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Webometric Study of World Class Universities Websites

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Abstract: The objective of this study is to determine whether there are differences in terms of visibility and accessibility of the top thirty and the bottom thirty world class universities websites. Using software *Alexa*, it is possible to gauge the volume of web traffic in order to determine the visibility of the website. In this study *Alexa* is applied to study the visibility of these universities websites. The development of any website has to comply with the existing accessibility guidelines. It is futile to have a website that is difficult to access by users owing to non-compliance with the existing standards on accessibility. To check for such irregularities a software *EvalAccess* was used. By comparing the state of visibility and accessibility among the top and bottom world class universities websites, it was found that those top rank universities websites are more visible and accessible as compared to the others.

Keywords: webometrics, websites, world class universities, *Alexa, EvalAccess*

1. Introduction

World universities are very much concerned with their rankings in the listing produced by several media organizations that are involved in ranking of world universities. There are three major organizations that conducted the ranking of World Universities, firstly the Centre for World Class Universities of Shanghai Jiao Tong University. According to *Shanghai Jiao Tong University Ranking* of World Universities 2013 the top ten universities in decreasing order are the Harvard University, Stanford University, University of California, Berkeley, Massachusetts Institute of Technology (MIT), University of Cambridge, California Institute of Technology, Princeton University, Columbia University, University of Chicago and University of Oxford. Secondly, the *QS World University Rankings* accorded the following universities as the top ten universities in decreasing order the Massachusetts Institute of Technology

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(MIT), University of Cambridge, Harvard University, University College London, University of Oxford, Imperial College London, Yale University, University of Chicago, Princeton University and California Institute of Technology. Thirdly, the *Times Higher Education World University Rankings* accorded the following universities as the top ten universities in decreasing order the California Institute of Technology, Harvard University, University of Oxford, Stanford University, Massachusetts Institute of Technology(MIT), Princeton University, University of Cambridge, University of California ,Berkeley, University of Chicago and the Imperial College London.

There are good reasons why private and media-based entities were involved in world university ranking. As explained by Merisotis (2002,) the major purposes were "to give information to the consumer in order to help him to make higher education choices, to function as an institutional marketing strategy, to promote quality of education institutions motivating competence among them."

Furthermore, as pointed out by Buela-Casal et al. (2007), "Nowadays, higher education has become so international that it is no longer enough for universities know their position in comparison to other universities from their own country. As universities increasingly compete in a global environment, they tend to compare themselves with world universities. In fact, the expression "World Class" has been created and many universities expect being considered as "World Class Universities".

Based on the ranking of the three organizations, there seem to be no coherence and congruency in the placement of the rankings of world universities. University rankings are inherently controversial as the quality of universities cannot be precisely measured by numerical indicators alone. We should therefore not completely rely on the ranking list as being definitive. Instead, the ranking is to be used simply as a kind of reference to assist in the decision-making processes. Despite the shortcomings Baty (2010), believed that rankings have some real uses, and love them or hate them, they are here to stay. Rankings help students select courses, help faculty make career choices, help department heads choose new research partners and help university managers set strategic priorities.

The differences in ranking arise from the different methodology and ranking systems used by the three organizations. For example one of the criteria used by the Shanghai ranking list is the number of university alumni who earned Nobel prizes as an education quality indicator while the *Times Higher Education* (*THE*) ranking list used the student /faculty ratio. THE ranking list gives 20% for research output while Shanghai ranking list give research output 40%. The pertinent question to be raised is which ranking list should we trust? Marszal (2014) expressed his dismay in finding out that two different university world rankings showed wildly variable results for UK universities – so which one should we trust? For the purpose of this study the *Times Higher Education*

World University Rankings 2013 will be used for data gathering and data analysis as they are the only global university performance tables to judge world class universities across all of their core missions – teaching, research, knowledge transfer and international outlook.

