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Comparison of Web 2.0 Use on State University Websites in Indonesia and Top World Universities Related to Webometric Ranking

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ABSTRACT

The present work determines the presence in the web 2.0 that twenty universities had through their educational portals. The universities are selected according to the Webometrics ranking (the ten best located in Indonesia and the best located worldwide) to identify what Web 2.0 tools they use. This study explores the educational portals of the twenty selected universities to determine which Web 2.0 tools they use and variables of the tools found will be assessed. The study only considers those Web 2.0 tools which are linked on websites of universities. Of the two most used tools, the relevant indicators are quantified from Youtube "Subscribers" and "Views " and Twitter "tweets" following", and "followers". Afterward, the results are shown and analyzed to establish possible relationships between the indicators of each tool. The results reflect the heterogeneous and, in many cases, the polarized presence that universities had on web 2.0 through their educational portals. We hope that the work will help universities have a verifiable reference instrument to develop their academic communication strategies through these tools on the way to a 2.0 university model.

Keywords: Web 2.0, Universities, Webometrics, ICT, Facebook, Twitter.

University and the Web 2.0

The development of the World Wide Web in the 90s has brought radical changes in the communication process in all types of organizations. Universities are no exception because universities are avant-garde institutions in using ICT for the initial adoption of this communication tool, which in many cases, has become a communication channel [1]. Likewise, observations made by Ehlers revealed the use of ICT since that decade in the university teaching system, which is considered one of the indicators of quality in this academic institution [2]. In this sense, the evolution of the Web has led to the creation of terms such as web 1.0, social web 2.0, social web 2.1, or web 3.0, with a desire to address its continuous progress [3]. This evolution, marked mainly by a series of changes through technological means, has had a full impact on ways of understanding communication. Of all these changes, undoubtedly, the most representative is the development of blogs or blogs and the expansion of highly complex social networks. In the case of blogs, this web communication greatly simplifies the publication of content by any Internet user. It enhances interaction by providing very simple tools so that readers can change their role to that of a publisher. As for social networks, the phenomenon has experienced enormous growth, doubling the number of content users share on social media-type communication platforms each year.

In the field of education, the challenge is to get the most out of these tools so that motivation arises to conduct research on user participation and enjoyment, produce recommendations for their development and use, especially in universities to become organizations where most of the members are intensive users of digital media [4]. Based on Rosen and Nelson observations, one of the unique potentials of web 2.0 in the educational environment is facilitating collaborative work because of the various possibilities for smooth interaction between users [5]. Williams and Chinn (2009) also highlighted the role of virtual digital communications via web 2.0 applications, stating that they play an important role in

enhancing teacher-student interaction [6]. The use of ICT in world universities has become one of the elements that have played a decisive role in improving the quality of these institutions in adapting them to new ways of acting and thinking [7]. Observations by Kulakli and Mahony on university 2.0 that adopting the parameters of the collaborative Web is to achieve a more social university where members can participate openly [8]. The area of University 2.0 adoption should include the gradual implementation of social software in various areas of university interest, such as teaching and research through E-learning 2.0, library services, information and registration, social and cultural policy services, administration, internal and external corporate communications and collective bodies and individuals from academic institutions. Forkosh-Baruch and Hershkovitz investigated the scientific use of social media sites Twitter and Facebook in the Israeli university state. Their findings demonstrate how popular social media sites are for sharing academic or professional news. According to the authors, using these social media sites can promote knowledge sharing and informal learning [9]. University management communications are gradually incorporating social strategies through tools such as blogs, micro-blogs, social networks, online video channels, wikis, and others. The introduction of collaborative tools requires greater flexibility and fluency in communication between the various social agents that make up the University.

