EVALUATING POPULARITY OF COLLEGE'S WEBSITE IN INDONESIA

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ABSTRACT

The number of colleges in Indonesia which are listed in Webometrics ranking is relatively few compared with the number of universities or institutes. According to government regulations, higher education provides academic and / or vocational education within the scope of the disciplines of science, technology, and / or art and if eligible they can organize professional education. Limitations in the field of science or academic courses offered become one of the major factors. This study evaluated 31 websites managed by colleges in Indonesia. Webmetrics parameters were analyzed using Spearman correlation and discriminant analysis. The research results generally show that the popularity of the websites by ICT colleges was higher than the popularity of the websites by the non-ICT colleges. Webmetrics parameters can predict grouping of colleges based on their highest total discriminating power i.e. the referring and total link, followed by the number of documents and the number of web pages.

Keyword: Webometrics, Webmetrics, Popularity Website, Website Visibility

1. INTRODUCTION

There exists a synergy or convergence of information technology with education. The convergence of these two domains has led into the formation of a new concept in the world of education, which refers to the same object but of different names. E-Learning, Virtual Class, Distance Learning, E-Education, Computer Assisted Learning, Virtual Learning Environment, and a variety of terms which is often heard and widely applied in the world of education. The point is how information technology can assist the learning process other than for academic information or services for faculty, students, graduates, and even the society. Even Bonillo [1] states

that the dissemination of knowledge and experience of ICT in higher education becomes one of the main components and agenda of the education reform. Education reform is also underway in Indonesia.

Internet becomes one of the alternatives that can be used as a source of information of a university. Validity and recency of information is an important aspect that should be considered by managers of university website. Moreover, these days Indonesian people start knowing the internet, although it could have only been confined to the rich in urban communities. More and more people are looking for information via the internet, and the more visit to online education program offered by universities is now being used by a variety of institutions or organizations engaged in education to gain popularity (Hrastinski and Jaldemark [10]).

In an educational environment, a web-based technology is designed to facilitate the learning process, thus the perception on the ease of use of the internet becomes indispensable, especially for learners who only know the introduction of computer and internet technology in developing countries (Brown [2]). The level of utilization of ICT—including the internet—at higher education becomes one of the important aspects that can contribute to the popularity of universities, and can be used for the implementation of a web-based learning model. Productivity of web-based learning model can be measured by the amount of content or the information on the university website.

The rapid development of the internet requires evaluating the visibility of universities in the internet world, including the implications for management, planning, and governance of higher education (Lee and Park [12]). Visibility has become one of the criteria in the model of ranking universities in today's internet age. Ranking of Higher Education at the international level has become a measure or a benchmark of success for performance or management of universities, including in Indonesia. Some agencies or rating models using the indicators associated with the internet are Webometrics and 4icu. They rank performance of universities based on the use of the internet technology in the education process. Capshaw [4] states that there is inconsistency among the ranking results published by research institutes widely used as a reference currently, even though for the top group, or those which enter the top 10, the ranking shows consistent results. These inconsistencies raise questions about the grading criteria, as well as whether the ranking of academic aspect can be aligned with the rating of more specific aspects, for example the rating based on the use of the internet technology in the educational process.

2. THEORITICAL FRAMEWORK

Vassiliadis et al. [17] state that the importance of ICT in the learning process is driven by government investment and initiatives of various institutions; however, research shows that its potential has not been fully realized because the economic and pedagogical parameters that affect the technology solutions have not been fully considered. According to Gulbahar [8], three factors are thought to have a significant influence on the effective use of technology, namely (1) the quantity and quality of learning materials, (2) incompetent teachers, and (3) inadequate technology infrastructure. According to Usluel, Askar, and Bas [16], the use of technology in some capacity does not give any guarantee toward academic success, but indications

from the study show no negative impact. Internet-based lecture shows no negative impact on students' achievement or students' perceptions of e-learning.

