3	607	27	3357	9
arums	Ardabil	1570	131	1	982	4	2688	10
zums	Zanjan	1680	637	30	87	70	2504	11
muq	Qom	1930	122	20	239	6	2317	12
bums	Birjand	1750	238	37	0	129	2154	13
kums	Kermanshah	1270	707	94	1	52	2124	14
umsha	Hamedan	1510	246	19	1	47	1823	15
kaums	Kashan	1200	451	6	1	106	1764	16
gums	Guilan	1050	151	50	215	0	1466	17
lums	Lorestan	1120	312	4	0	18	1454	18
skums	Shahrekord	550	288	3	520	27	1388	19
hums	Hormozgan	1110	149	39	1	52	1351	20
ajums	Ahvaz	781	305	9	2	3	1100	21
medilam	Ilam	772	164	9	0	21	966	22
uswr	Behzisti	889	22	9	8	0	928	23
nkums	Bojnoord	419	483	3	0	2	907	24
umsu	Urumia	533	196	0	0	1	730	25
rums	Rafsanjan	255	358	10	0	15	638	26
bpums	Bushehr	478	14	7	0	0	499	27
zaums	Zahedan	233	239	12	0	2	486	28
mazums	Mazandaran	292	125	5	2	10	434	29
yums	Yasouj	244	98	1	29	6	378	30
jums	Jahrom	248	98	0	0	0	346	31

zbmu	Zabol	138	131	0	0	4	273	32
semums	Semnan	161	69	3	0	34	267	33
medsab	Sabzevar	164	67	0	1	0	232	34
mubabol	Babol	175	43	1	0	2	221	35
arakmu	Arak	128	92	0	0	0	220	36
fums	Fasa	116	67	21	0	8	212	37
gmu	Gonabad	145	48	0	0	5	198	38
muk	Kordestan	97	22	0	1	3	123	39
qums	Qazvin	113	0	0	0	0	113	40
shmu	Shahrood	29	24	1	46	1	101	41
dums	Dezful	33	5	0	0	0	38	42
jmu	Jiroft	9	2	1	0	0	12	43

Table 3 showed that Shiraz University of Medical Sciences, with the total number of 18342 rich files, placed in first rank. The second and third ranks were taken by Mashhad University of Medical Sciences (15845 rich files) and Tehran University of Medical Sciences (14495 rich files). Jiroft University of Medical Sciences with 12 rich files got the last rank in this list. Iranian medical universities usually used pdf and Microsoft word formats and the least used format was xml according to the information provided in Table 3. In sum, Iranian medical universities had 83402 pdf, 1828 xls, 23204 doc, 5052 xml and 3692 ppt files on their web sites.

Table 4. The total rank of Iranian medical universities based on size, visibility and rich files values for each university web site

Row	Studied Web Sites	Column1	Tip	Rs	Rv	Rr	Total Rank
1	tums.ac.ir	Tehran	1	1	1	3	9
2	sums.ac.ir	Shiraz	1	2	3	1	17
3	mums.ac.ir	Mashhad	1	4	2	2	18
4	sbmu.ac.ir	ShahidBeheshti	1	6	6	5	39
5	mui.ac.ir	Isfahan	1	3	7	6	40
6	tbzmed.ac.ir	Tabriz	1	10	11	4	68
7	umsha.ac.ir	Hamedan	2	14	8	15	75
8	ssu.ac.ir	Yazd	2	7	14	7	77
9	bums.ac.ir	Birjand	3	19	10	13	91
10	zums.ac.ir	Zanjan	2	11	16	11	93
11	goums.ac.ir	Golestan	2	9	17	9	95
12	arakmu.ac.ir	Arak	2	28	11	36	100
13	mubabol.ac.ir	Babol	2	5	15	35	105
14	arums.ac.ir	Ardabil	2	12	19	10	110
15	lums.ac.ir	Lorestan	2	32	9	18	118
16	bpums.ac.ir	Bushehr	3	36	5	27	119
17	uswr.ac.ir	Behzisti	2	8	20	23	119
18	kmu.ac.ir	Kerman	1	23	18	8	126
19	umsu.ac.ir	Urumia	2	29	13	25	135
20	muk.ac.ir	Kordestan	3	25	4	39	136
21	muq.ac.ir	Qom	2	15	24	12	138
22	gums.ac.ir	Gilan	2	24	21	17	149
23	kums.ac.ir	Kermanshah	2	13	28	14	152
24	ajums.ac.ir	Ahvaz	1	22	22	21	153
25	kaums.ac.ir	Kashan	2	20	26	16	160
26	hums.ac.ir	Hormozgan	2	26	23	20	164
27	semums.ac.ir	Semnan	2	27	26	33	181
28	zaums.ac.ir	Zahedan	2	17	31	28	186
29	skums.ac.ir	Sharekord	2	16	36	19	195
30	mazums.ac.ir	Mazandaran	2	38	24	29	201
31	rums.ac.ir	Rafsanjan	3	21	34	26	204
32	qums.ac.ir	Qazvin	2	18	33	40	204