Webometrics

The presence of academic institutions, and especially universities, on the Web can produce information that is very useful for evaluating educational and research activities, not only for making something formal through articles and publications but also for transmitting knowledge more informally [10]. Thus, the web ranking of universities [10] in Aguillo [11], published since 2004, is directly inspired by the composite indicator model of the Shanghai ranking model but uses cybermetric data taken from the University's website. This ranking has a broad scope in terms of the number of universities (20,000) and academic mission, including teaching, research, commitment to society, technology transfer, and the presence of major internationalization efforts [12]. Cybermetrics or webometrics is a new discipline developed in the mid-90s, which aims to describe the process of scientific communication quantitatively and the structure of academic and research units based on information presented or exchanged via the Internet [12]. The Web is crawled with the help of automated robots, whose data can be obtained directly or through commercial search engines, which are currently the most powerful and efficient tool for describing global scenarios. The mechanism for classifying universities in the Webometrics ranking means that a university's activities are considered multidimensional, reflected in its presence on the World Wide Web. The best way to build a ranking is by combining a group of indicators that measure all of these aspects. Almind and Ingwersen proposed the first web indicator, Web Impact Factor (WIF), which is based on an analysis that combines the number of links from external pages to a website and the number of pages on the website, a 1:1 relationship between visibility and size [13]. This relationship is used as a starting point in Webometrics ranking, adding two indicators to the size component: the number of documents, measured as the number of rich files in the web domain, and the number of publications aggregated on the Web.

Google Scholar database.

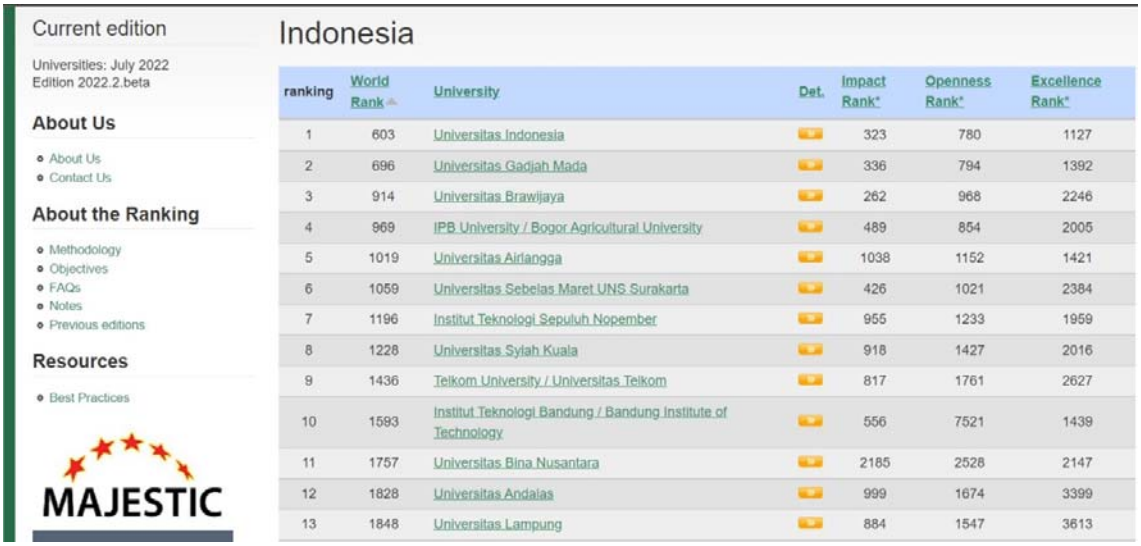
The presence of universities in web 2.0 through educational portals enables them to have a frame of reference that helps assess and improve the use of information and communication channels through this medium for the benefit of the university community and society in general. As such, it also sets the standard for generating informative and communicative principles and attitudes in the university community according to the needs of educational institutions and Web 2.0 philosophy.

Purpose

This study aims to determine the existence of twenty universities in web 2.0 through their educational portals. These universities are a selected sample of the Webometrics ranking (Rank of Indonesian Universities and World Ranking). By knowing the use of web 2.0 in the university portal, it will be able to become a comparison between universities that have high webometrics rankings in relation to the official social media activities available on the university portal.

