

Web Impact Factor: a Webometric Approach for Indonesian Universities

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Abstract—This study explores the Web Impact Factors (WIFs) for Indonesian universities. Counts of links to the web sites of Indonesian universities were calculated from the output of Yahoo search engine. The WIFs for Indonesian universities were calculated by dividing link page counts by the number of pages found in Yahoo for each university at a given point in time. These WIFs from the approach is then compared, to study the impact, visibility, rich content and influence of Indonesian university web sites.

Keywords—Indonesian Universities, websites, webometrics, web impact factor

I. INTRODUCTION (HEADING 1)

Universities in Indonesia consist of two types: private Universities (funded by non-profit organization) and public university (funded by Indonesian government). The university is an integral part of the Ministry of education. All of the universities have their own websites to provide a view of functioning of the service. Unfortunately, there have been relatively few analyses of contents and visibility of university websites. This brings us to a position that an analysis of the linking and visibility of university websites has become extremely important. The present study was carried out to examine the linking on websites of Indonesian university under Indonesian Ministry of Education and to find out their web impact factor (WIF) and amount of information present on these websites in the form of rich files.

II. LITERATURE REVIEW

Several studies have been published, describing the concept of webometrics [1, 2]. The most convenient way of measuring links for university sites is to use the advanced search facilities of general Web search engines. The WIF as an important indicator of the overall influence of a web site, using the backlinks or inlinks to the web site [3]. Backlink, also known as inlinks can be seen as an indicator of the overall significance and importance of a site. Another WIF studies has been carried out using the advanced search facilities of AltaVista, both before and after its acquisition by Yahoo [4]. The importance of backlink or inlinks are: (i) more visibility on the web means more chances the site will be visited and therefore the more potential impact the site will have within the scholarly community; (ii) better indexing by search

engines [5]; and (iii) higher ranking in search results. WIF is the number of pages linking to a web site, divided by the number of pages in the web site [3], links to a web site can be made from within the web site (self-links), or from outside. The age of a web site affects the number of inlink pages, in general newly created links (e.g. links in the newest pages on the Web or new links that have been recently added to old pages) are less likely to have been indexed by search engine [6], moreover, universities that are more productive in research draw more inlinks from other websites [7].

III. METHODOOGY AND ANALYSIS

This study uses an approach for data collection: by using Yahoo search engine because it offers special function that search for matches only in Web elements such as pages, domains, inlinks, and so on, Collection was conducted within the same month (September 2011) in order to limit errors associated with frequent website updates. Yahoo search engine support linkdomain:www.xxx.ac.id as a command to find pages with a backlink to a site. For example, linkdomain:uny.ac.id will find all pages with at least one link to the Web site of the Universitas Negeri Yogyakarta. It also supports domain.www.xxx.ac.id to retrieve the number of Web pages indexed per site or domain, where xxx is the domain name of the university web site. Searching procedure was carried out to determine the total number of links, the number of inlinks, the number of self-links, the total number of pages. The count of inlinks to the university site and number of pages at the university site were used to calculate the inlink (revised) WIF of the university. Observations selected were used to calculate the Overall Web Impact Factor (WIF) and the Absolute WIF for each websites.

$$\text{Total pages} = A$$

$$\text{Inlinks} = B$$

$$\text{External links} = C$$

Overall WIF of the website = Number of inlinks the website receive (B) / Number of web pages indexed from the same website (A). $OWIF = B/A$

Absolute (External) WIF of the website = Number of external links (C) / Number of web pages indexed from the same website (A). $AWIF = C/A$

The indicators used in this study comply with the quantitative aspect of the links and information being provided on a website. These indicators⁴ are:

(i) *Size (Number of webpages)*: This data, however, only provides an insight into quantitative aspect of information on the website and not the quality. Thus, for more rigorous results, other indicators have been used.

(ii) *Visibility (Total number of inlinks)*: The number of unique inlinks received by a domain is a measure that represents visibility and impact of the published material, and although there is a great diversity of motivations for linking, a significant fraction works in a similar way as bibliographic citation.

(iii) *Web Impact Factor (Number of inlinks/Number of webpages)*, WIF is a measure of the frequency with which a webpage of a website is linked at a given point in time. A higher WIF represents greater reputation of a website.

(iv) *Rich Files*: Number of webpages supporting different file formats, like Portable Document Format (.pdf), post script (.ps), Microsoft Word (.doc), and Microsoft PowerPoint (.ppt).