33	nkums.ac.ir	Bojnoord	3	30	32	24	212
34	yums.ac.ir	Yasooj	3	14	43	30	230
35	gmu.ac.ir	Gonabad	3	39	29	38	232
36	medilam.ac.ir	Ilam	3	31	38	22	236
37	jums.ac.ir	Jahrom	3	33	37	31	245
38	dums.ac.ir	Dezful	3	43	30	42	248
39	fums.ac.ir	Fasa	3	37	35	37	251
40	shmu.ac.ir	Shahrood	3	35	36	41	255
41	zbmu.ac.ir	Zabol	3	34	40	32	260
42	medsab.ac.ir	Sabzevar	3	40	42	34	282
43	jmu.ac.ir	Jiroft	3	42	41	43	291

The Iranian medical universities are listed in Table 4 together with their corresponding URLs and the rank that each indicator received in each university web sites. Furthermore, the total rank (Total Rank=2Rs+4Rv+Rr) of Iranian medical universities based on number of web pages, visibility and total number of rich files can be seen in this table. Tehran, Shiraz and Mashhad University of Medical Sciences had the highest total rank and Zabol, Sabzevar and Jiroft University of Medical Sciences had the lowest Total rank.

We applied Pearson correlation coefficients to examine the relationship between the webometric ranking of Iranian medical universities with the university ranking published by Iran MHME. Table 5 indicates a significant relationship between the webometric rank and the university rank in Iran MHME.

Table 5. Pearson correlation coefficient

	Webometric rank	University rank
Webometric rank	1	0.85 *
University rank	0.85 *	1

Discussion

Current study calculated the number of web pages, external inlinks and rich files as well as total rank for Iranian medical universities web sites using Majestic SEO, Google, Yahoo and Bing search engines. This study used Aguillo et al. (2006) formula to calculate rank of university web sites, thus we used Google to calculate the total number of rich files and web pages, Majestic

SEO search engine to calculate external inlinks and web pages, Yahoo and Bing to calculate the number of web pages.

Tehran, Shiraz and Mashhad University of Medical Sciences had the highest total rank. In a study by Aminpour (2009), Rafsanjan University of Medical Sciences, located at the first place for the WIF among Iranian medical universities. However, in current study Jiroft University of Medical Sciences ranked last among the 43 Iranian medical universities. International Webometric Ranking ranked Tehran University of Medical Sciences at 15th place among Middle East universities and 784th in the world rank (15th/ 784th) in 2013. The next places obtained by Shiraz University of Medical Sciences (51th/ 1579th), Isfahan University of Medical Sciences (57th/ 1649th), Tabriz University of Medical Sciences (88th/1907th), and Shahid Beheshti University of Medical Sciences (61th/ 1711th) placed at the next ranks (Ranking Web of Universities, 2013). Tehran and Shiraz University of Medical Sciences placed at the 2nd and 13th in the national webometric ranking among all medical and non-medical universities.

Tehran University of Medical Sciences which is the biggest medical university in Iran, is ranked at the first place for about 10 years based on university ranking indicators in Iranian Ministry of Health. This university ranked 38 at Aminpour et al. (2009) study. Our study indicated that Tehran University of Medical Sciences with 220453 web pages, 887545 external inlinks, and 14495 rich files got the first position at total rank. According to webometric ranking, Tehran University of Medical Sciences was ranked first in 2012 and July 2013 reports. Then, it might be concluded that the use of indicators such as rich files can give a better and more reliable view of university rankings.

Tehran, Shiraz and Isfahan University of Medical Sciences had the highest rank for web pages. However, in Aminpour et al (2009) study, Tehran, Iran, Guilan and Isfahan University of Medical Sciences had the highest rank for total pages. The webometric ranking in July 2013 indicated that Tehran, Shiraz and Mashhad and Isfahan University of Medical Sciences had the best national ranking for the total number of web pages (presence) among Iranian medical universities. Since, Tehran, Shiraz and Mashhad and Isfahan University of Medical Sciences are the largest and 1st ranked medical universities in the country, own the most and major colleges and research centers and serve a big number of people, they have more web pages than other national universities. Some universities had also the lowest number of web pages. Most of these universities were ranked in 3rd and 2nd classes of the universities in the national ranking by the Ministry of Health. There might be a relationship between webometric ranking with the health ministry ranking, size of the university, number of students, faculty members, colleges, fields and etc.