Methodology

According to McMillan and Schumacher, this study is exploratory-quantitative. Including Exploratory because it explores the educational portals of the twenty selected universities to determine which Web 2.0 tools they use (if any) and quantitative because the related variables of the tools found will be assessed [14]. Research can also be considered a "case study"; a case can be an object defined by pre-existing boundaries [15]. Here the limit is determined exclusively for the case of the selected 20 universities. The selection of the 20 tertiary institutions was based on the Webometrics ranking (semester ranking), taking into account the ten best-ranked tertiary institutions in each category (for Indonesia and the world) in the January/July 2022 semester. Screenshots of Indonesia's ranking are shown to clarify this procedure in Figure 1, as we imagine the University of Indonesia and Gadjah Mada University ranked first and second, respectively. Data showing the number of publications from the University's official account on social media were taken during several days of observation in August 2022, this data is collected periodically to ensure the validity and reliability of the data



ranking	World Rank	University	Det.	Impact Rank*	Openness Rank*	Excellence Rank*
1	603	Universitas Indonesia		323	780	1127
2	696	Universitas Gadjah Mada		336	794	1392
3	914	Universitas Brawijaya		262	968	2246
4	969	IPB University / Bogor Agricultural University		489	854	2005
5	1019	Universitas Airlangga		1038	1152	1421
6	1059	Universitas Sebelas Maret UNS Surakarta		426	1021	2384
7	1196	Institut Teknologi Sepuluh Nopember		955	1233	1959
8	1228	Universitas Syiah Kuala		918	1427	2016
9	1436	Telkom University / Universitas Telkom		817	1761	2627
10	1593	Institut Teknologi Bandung / Bandung Institute of Technology		556	7521	1439
11	1757	Universitas Bina Nusantara		2185	2528	2147
12	1828	Universitas Andalas		999	1674	3399
13	1848	Universitas Lampung		884	1547	3613

Figure 1. Web ranking of universities at a Indonesia level

In the same way, the world's best-ranked universities are selected. After the selection was made, the Web 2.0 tools used by each University were identified, and the two tools with the largest presence among these institutions educational portals were determined. Finally, each specific variable of the two recognized tools is quantified and assessed. Selected universities. Table 1 shows the chosen universities considering that Harvard and Stanford University are ranked the best in the world.

Table 1. Selected universities based on Webometrics ranking.

Domain	University Name	Country
https://www.ui.ac.id/	Universitas Indonesia	Indonesia
https://www.ugm.ac.id/	Universitas Gadjah Mada	Indonesia
https://www.ub.ac.id/	Universitas Brawijaya	Indonesia
https://www.ipb.ac.id/	Institut Pertanian Bogor	Indonesia
https://www.unair.ac.id/	Universitas Airlangga	Indonesia
https://www.uns.ac.id/	Universitas Sebelas Maret	Indonesia
https://www.its.ac.id/	Institut Teknologi Sepuluh November	Indonesia
https://www.unsyiah.ac.id/	Universitas Syah Kuala	Indonesia
https://www.itb.ac.id/	Institut Teknologi Bandung	Indonesia
https://www.unand.ac.id/	Universitas Andalas	Indonesia
https://www.harvard.edu/	Harvard University	USA
https://www.stanford.edu/	Stanford University	USA
https://www.mit.edu/	Massachusetts Institute of Technology	USA
https://www.ox.ac.uk/	University of Oxford	UK
https://www.berkeley.edu/	The University of California, Berkeley	USA
https://umich.edu/	University of Michigan	USA
https://www.washington.edu/	University of Washington	USA
https://www.cornell.edu/	Cornell University	USA
https://www.columbia.edu/	Columbia University in the City of New York	USA
https://www.jhu.edu/	Johns Hopkins University	USA