Higher ranks indicate higher quality, lower ranks indicate lower quality. Based on the education quality indicator as reflected in the rankings equal number of universities belonging to the high ranks and lower ranks are selected as samples for this study. One of the common features that any universities in the world have to display are their websites. With the introduction of the World Wide Web and graphical browsers in the 1990s, the Internet has become widely accessible and universities have grabbed the idea of using it for their multifarious purposes and agenda by establishing websites to foster their mission and visions. It is envisaged that universities' websites partake in the success or failure of universities to market their programs to the world at large. Perceptions of students and faculty as to the quality of the educational programmes offered by universities could be judged from university websites. Their judgment might be swayed by what are available in the websites. As Conway and Dorner (2004) pointed out "a party may be providing large amounts of information on its website, but if this information is difficult to find, its usefulness will be reduced. Likewise, a website may offer a high level of interactivity, but if a user cannot access the site it will count for little." The crux of the problems lies in the visibility and accessibility of those websites. What needs to be addressed is whether there are differences in terms of visibility and accessibility of the websites representing the top rank universities and the bottom rank universities. As these websites are around for quite sometimes already it is therefore appropriate to question on how effective are those websites. A study should be conducted to explore whether differences in terms of visibility and accessibility exist between the top rank and bottom rank world universities websites.

2. Purpose of the study

The objective of this study is to determine whether there are differences in terms of visibility and accessibility of the top rank and the bottom rank universities websites. Thirty (30) samples were drawn from the top rank and the bottom rank universities based on the *Times Higher Education World University Rankings* 2013.

3. Visibility

The first thing that any organization would like to tell the world of its presence was through its website. The better website can help the convergence of the goals of the users and the owner; therefore, the website will be more successful (Fan, 2006). A valid indicator of site visibility and online stature would be the volume of web traffic to a given site. Higher quality websites tended to attract more links. According to Rowlett (2006), linking was an extremely important way to increase website visibility. The greater number of quality links you have

coming to your site, the better your visibility. It has also been shown that search engines generated a large proportion of web traffic and most modern search engine algorithms tended to return heavily–linked sites first.

One of the techniques that can be applied to study the issue of visibility was using the software *Alexa.* In their study on quality of websites, Lin et al. (2004) reiterated the significance of *Alexa*, "With an installed base of well over 10 million toolbars, the *Alexa* traffic rankings represent the largest and most global sample of Internet usage available in the world." According to Hanson (2000), the rankings of *Alexa* were based on the user popularity. The website usage can be an indicator of online quality. Using *Alexa*, it is possible to gauge the volume of the web traffic for a particular website. *Alexa* also offered context for each site visited: to whom it was registered, how many pages it had, how many other sites pointed to it, and how frequently it was updated.

Table 1 shows the number of in links, web traffic volume, and the load time for opening the top rank universities websites. California Institute of Technology, which occupies No 1 ranking position on the *Times Higher Education World University Rankings* 2013, has demonstrated that its website has a large web traffic as well as high in-links. It has 11,418 web traffic and 30,160 in-links. Stanford University, which occupies No 2 ranking position, has a website with 127,940 in-links and 1,396 web traffic. Occupying third ranking position, the University of Oxford, has a website with 6,214 web traffic and 44,123 in-links. Harvard University, occupying fourth ranking position, has a website with 1,592 web traffic and 125,458 in-links. The illustrious Massachusetts Institute of Technology (MIT), occupying fifth ranking position, has demonstrated its tradition of excellence and boast an illustrious history by having a website that has the highest in-links. It has 135,799 in-links and 1,344 web traffic. On the other hand the University of Toronto, occupying twenty first position, has a website with 287,125 web traffic and 3 in-links, which means it has the highest web traffic and the lowest in-links among the top rank world universities websites. The range of web traffic and in-links for the top rank world universities websites are as follows: 1396 to 287,125 web traffic and 3 to 135,799 in-links. Therefore, we can infer that top rank universities' websites have large web traffic and in-links. There are only two universities websites that have slow load time, namely the California Institute of Technology and the National University of Singapore.