Duhaney [5] states the introduction of new information technologies in the teaching process has an impact on learning activities in the traditional classroom. The results of the study by Capshaw [4] show that the availability of sites and institutional content correlated with national income and the connectivity levels of national telecommunication, but the correlation is not very strong. Several other variables, as yet unidentified, maybe more strongly linked to the development of institutional websites and diffusion of this technology at the institutional level that is still low in middle-income countries.

Various ranking of universities in the international environment have been done periodically, although the ranking agencies are relatively few. The current ranking methods often used as a reference are the Academic Ranking of World Universities (ARWU) from Shanghai Jia Tong University, Times Higher Education Supplement (THES) QS World Univeristies Rankings (THES = QS), the Webometrics Ranking of World Universities (WRWU), and Performance Ranking of Scientific Papers for World Universities (SPWU) of National Taiwan University. AGUILLO (2009) makes a comparison of the various ranking models, namely Webometrics, ARWU, HEEACT, and QS-THES using six criteria: teaching, internationalization, size, research, impact, and prestige. The complete comparison can be seen in the figure 1.

(1)

CRITERIA	WEBOMETRICS Spain (research lab)		ARWU China (university)		HEEACT Taiwan (gov agency)		QS-THES United Kingdom (firm)	
Univs analysed	17000		3000		3500		2000	
Univs ranked	6000		500		500		500+	
Teaching			Alumni Nobel	10%			Students/Staff	20%
Internatio-nalisation							% Foreign Students	5%
							% Foreign Professors	5%
Size	Webpages	20%	University	10%				
Research	Documents	15%	Nature&Science	20%	Papers S&SSCI	20%		
	Papers GS	15%	Papers S&SSCI	20%				
Impact	Links	50%	Highly Cited Researchers	20%	Highly Cited Res	50%	Citations Scopus	20%
					Cit High IF Journals			
					Citations S&SSCI	30%		
Prestige			Faculty Nobel	20%			Academic Survey	40%
							Employers Survey	10%

Figure 1. Comparison of Rating Models (Isidro F. Aguillo [11])

Capshaw [4] conducts a correlation analysis on the results of the ranking of the five institutions, namely Webometrics, Jiao Tong, Times, U.S. News, and Gourman. The results generally show a low correlation between the rankings. Correlation for the top ten or top twenty was higher than those for ranking 50, 100, or alluniversity rankings. The results of the correlation analysis can be seen in the figure 2.

(2)

	Webometrics					Jiao Tong				
	All	Top 100	Top 50	Top 20	Top 10	All	Top 100	Top 50	Top 20	Top 10
Webometrics										
Jiao Tong	0.472	0.281	0.292	**0.485**	0.359					
Times	0.229	0.319	0.260	0.136	**0.560**	0.385	0.379	0.324	0.179	**0.529**
US News	0.376	0.344	0.322	0.592	**0.610**	0.516	0.516	0.354	0.563	**0.663**
Gourman	0.422		0.422	**0.624**	-0.359	0.487		**0.487**	0.472	0.432

	Times Higher Education					US News				
	All	Top 100	Top 50	Top 20	Top 10	All	Top 100	Top 50	Top 20	Top 10
Webometrics										
Jiao Tong										
Times										
US News	0.381		0.368	0.220	**0.425**					
Gourman	0.638			0.518	**0.549**	0.707			0.084	**0.713**

Figure 2. Comparison Ranking of 5 Institution(Capshaw [4])