Presentation and analysis of results

University presence in web 2.0

Table 2 shows the Web 2.0 tools used in the selected university education portals. It can be seen that 19 out of 20 universities have a Twitter icon and link to other social media on the university portal. Similarly, 18 out of 20 universities have a presence on Facebook and Instagram, and 17 out of 20 universities have a presence on YouTube. This means that the web 2.0 tool with the largest presence is Twitter. On the other hand, Universitas Gadjah Mada is an institution that does not have a presence in the four common tools identified (Twitter, Facebook, YouTube, and Instagram). At the same time, Universitas Sebelas Maret is the only institution with one presence in social media, namely Twitter in web 2.0. The remaining 18 universities are at least three devices 2.0 present. Similarly, there are proprietary web 2.0 tools used by certain universities, such as LinkedIn at the University of Indonesia, Bogor Agricultural Institute, and Stanford University.

Table 2. Web 2.0 tools used by the selected universities

	tweeter	Facebook	youtube	Instagram	LinkedIn	others
https://www.ui.ac.id/	1	1	1	1	1	
https://www.ugm.ac.id/	0	0	0	0	0	Wa
https://www.ub.ac.id/	1	1	1	1		Flickr, RSS, wiki
https://www.ipb.ac.id/	1	1	1	1	1	
https://www.unair.ac.id/	1	1	1	1	0	Tiktok, wa
https://www.uns.ac.id/	1	0	0	0	0	
https://www.its.ac.id/	1	1	1	1		Lin.e
https://www.unsyiah.ac.id/	1	1	1	1		Google+
https://www.itb.ac.id/	1	1	1	1		Rssfeed
https://www.unand.ac.id/	1	1	0	1	0	
https://www.harvard.edu/	1	1	1	1		
https://www.stanford.edu/	1	1	1	1	1	Itunes
https://www.mit.edu/	1	1	1	1		
https://www.ox.ac.uk/	1	1	1	1	1	Itunes, e-weibo, Medium

https://www.berkeley.edu/	1	1	1	1		Medium
https://umich.edu/	1	1	1	1	1	
https://www.washington.edu/	1	1	1	1	1	Pinterest
https://www.cornell.edu/	1	1	1	1		
https://www.columbia.edu/	1	1	1	1	1	
https://www.jhu.edu/	1	1	1	1	1	

From what has been shown, Instagram, Twitter, Facebook, and Youtube are the four most used Web 2.0 tools by the twenty selected universities. Therefore, this study examines and analyzes several indicators that represent this tool.