Table 1. Scoring for top rank world universities websites

Rank	Name of University	Alexa Traffic Rank	In-Links	Load Time
1	California Institute of Technology	11,418	30,160	Slow (1.742 Seconds)
2	Stanford University	1,396	127,940	Fast (1.071 Seconds)
3	University of Oxford	6,214	44,123	Average (1.566 Seconds)
4	Harvard University	1,592	125,458	Fast (1.133 Seconds)
5	Massachusetts Institute of Technology	1,344	135,799	Fast (1.155 Seconds)
6	Princeton University	5,938	45,917	Fast (0.901 Seconds)
7	University of Cambridge	5,715	43,810	Fast (1.007 Seconds)
8	Imperial College London	29,461	7,087	Fast (1.036 Seconds)
9	University of California, Berkeley	2,112	102,505	Very Fast (0.713 Seconds)
10	University of Chicago	7,676	45,617	Fast (0.968 Seconds)
11	Yale University	4,562	62,000	Fast (0.99 Seconds)
12	ETH Zürich – Swiss Federal Institute of Technology Zürich	9,466	26,261	Fast (0.874 Seconds)
13	University of California, Los Angeles	3,848	66,350	Very Fast (0.733 Seconds)
14	Columbia University	3,461	60,631	Fast (0.857 Seconds)
15	University of Pennsylvania	3,308	64,216	Fast (0.944 Seconds)
16	Johns Hopkins University	8,715	32,902	Fast (1.058 Seconds)
17	University College London	11,191	23,975	Fast (1.127

				Seconds)
18	Cornell University	2,889	89,182	Fast (1.005 Seconds)
19	Northwestern University	7,458		Fast (0.797 Seconds)
20	University of Michigan	2,934	75,592	Fast (0.91 Seconds)
21	University of Toronto	287,125	13	Not available
22	Carnegie Mellon University	5,803	54,429	Very Fast (0.715 Seconds)
23	Duke University	7,905	38,937	Fast (1.007 Seconds)
24	University of Washington	3,362	69,818	Very Fast (0.785 Seconds)
25	University of Texas at Austin	2,792	66,650	Fast (0.84 Seconds)
26	Georgia Institute of Technology	9,934	29,054	Fast (0.847 Seconds)
27	University of Tokyo	8,259	19,968	Very Fast (0.482 Seconds)
28	University of Melbourne	16,131	15,067	Average (1.452 Seconds)
29	National University of Singapore	10,950	18,074	Slow (1.838 Seconds)
30	University of British Columbia	7,382	33,187	Fast (1.016 Seconds)

Table 2 shows the number of in-links, web traffic volume and the load time for opening the low rank universities websites. King Mongkut's University of Technology, Thonburi, has the largest web traffic of 128,365 visitors and 4,657 in-links while the Temple University has the largest in-links of 17,337 institutions and 18,467 web traffic. The range of web traffic and in-links for the low rank world universities websites are as follows: 12,305 to 128,365 web traffic and 648 to 17,337 in-links. There is only one university website that has a slow load time, namely the University of Tasmania.

Comparing the largest web traffic and in-links for both group of universities websites we find that in the top rank we have 287,125 web traffic and 135,799 in-links and in the low rank we have 128,365 web traffic and 17,337 in-links. Therefore, the web traffic and the in-links of the top rank universities are much larger than the low rank universities websites. By inference we can conclude

that the top rank universities websites are very much visible as compared with the low rank universities websites.

Table 2 Scoring for low rank world universities websites

Rank	Name of University	Alexa Traffic Rank	In-Links	Load Time
371	Keele University	120,733	3,419	Fast (1.193 Seconds)
372	Keio University	12,305	11,820	Very Fast (0.461 Seconds)
373	King Mongkut's University of Technology, Thonburi	128,365	4,657	Fast (1.138 Seconds)
374	University of KwaZulu-Natal	61,175	2,340	Average (1.743 Seconds)
375	Lehigh University	43,492	10,056	Average (1.288 Seconds)
376	Université de Liège	40,746	6,138	Fast (1.132 Seconds)
377	Loughborough University	54,169	5,436	Fast (0.961 Seconds),
378	Massey University	87,725	5,900	Average (1.327 Seconds)
379	University of Minho	56,418	6,090	Fast (1.032 Seconds)
380	University of Modena and Reggio Emilia	73,213	1,678	Fast (0.879 Seconds)
381	University of Oklahoma	22,265	15,332	Fast (1.117 Seconds)
382	Université Paris Dauphine	85,389	2,080	Fast (1.121 Seconds)
383	University of Porto	17,627	9,541	Very Fast (0.644 Seconds)
384	University of Salento	95,667	648	Fast (1.162 Seconds)
385	Southern Methodist University	47,679	7,843	Very Fast (0.716 Seconds)
386	University of Stirling	106,858	3,742	Very Fast (0.757 Seconds)