Esteban Romero-Frías [6] explains that Webometric technique is based on the exploitation of the information in hyperlinks that connect different documents on the web. Webometrics can be considered not only as a new discipline that applies bibliometric techniques for quantitative studies of the site, but also as a discipline that develops concepts and methodology by itself. The origin of Webometrics can be found in the field of Information Science. The term Webometrics was first coined by Almind Tomas and Peter Ingwersen in 1997 and seems to be widely accepted by the research community along with the term Cybermetrics. Cybermetrics focuses more on the study of the internet phenomenon that is not web-based, such as email, chat, newsgroups studies, etc. The following figure 3 shows the location and overlap of these disciplines within the general context of Information Science.
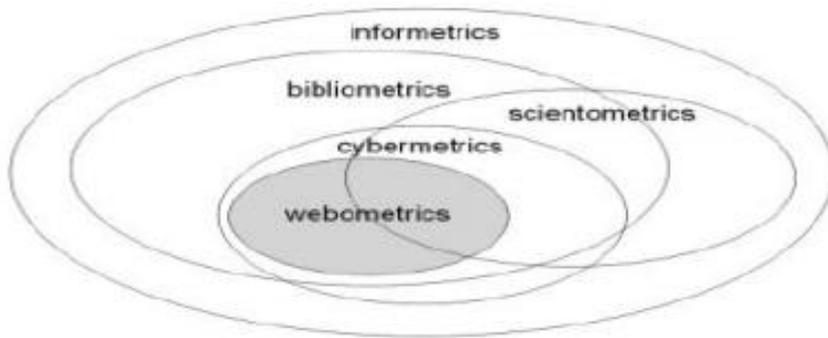
(3)

Figure 3. Webometrics and Cybermetrics in the context Information Science
(Björneborn and Ingwersen 2004 InEsteban Romero-Frias [3])

Ortega and Aquillo [12] present thesize and the link of websites from one country to others as shown in the figure 4.The highest web page size on average is in the United States. The next is China, Japan, Australia, and Canada.
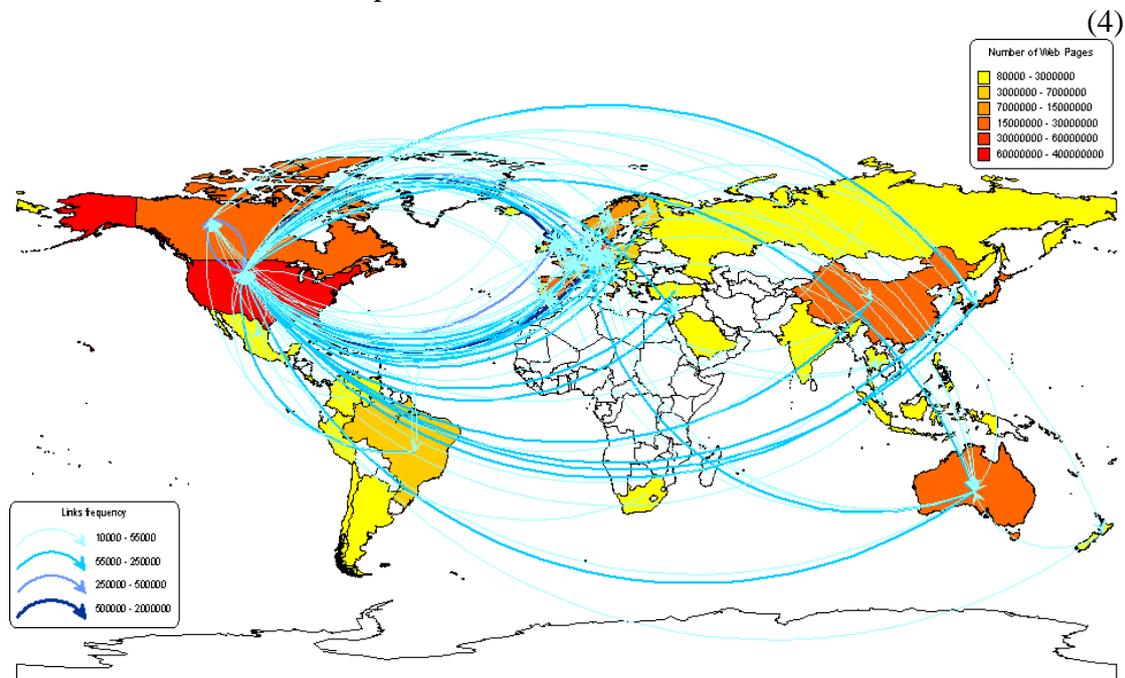
(4)

Figure 4. Map of geographical distribution and the amount of content the website link
(Jose Luis Ortega, Isidro Aguillo [12])