A. *Sample Data*

The recently 20 universities webometric highest rank in 2010 were selected for this study. The list of the studied universities is provided in Table 1. Sources of data includes: Catalogue of Indonesian universities (http://www.webometrics.info/university_by_country_select.asp.htm)

Table 1: List of Indonesian Universities with the corresponding website addresses

	University	Alamat
1	Universitas Gadjah Mada	www.ui.ac.id
2	Universitas Indonesia	www.itb.ac.id
3	Institut Teknologi Bandung	www.unair.ac.id
4	Universitas Airlangga	www.undip.ac.id
5	Universitas Diponegoro	www.petra.ac.id
6	Universitas Kristen Petra	www.gunadarma.ac.id
7	Universitas Gunadarma	www.unand.ac.id
8	Universitas Andalas	www.its.ac.id
9	Institut Teknologi Sepuluh November	www.um.ac.id
10	Universitas Negeri Malang	www.unsri.ac.id
11	Universitas Sriwijaya	www.ums.ac.id
12	Universitas Muhammadiyah Surakarta	www.usu.ac.id
13	Universitas Sumatera Utara	www.uui.ac.id
14	Universitas Islam Indonesia	www.unikom.ac.id
15	Universitas Komputer Indonesia	www.umm.ac.id
16	Universitas Muhammadiyah Malang	www.mercubuana.ac.id
17	Universitas Mercu Buana	www.binus.ac.id
18	Universitas Bina Nusantara	www.umy.ac.id
19	Universitas Muhammadiyah Yogyakarta	www.uajy.ac.id
20	Universitas Atma Jaya Yogyakarta	www.ui.ac.id

A comparative analysis of data with regard to the link analysis and presence of information was studied, and its visibility on web was calculated. The number of webpages along with rich files was also examined. Thereafter, interpretations were made based on the analyses.

B. *Weblink Analysis*

Table 2 gives number of webpages and number of inlinks for university websites based on the highest webometric rank in 2010. It shows that among all universities, Universitas Sriwijaya had the highest universities number of webpages while Universitas Bina Nusantara had the lowest number of

webpages. The calculation of WIF requires number of webpages and number of inlinks to a website (given in Table 1). Table 2 shows the WIF for selected universities, last column in table 2 gives web impact factor for ease of ranking. It shows that Universitas Bina Nusantara had the highest impact on web with far more the number of inlinks as compared to the number of webpages on its website. It was followed by Universitas Komputer came next, which also exceeded inlink value of Universitas Bina Nusantara.

TABLE 2. List of Indonesian Universities with the corresponding number of inlinks, webpage and WIF

	University	A	B	WIF
1	Universitas Gadjah Mada	3812	12011	0.317
2	Universitas Indonesia	4270	6276	0.680
3	Institut Teknologi Bandung	16467	12893	1.277
4	Universitas Airlangga	688	1283	0.536
5	Universitas Diponegoro	798	3346	0.238
6	Universitas Kristen Petra	586	182	3.220
7	Universitas Gunadarma	835	2155	0.387
8	Universitas Andalas	2081	6716	0.310
9	Institut Teknologi Sepuluh Noverber	983	19640	0.050
10	Universitas Negeri Malang	224	2081	0.108
11	Universitas Sriwijaya	408	25788	0.016
12	Universitas Muhammadiyah Surakarta	414	1088	0.381
13	Universitas Sumatera Utara	548	2552	0.215
14	Universitas Islam Indonesia	1770	5030	0.352
15	Universitas Komputer Indonesia	1506	266	5.662
16	Universitas Muhammadiyah Malang	597	7120	0.084
17	Universitas Mercu Buana	466	3402	0.137
18	Universitas Bina Nusantara	743	44	16.886
19	Universitas Muhammadiyah Yogyakarta	410	1486	0.276
20	Universitas Atma Jaya Yogyakarta	318	1256	0.253

For the each indicator used in this study, there were a clearly different set of websites of the universities, which achieved the topmost ranks. Thus, different universities excelled from different point of view. There was a universities with as high as 16467 webpages, and a university with a WIF as strong as 16.886. On the other hand there was a university with lowest number of webpages at 318 only, and a WIF of 0.084. Figure 1 depicts that only a quarter or 20 selected universities have above average number of webpages on its website. With the

total average of 3309 number of webpages per website, majority of universities fall below even that average.