387	University of Strathclyde	51,145	5,663	Very Fast (0.675 Seconds)
388	University of Surrey	32,791	7,613	Very Fast (0.812 Seconds)
389	University of Technology, Sydney	31,571	4,606	Fast (1.233 Seconds),
390	National Taiwan University of Science and Technology	70,902	8,315	Very Fast (0.507 Seconds)
391	University of Tartu	84,560	5,965	Very Fast (0.521 Seconds)
392	University of Tasmania	99,093	4,599	Slow (2.698 Seconds)
393	Temple University	18,467	17,337	Very Fast (0.777 Seconds)
394	The University of Texas at San Antonio	35,788	5,408	Very Fast (0.734 Seconds)
395	University of Valencia	14,717	9,419	Fast (0.893 Seconds)
396	Polytechnic University of Valencia	20,172	9,558	Fast (1.123 Seconds)
397	University of Vigo	28,288	14,738	Fast (0.885 Seconds)
398	University of Warsaw	28,288	14,738	Fast (0.885 Seconds)
399	Waseda University	22,506	3,191	Very Fast (0.529 Seconds)
400	University of Wyoming	41,191	6,882	Fast (0.936 Seconds)

The foregoing paragraphs clearly demonstrate that the top rank universities besides being rank highly on quality education and academic performance they are also highly visible as manifested from their large number of in links and web traffic. Their websites also do not suffer from loading time problem.

4. Accessibility

The development of any website has to comply with the existing accessibility guidelines. It is futile to have a website that is difficult to access by users owing to noncompliance with the existing standards on accessibility. To check for such irregularities a software *EvalAccess 2.0* was used. It is an on-line web accessibility evaluation tool which has been developed using Web Service technology. This tool provides different methods for evaluating web

accessibility: evaluation of a single web page, evaluation of a web site and evaluation of HTML mark-up. It returns a complete report of errors as a result of the evaluation. For the purpose of this study we are concerned only with Priority 1 errors. Priority 2 and Priority 3 errors are excluded from our evaluation. In cases where Priority 1 are zero errors no report will be made for those cases. It means that they have satisfied the Web Content Accessibility Guidelines (WCAG).

Table 3 shows the accessibility problems faced by top rank universities websites. Out of thirty top rank universities websites ten top rank universities websites have Priority 1 errors. However, the number of errors range from 1 to 10 which generally are not serious.

Table 3: Scoring for top rank world universities websites

Name of University	Priority 1
California Institute of Technology	2
Stanford University	1
University of California, Berkeley	1
University of Chicago	10
Columbia University	1
University of Pennsylvania	7
Cornell University	5
Northwestern University	4
University of Toronto	3
Duke University	1

Table 4 shows the accessibility problems faced by bottom rank universities websites. Out of thirty bottom rank universities websites, about half, or fourteen bottom rank universities websites, have Priority 1 errors. Only one university, the University of KwaZulu-Natal has 17 Priority 1 errors, which is considered serious and required remedial steps to overcome the situation.

Table 4. Scoring for bottom rank world universities websites

Université Paris Dauphine	1
University of Porto	3
University of Salento	1
Southern Methodist University	1
University of Strathclyde	3
University of Surrey	3
National Taiwan University of Science and Technology	1
University of Tartu	4
The University of Texas at San Antonio	11
University of Warsaw	2
Waseda University	4
Massey University	10
University of KwaZulu-Natal	17
Keele University	1

5. Conclusion

By comparing the state of visibility and accessibility among the two clusters of universities websites, the findings of the study revealed as expected that those top rank universities websites are more visible and accessible as compared to the other cluster. It is pertinent therefore, for those universities that are not highly visible and accessible to take the necessary steps to improve the development of their websites. Hopefully by taking these measures it would help the university in their drive to be the best among their contemporaries.

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