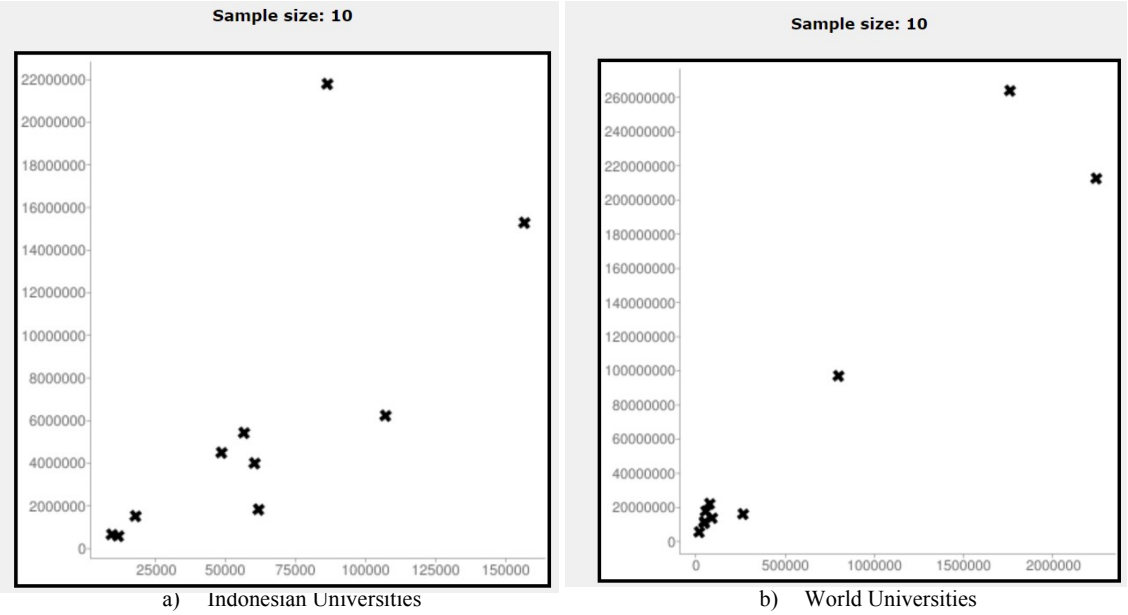
University on Youtube

Table 3 shows the measured values for the "Subscribers" and "Views" indicators on Youtube at each University. As we can see, Harvard University is the institution with the most "Customers" (2240000), and "Views" (212289406) . At the university level in Indonesia, the Bandung Institute of Technology has the best performance. The R-value is 0.7123 for Indonesian Higher Education. This number is a moderate positive correlation, which means there is a tendency for a high X score to a high Y variable score (and vice versa).

Table 3. Indicators of the presence on Youtube of the selected universities.

Domain Name	Youtube	Subscribers (X)	Views (Y)
https://www.ui.ac.id/	1	60300	3977465
https://www.ugm.ac.id/	0	107000	6218577
https://www.ub.ac.id/	1	11700	599194
https://www.ipb.ac.id/	1	56300	5425717
https://www.unair.ac.id/	1	48700	4494609
https://www.uns.ac.id/	0	61800	1811967
https://www.its.ac.id/	1	86500	21789879
https://www.unsyiah.ac.id/	1	17700	1513267
https://www.itb.ac.id/	1	157000	15296324
https://www.unand.ac.id/	0	9050	627343
mean		61605	6175434,2
https://www.harvard.edu/	1	2240000	212289406
https://www.stanford.edu/	1	1760000	263915576
https://www.mit.edu/	1	796000	96670754
https://www.ox.ac.uk/	1	267000	15948845
https://www.berkeley.edu/	1	57500	17877256
https://umich.edu/	1	47700	11361569
https://www.washington.edu/	1	21400	5658081
https://www.cornell.edu/	1	74300	22219395
https://www.columbia.edu/	1	91800	14150904
https://www.jhu.edu/	1	50100	11242318
mean		540580	67133410,4

The value of R is 0.9608 for world-level Universities. This number is a strong positive correlation, which means that high X variable scores go with high Y variable scores (and vice versa).



a) Indonesian Universities b) World Universities

Figure 1. Scatter diagram of the relationship between the "Subscribers" and "Views" indicators on Youtube.

University on Facebook and Instagram

As shown in table 2, Facebook and Instagram are the two most used Web 2.0 tools besides youtube and twitter among the twenty selected universities. Therefore, this study assesses and analyzes several representative indicators of these tools on the University's website. Table 4 shows the values corresponding to the "likes", "Followers" and "following" indicators on Facebook for each University, as well as "Posts", "Followers" and "following" on Instagram. As can be seen on Instagram, Harvard University is the institution with the most "followers" (2106144) from 2154 "Posts" and 157 "following". At the university level in Indonesia, Gadjah Mada University has the most active accounts with "Followers" (936258) and 898 "Following".