3. METHODOLOGY

The forms of higher education in Indonesia consist of University, Institute, Colleges, Academic, and Polytechnic. This study used a sample of colleges in Indonesia which are included in the college ranking of Webometrics version in January 2014. The number of colleges selected is 31 colleges that comprise 16 colleges of computer or information technology, 13 colleges of non-computer technology, and 2 colleges of computer and of non-computer in one site. Data Webometrics ranking is taken from the website, specifically for Indonesia. Observations are made on the official website

run by the respective colleges. Data on popularity or content on the website is measured by (1) the number of the web pages and the number of documents, by using Google search engine, (2) the number of links, by using ahrefs.com and www.majestic.com, and (3) the traffic, by using www.alexa.com. The profile of the colleges refers to national data from the Ministry of Education and Culture of the Republic of Indonesia, i.e. the number of offered courses,the number of faculty, and the number of students.

In addition to descriptive statistics, the analytical techniques used to test some of the relationships between variables are (1) independent sample t-test or ANOVA to see the difference on the popularity and the richness of the web content and between the computer colleges and non-computer colleges, (2) discriminant analysis to determine the predictive model clustering colleges using the popularity and the richness of the web content as the predictor, and (3) correlation test to determine the relationship of ranking, popularity, and richness of content with the profile of the colleges including the number of faculty and students.

4. RESULTS AND DISCUSSION

The number of universities in Indonesia which are listed in Webometrics rankings for January 2014 is as many as 410 campuses. The number increased by 52 universities compared to the previous edition, July 2013, as many as 358 campuses. Although the number of listed universities increases, the average ranking of universities in Indonesia in general has decreased when compared to July 2013 edition. Indicators of openness and excellence increasingly consider the quality of scientific documents produced by each university, while the indicator of web visibility increasingly takes into account the quality and diversity of the link source.

The indicators for Webometrics ranking on January 2014 are relatively the same as the previous edition, i.e. Impact, Presence, Openness, and Excellence, but with some minor changes to the records or data sources, in particular on impact and openness. Impact is an assessment indicator on the visibility of a website with the weight of the total rating of 50%. The other three indicators, namely presence, openness, and excellence, show the activity of a website. The assessment weightfor activity is 50%, one thirdfor each indicator.

Most of these higher education institutions are universities or institutes. According to the Law on National Education System No. 20 [7], a higher education institution could be in the form of academy, polytechnic, college, university, or institute. Higher education institutions can hold academic and / or vocational education within the scope of the disciplines of science, technology, and / or art and if eligible they can organize professional education. This study evaluated 31 websites managed by colleges in Indonesia. Comparison on Webometrics ranking between the ICT colleges and non-ICT colleges can be seen in Figure 5. The comparison also includes colleges that organize ICT and non-ICT courses using a single domain.
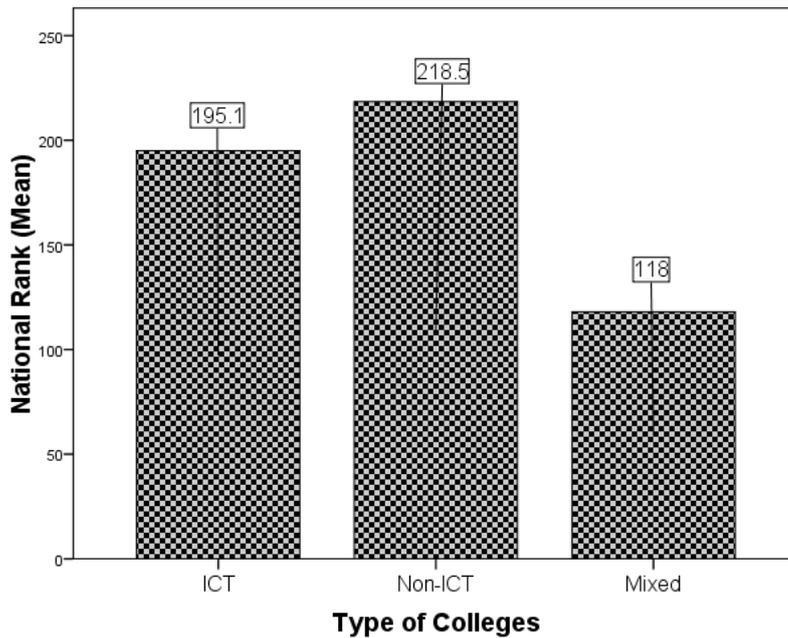
(5)