Findings indicated that Tehran, Mashhad and Shiraz University of Medical Sciences had the highest rank and Yasouj University of Medical Sciences had the lowest rank for the total number of external links in Majestic SEO. However, Aminpour et al (2009) indicated that Mazandaran University of Medical Sciences was the first in the number of external inlinks, following Tehran (9700) and Shiraz University of Medical Sciences (7800), respectively. According to webometric ranking in July 2013, Tehran, Shiraz, Mashhad and Isfahan University of Medical Sciences received the highest rank for external inlinks. We think the difference between findings of our study, Amipour et al (2009) and the webometric ranking in 2013 is due to the use of different search engines to calculate external inlinks. Aminpour et al (2009) used Alta Vista, in current study we used Majestic SEO and webometric ranking used Majestic SEO and AHREFS to calculate visibility.

Shiraz, Mashhad and Tehran University of Medical Sciences got the best positions in rich files, respectively. In sum, Iranian medical universities had 83402 PDF, 1828 XLS, 23204 DOC, 5052 XML and 3692 PPT files on their web sites. To compare with highly ranked Asian universities such as University of Tokyo and National Taiwan University, even highly ranked Iranian medical universities have published few documents on the Web. Webometric ranking in July 2013 indicated that Mashhad, Isfahan, Tehran and Shiraz University of Medical Sciences had the best ranking in rich files. A number of universities had a low number of rich files. Findings indicated that most of these universities were ranked 3rd and 2nd in national ranking by health ministry. We noticed that these universities get a low rank in rich files, as they are small universities that serve fewer people than biggest universities like Tehran University of Medical Sciences.

According to findings, one may argue that the medical universities that were ranked high in the ministry have more impact on the Web. For instance, Tehran University of Medical Sciences, Shiraz University of Medical Sciences, Isfahan, Shahid Beheshti, and Mashhad University of Medical Sciences are the best ranked universities in Iran according to the health ministry ranking. Webometric ranking by Cybermetric Lab in 2012 and 2013 also indicated that these universities had a better national ranking (Tehran University of Medical Sciences ranked 1st, Shiraz ranked 2nd, Isfahan ranked 3rd, Shahid Beheshti ranked 4th and Mashhad ranked 5th). These 1st ranked universities are bigger in size, services, and customers and produce more scientific information in the country. Findings indicated that there was a relationship between these variables and webometric ranking of web sites.

This study had some limitations. We used the formula presented by Aguillo et al., in 2006. Thus, we did not calculate new indicators such as the number of rich files on the web site of each university with the output of Google Scholar. Another limitation was the variability of search engine results.

Conclusions

The findings of the current study indicated that Iranian medical universities had a low number of web pages, external inlinks and rich files. This may cause these universities to have a low presence on the Web. Furthermore, as findings indicated this might be concluded that Iranian medical universities with higher rank in MHME had also a better webometric rank. It is recommended to use rich files in webometric studies as the use of rich files results in a more reliable ranking.

Medical universities should enrich their web sites and try to attract more visibility by publishing more valuable information in the international languages. They should provide more web pages and valuable content to make them more attractive internationally. For instance, lesson plans of each department, faculty members resumes, course syllabus and resources, annual and monthly university reports, free online courses, class conferences of master and PhD students, faculty members pamphlets and presentations, scientific projects, thesis and dissertations and electronic books can be uploaded on the university web site in various formats. Furthermore, they can put the web domain link of other national universities in their web sites for increasing their visibility.

Attributes such as the languages of the web site influence its impact and presence on the Web. English and Arabic web pages in Iranian medical universities web sites should be improved to acquire outstanding international view. To increase inlinks and visibility, each university should have only one domain and the web sites of health centers, hospitals and research centers should be under the name of the main web domain of the university. Each university should link its web site to other medical and non-medical universities.

Further studies should be carried out by using the new webometric indicators to investigate the rank of universities to fill the gap and to help them improve over the time. Further studies should be done to examine the relationship between external inlinks, size and rich files with other international and national rankings which use other indicators such as scientific production, size of the university, number of students, faculty members, colleges and etc.

Acknowledgments

This study was a part of a MS thesis supported by Iran University of Medical Sciences, School of Health Management and Information Science.