Table 4. Indicators of the presence on Facebook and Instagram

	Facebook			Instagram		
	likes	Follower	following	post	follower	following
https://www.ui.ac.id/	187837	196390	NA	3358	781015	156
https://www.ugm.ac.id/	NA	488000	NA	2112	936258	898
https://www.ub.ac.id/	46000	49000	NA	2834	377750	295
https://www.ipb.ac.id/	102077	107433	NA	2601	230057	243
https://www.unair.ac.id/	80000	81000	NA	1715	249522	524
https://www.uns.ac.id/	98000	101000	NA	2149	211632	66
https://www.its.ac.id/	80501	81682	NA	5672	119776	182
https://www.unsyiah.ac.id/	11394	12318	NA	2892	86063	178
https://www.itb.ac.id/	267463	277614	NA	3578	349205	133
https://www.unand.ac.id/	8000	8500	NA	1129	91280	431
mean	86679,4	89818,37	NA	2821,3	214410,6	256,5
https://www.harvard.edu/	NA	6500000	135	2154	2106144	157
https://www.stanford.edu/	NA	1500000	147	1950	1040819	191
https://www.mit.edu/	1300000	1400000	NA	2416	424446	767
https://www.ox.ac.uk/	4474268	4679087	NA	2655	1259364	317
https://www.berkeley.edu/	NA	501000	592	2096	251402	381
https://umich.edu/	793719	782884	NA	4445	352965	152
https://www.washington.edu/	NA	364000	596	2130	198399	235
https://www.cornell.edu/	NA	417000	183	2258	313618	205
https://www.columbia.edu/	NA	444000	37	2770	334449	625
https://www.jhu.edu/	293535	335205	NA	1174	201331	578
mean	NA	1692317	NA	2404	648293	360,8

Based on data available on Facebook, Harvard University was the institution with the most "follower" (2106144) from 2154 "Post" and 157 "following". At the Indonesian Universities level, Universitas Gadjah Mada has the most active account with the number of "Followers" (936258) and 898 "Following".

Table 5. Correlations of Indicators in Facebook and Instagram

Facebook	Follower
Likes (Indonesian Universities)	0.999
Following (World Universities)	-0.345
Instagram	
(Indonesia)	
Post	-0.0587
Following	0.507
(World)	
Post	-0.0558
Following	-0.399

A negative correlation indicates that the two variables ("Following" to "Followers" and "Posts" to "Followers") tend to move in opposite directions. A correlation coefficient of -0.8 or a lower value indicates a strong negative relationship, while a coefficient of -0.3 or a lower value indicates a very weak relationship. Likewise, by associating the value of "likes" with the value of "Followers" on Facebook at the university level in Indonesia (Table 5), it can be said that statistically, there is a "very good correlation" between the two indicators, obtaining a Pearson correlation index of 0.999. and a "highly significant" correlation level (0.00), well below the required 0.01.

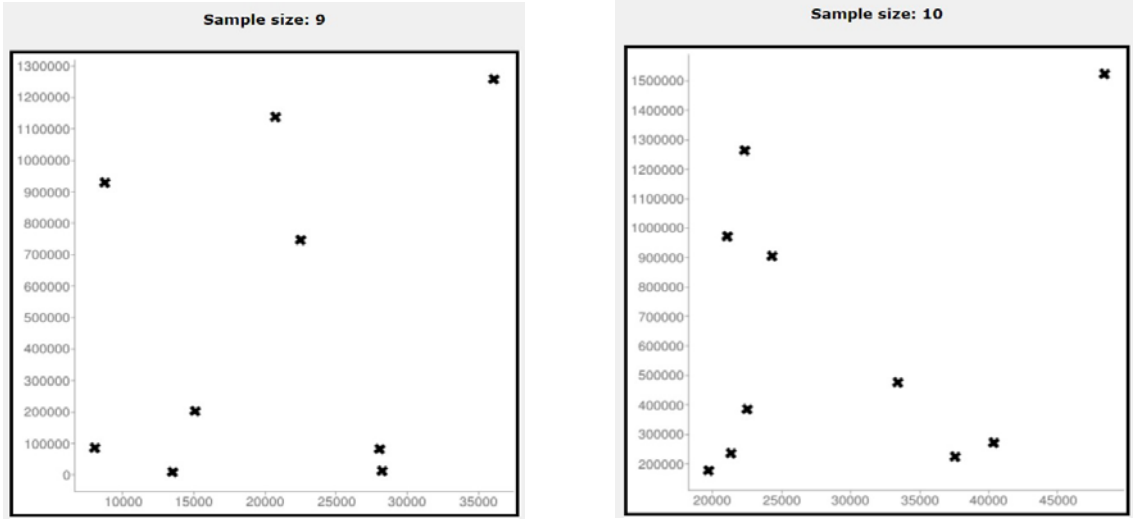
University on Twitter

Table 6 shows the scores corresponding to the Twitter "tweets", "following", "followers" and "Lists" indicators for each University.