Figure 5. Webometrics Ranking Comparisons Between the ICT and non ICT College

Webometrics ranking for ICT colleges is higher than the non-ICT colleges. The rankings of colleges providing mixed programs (ICT plus non-ICT courses) tend to be better because one domain is used for the two programs. The difference in ranking might be due to better experience and mastery of ICT on computer-based colleges in terms of availability of human resources in the field of ICT and also better infrastructure. This is consistent with the results of several previous studies. Saekow and Samson [15] put more emphasis on network connection with effective bandwidth access; while Buchanan, Sainter, and Saunders [3] further highlight the structural factors such as the availability of resources and technical support, in addition to aspects of digital literacy and training for lecturers. Bonillo [1] states ICT is one of the sources of competitive advantage of an organization.

The subsequent analysis looks at the relationship of various parameters of webmetrics using the Spearman corelation analysis, and the results can be seen in Table 1. The results generally show that the Webometrics ranking is closely related to all parameters of webmetrics. Highest correlation value is shown on the external parameters of backlinks and number of webpages indexed by search engines. The numbers of links from other websites connected to the websites indicate the level of popularity of the websites. The rating is also related to the amount of information or content available on the website. The higher the number of webpages, the higherthe website ranking will be. Indeed, the availability of links to another website does not necessarily result in increasing visit to campus websites, although the parameters of referring domain and referring page show a significant correlation with the ranking of a website.

Tabel 1. Relationship of Various Parameters of Webmetrics

		National Rank	Web pages	Reffering domain	External backlink	Reffering Page	Total backlink	Doc.
National Rank	Pearson Correlation	1	-.643**	-.635**	-.661**	-.597**	-.509**	-.621**
	Sig. (2-tailed)		.000	.000	.000	.000	.003	.000
	N	31	31	31	31	31	31	31
Number of web pages	Pearson Correlation	-.643**	1	.258	.264	.256	.183	.607**
	Sig. (2-tailed)	.000		.160	.151	.164	.326	.000
	N	31	31	31	31	31	31	31
Majestic - Reffering domain (fresh)	Pearson Correlation	-.635**	.258	1	.859**	.890**	.928**	.439*
	Sig. (2-tailed)	.000	.160		.000	.000	.000	.013
	N	31	31	31	31	31	31	31
Majestic - External backlink (fresh)	Pearson Correlation	-.661**	.264	.859**	1	.792**	.761**	.349
	Sig. (2-tailed)	.000	.151	.000		.000	.000	.054
	N	31	31	31	31	31	31	31
Ahrefs - Reffering Page	Pearson Correlation	-.597**	.256	.890**	.792**	1	.953**	.461**
	Sig. (2-tailed)	.000	.164	.000	.000		.000	.009
	N	31	31	31	31	31	31	31
Ahrefs - Total backlink	Pearson Correlation	-.509**	.183	.928**	.761**	.953**	1	.439*
	Sig. (2-tailed)	.003	.326	.000	.000	.000		.014
	N	31	31	31	31	31	31	31
Number of documents	Pearson Correlation	-.621**	.607**	.439*	.349	.461**	.439*	1
	Sig. (2-tailed)	.000	.000	.013	.054	.009	.014	
	N	31	31	31	31	31	31	31

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	Sig. (2-tailed)		.000	.000	.000	.000	.003	.000
	N	31	31	31	31	31	31	31
Number of web pages	Pearson Correlation	-.643**	1	.258	.264	.256	.183	.607**
	Sig. (2-tailed)	.000		.160	.151	.164	.326	.000
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	Sig. (2-tailed)	.003	.326	.000	.000	.000		.014
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	Sig. (2-tailed)	.000	.000	.013	.054	.009	.014	
	N	31	31	31	31	31	31	31

Note: **. Correlation is significant at the 0.01 level (2-tailed), *. Correlation is significant at the 0.05 level (2-tailed)..