References

- Aguillo, I. F. (2012). Is Google Scholar useful for bibliometrics? A webometric analysis. *Scientometrics*, 91(2), 343-351.
- Aguillo, I. F., Granadino, B., Ortega, J. L., & Prieto, J. A. (2006). Scientific research activity and communication measured with cybermetrics indicators. *Journal of the American Society for Information Science and Technology*, 57(10), 1296-1302.
- Aguillo, I. F., Ortega, J. L., & Fernández, M. (2008). Webometric ranking of world universities: Introduction, methodology, and future developments. *Higher Education in Europe*, 33(2-3), 233-244.
- Aminpour, F., Kabiri, P., Otraj, Z., & Keshtkar, A. A. (2009). Webometric analysis of Iranian universities of medical sciences. *Scientometrics*, 80(1), 253-264.
- Elgohary, A. (2008). Arab universities on the web: A webometric study. *Electronic Library*, 26(3), 374-386.
- Ingwersen, P. (1998). The calculation of web impact factors. *Journal of Documentation*, 54(2), 236-243.
- Islam, M. A., & Alam, M. S. (2011). Webometric study of private universities in Bangladesh. *Malaysian Journal of Library & Information Science*, 16(2), 115-126.
- Jeyshankar, R., & Ramesh Babu, B. (2009). Websites of universities in Tamal Nadu: A webometric study. *Annals of library and information studies*, 56(2), 69.
- Khosrowjerdi, M., Bayat, M. K., Eslami, A., Hajipoor, M., & Zeraatkar, N. (2011). Proximity rule and Matthew effect in co-authorships of Iranian medical universities. *Webology*, 8(2), article 92. Retrieved January 10, 2014, from <http://www.webology.org/2011/v8n2/a92.html>
- Kousha, K., & Horri, A. (2004). The relationship between scholarly publishing and the counts of academic inlinks to Iranian university web sites: exploring academic link creation motivations. *Journal of Information Management and Scientometrics*, 1(2), 13-22.
- Lee, M., & Park, H. W. (2012). Exploring the web visibility of world-class universities. *Scientometrics*, 90(1), 201-218.
- Lu, K., Joo, S., & Wolfram, D. (2011). An investigation of web resource distribution in the field of information science. *International Journal of Scientometrics, Informetrics and Bibliometrics*, 15(1), Paper 1. Retrieved May 12, 2014, from <http://www.cybermetrics.info/articles/v15i1p1.html>
- Noruzi, A. (2004). Introduction to Webology. *Webology*, 1(1), article 1. Retrieved January 10, 2014, from <http://www.webology.org/2004/v1n1/a1.html>
- Noruzi, A. (2005). Web impact factors for Iranian universities. *Webology*, 2(1), article 11. Retrieved January 10, 2014, from <http://www.webology.org/2005/v2n1/a11.html>
- Noruzi, A. (2006). Web presence and impact factors for Middle-Eastern countries. *Online Magazine*, 30(2), 22-28.
- Nwagwu, W. E., & Agarin, O. (2008). Nigerian university web sites: A webometric analysis. *Webology*, 5(4), article 65. Retrieved January 10, 2014, from <http://www.webology.org/2008/v5n4/a65.html>
- Ortega, J. L., & Aguillo, I. F. (2009). Mapping world-class universities on the web. *Information Processing & Management*, 45(2), 272-279.
- Pavlina, K. (2012). Webometric ranking of European universities. *Procedia - Social and Behavioral Sciences*, 46(0), 3788-3792.
- Ranking Web of Universities (2013). Retrieved January 10, 2014, from http://www.webometrics.info/en/Asia_Pacifico/Middle_East
- Ranking Web of Universities (2013). Retrieved January 10, 2014, from <http://www.webometrics.info/en/Methodology>
- Shukla, S.H., and Poluru, L. (2012). Webometric Analysis and Indicators of Selected Indian State Universities” *Information Studies*, 18(2), 79-104.

- Smith, A.G. (1999). A tale of two web spaces: comparing sites using web impact factors. *Journal of Documentation*, 55(5), 577-592.
- Thelwall, M. (2003). Can Google's PageRank be used to find the most important academic Web pages? *Journal of Documentation*, 59(2), 205-217.
- Thelwall, M., & Harries, G. (2004). Do the web sites of higher rated scholars have significantly more online impact? *Journal of the American Society for Information Science and Technology*, 55(2), 149-159.
- Vijayakumar, M., Kannappanavar, B. U., & Santosh Kumar KT. (2011). Webometric analysis of web presence and links of SAARC countries. *DESIDOC Journal of Library & Information Technology*, 32(1). Retrieved January 10, 2014, from <http://publications.drdo.gov.in/ojs/index.php/djlit/article/view/1409>

Bibliographic information of this paper for citing:

- Tafaraji, Roghaye, Tahamtan, Iman, Roudbari, Masoud, Sedghi, Shahram (2014). "Webometric analysis of Iranian medical universities according to visibility, size and rich files." *Webology*, 11(1), Article 119. Available at: <http://www.webology.org/2014/v11n1/a119.pdf>

Copyright © 2014, Roghaye Tafaraji, Iman Tahamtan, Masoud Roudbari, Shahram Sedghi.