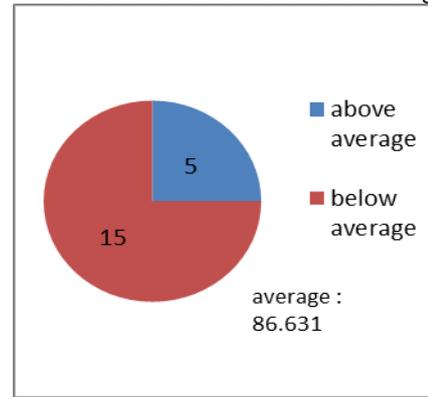


FIGURE 1. Average distribution of university websites on the basis of number of webpages.

A total average WIF was 1.569, which is not considered satisfactory. Considering the importance of websites, this value should have been high. Figure 2 shows that in meeting average value, WIF is better than the number of webpages. Around 20 per cent of the ministries had above average WIF while 80 per cent still remain below it.

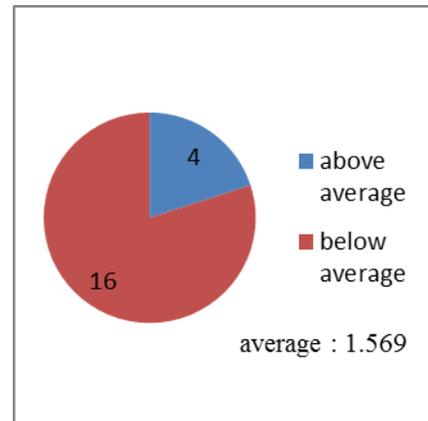


FIGURE 2. Average distribution of university websites on the basis of web impact factor.

C. Rich Files

Also, many of the files were provided in different formats so that the user can access the file in desired format. The comprehensive file-type-wise data regarding the number of rich files has been displayed in Table 3.

TABLE 3. Number of rich files for selected universities in Indonesia

No.	Website	*.pdf	*.ps	*.ppt	*.doc	Total
1	www.umm.ac.id	251,000	47,500	1,650	197,000	497,150
2	www.petra.ac.id	138,000	108,000	138	1,050	247,188
3	www.gunadarma.ac.id	217,000	4,110	3,270	5,860	230,240
4	www.its.ac.id	146,000	1	111	1,500	147,612
5	www.ui.ac.id	84,800	304	3,310	2,680	91,094
6	www.usu.ac.id	83,100	0	160	247	83,507
7	www.unikom.ac.id	77,800	0	52	282	78,134
8	www.ums.ac.id	50,000	8	45	3,630	53,683
9	www.unair.ac.id	42,400	3,190	1,920	1,830	49,340
10	www.undip.ac.id	34,800	0	271	1,350	36,421
11	www.uui.ac.id	34,100	0	47	796	34,943
12	www.unand.ac.id	28,400	3,240	661	1,830	34,131
13	www.binus.ac.id	7,750	0	11,900	13,600	33,250
14	www.um.ac.id	4,950	1,240	725	16,700	23,615
15	www.itb.ac.id	19,500	291	1,120	1,630	22,541
16	www.ugm.ac.id	17,000	0	2,150	2,970	22,120
17	www.mercubuana.ac.id	9,030	660	342	9,690	19,722
18	www.unsri.ac.id	9,480	30	334	2,730	12,574
19	www.umy.ac.id	8,790	568	413	1,360	11,131
20	www.uajy.ac.id	1,190	1,780	642	612	4,224

The rich files need corresponding software for viewing. These readers are mostly the ones who are broadly used all across the world, or can be downloaded from the link given alongside the links to the file itself. Also, many of the files were delivered in different formats, so that the user can access the file in desired format. Then, there was a university with a total of 497150 rich files, and contrastingly there was one with only 4224 files. Thus, the websites of the selected universities proved to be a bag of mixed beans where all variety, ranging from highest to the lowest, can be found. The comprehensive file-type-wise data regarding the number of rich files has been displayed in Table 3. Universitas Muhammadiyah Malang ranked first in rich files, especially from .pdf and .doc file type. Universitas Petra came second. Also, number of .pdf files exceeded the number of .doc and .ppt files.

IV. CONCLUSION

From the study, it can be concluded that Universitas Sriwijaya had the highest universities number of webpages ranked in with respect to number of webpages. Universitas Bina Nusantara had the highest impact on web with far more the number of inlinks as compared to the number of webpages on

its website. Universitas Muhammadiyah Malaang was ranked on the top for presence of rich files from the contribution of .doc and .pdf file type.

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