The number of links is one measures of the visibility of a website. The willingness of other websites to put some links is greatly influenced by various factors, one of which

is the usefulness of the website, so other sites consider the campus website as a source of information or reference material. Lee and Park [13] see it from another perspective regarding the visibility, which is related to the strategic planning and management of higher education, including the provision of budget for the assessment of image or marketing of college. Differences in the field of study offered by higher education institutions in Indonesia are also expected to affect webmetrics parameters. The results of discriminant analysis are used for predicting the grouping of higher education institutions based on webmetrics parameters as shown in Table 2.

Tabel 2. Classification Results[a]

| | Type of Colleges | Predicted Group Membership | | Total |
		ICT	Non-ICT	
Original Count	ICT	13	3	16
	Non-ICT	2	11	13
	Ungrouped cases	0	2	2
%	ICT	81.2	18.8	100.0
	Non-ICT	15.4	84.6	100.0
	Ungrouped cases	.0	100.0	100.0

Note:[a]82.8% of original grouped cases correctly classified.

Prediction rate of 82.8% is quite high which shows that the major or courses offered by higher education institutions has a close relationship with webmetrics parameter values. The parameter showing the greatest discriminating power is the number of links, and total well referring link, followed by the number of documents and the number of web pages on the campus website. These results indicate that the popularity of the website is more discriminating compared with the richness of content in the form of web pages and number of documents. These results are consistent with previous studies by Silfianti et al. [14], which finds that the order of webmetrics indicators based on their discriminating power is citation flow, trusts, referring domain, link reputation, global ranking, and external backlinks (Silfianti et al., [14]). All of these parameters become the proxy for the popularity of the website.

5. CONCLUSION AND RECOMMENDATION

The websites of ICT-based higher education institutions show higher popularity than the websites of websites of non-ICT-based higher education institutions. The test results indicate that webmetrics parameters act as predictors of grouping higher education institutions in Indonesia with a prediction rate of 82.8%. Parameters that have discriminating power are the number of links, both the referring domain and referring page. The number of documents and the number of web pages has not been a significant differentiating factor because the richness of information on the websites is

not so much different and still belongs to the category of less productive. This study provides several implications or follow-up effort, especially for the managers of the campus websites. According to Silfianti [14], the popularity of the web can be strengthened by website development which is search-engine friendly.

The management of colleges may consider several factors that may increase the number of visitors to the website. First, visitors are actually interested in finding useful information. If the website of higher education institutions presents a variety of useful information, then the chances of it being visited will be greater. Such information is not only limited to academic information for their own community. The website of higher education institutions must able to present valuable information to the public. Various academic information which can be accessed via the internet can increase the number of visits to these pages, at least by its academic community. Second, the website of higher education institutions needs to integrate the internet in the teaching process or the educational process. A variety of web-based learning model has been widely implemented, for example, e-learning, virtual class, or distance learning. This is consistent with the argument by Hu et al. [9] that for higher education institutions, the internet is used for the creation, storage and dissemination of information and knowledge.

Third, the open content policy is one factor that can increase the accessibility of information to the pages of the website of higher education institutions. The openners nature of information can at least increase the amount and variety of information that can be accessed for free by the public. Risks that need to be anticipated by the open-content policy, especially the one that is user-generated content, is on the quality of the content that requires monitoring as to makesure that it is accordance with laws and regulations. Fourth, updating content is one of the biggest challenges in the management of the website of higher education institutions. Writing on the internet is the key to increasing the amount of information.The culture of writing is one of the main capital in the provision of information in the pages of the website of higher education institutions. Scientific publications, teaching materials, or other types of information can be produced by faculty and students. If the productivity is in line with the benefits or improved quality of the content of the pages, a great chance for the website to be visited by the public is available and the website will be more popular. Many factors need to be included in the governance of higher education policy as argued by Lee and Park [13] that the visibility of a website is related to university governance.

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