Table 6. Indicators of the presence on Twitter of the selected universities.

	Tweeter	Tweets	Follower
https://www.ui.ac.id/	1	36100	1257934
https://www.ugm.ac.id/	0	20700	1139335
https://www.ub.ac.id/	1	15100	203086
https://www.ipb.ac.id/	1	22500	746053
https://www.unair.ac.id/	1	28100	82331
https://www.uns.ac.id/	0	8019	87083
https://www.its.ac.id/	1	88700	NA
https://www.unsyiah.ac.id/	1	28200	14368
https://www.itb.ac.id/	1	8742	929705
https://www.unand.ac.id/	0	13500	9342
mean		26966	496581
https://www.harvard.edu/	1	48400	1523093
https://www.stanford.edu/	1	21100	973559
https://www.mit.edu/	1	22300	1262513
https://www.ox.ac.uk/	1	24300	906388
https://www.berkeley.edu/	1	21300	234633
https://umich.edu/	1	40400	272402
https://www.washington.edu/	1	19700	177307
https://www.cornell.edu/	1	22500	384918
https://www.columbia.edu/	1	33400	477783
https://www.jhu.edu/	1	37600	225500
mean		29100	643809

This can be seen at the Indonesian level, the Institut Teknologi Sepuluh November is the University that produces the most tweets (88700), while at the world level Harvard University is the University that has the most "Tweets" (48400) and "Followers" (1523093).



a) Indonesian Universities b) World Universities

Figure 2. Scatter diagram of the relationship between the "Tweets" and "Followers" indicators on Twitter.

Graph 2 shows the dispersion of the indicators "Tweets" and "followers", according to the corresponding values by University, where the intersection number represents the name of each educational institution. In this sense, we visually verify that there is no relationship between the set of values of the "tweets" indicator and the set of values of the "followers" indicator. However, it stands out once again that Harvard University had the highest number of "tweets" and "followers", and the Institut Teknologi Sepuluh November had the most "tweets" but unfortunately, no value was available. Correlation coefficient (r): 0.268 (Indonesian Universities), Correlation coefficient (r): 0,219 (world universities).

Conclusions

The most used Web 2.0 tools in the educational portals of the twenty universities are Facebook, Twitter, YouTube, and Instagram. In addition, some universities use Web 2.0 tools which can be considered exclusive to each institution. There is a very high relationship between the "Views" and "Subscribers" indicators on Youtube for universities at the world level. The more "subscribers", the proportion of "Views" also increases proportionally. Of the 20 universities selected, Harvard University has the most presence of Facebook and Instagram, according to the "Followers" indicator. Similarly, those who have the highest number of Tweets (Twitter). University One in Twenty universities does not place logos or links to any social media on the university portal or website, even if it has such information and active social media channels. Universities have not using Web 2.0 tools as a means of information and communication through their educational portals. Universities will be recommended to promote and use Web 2.0 tools in their educational portalsmnbmnbm, as a means of information and communication both internally (lecturers, students, administrators) and externally (general public), taking into account the aspects that achieve the University's vision of social, creating space open communication throughout the university community and society as a whole. Promote the principles and attitudes of the web 2.0 philosophy throughout the university community and society. Universities as a reference for civil society in adoption and social software. Adopt a more open and horizontal university model. Promote knowledge dissemination, open repositories, and scientific reputation alternatives, following an open access model.

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