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A New Approach of Indonesian University Webometrics Ranking Using Entropy and PROMETHEE II

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Abstract

The webometric ranking system is currently one of the most widely used methods to rank website quality including for university websites. It uses pre-determined weights for the criteria assessed in these method; therefore, raised a question whether the pre-determined weigh is objective. Entropy method provides a more objective weighing method criterion. This study aims to compare the use of the entropy method followed by PROMETHEE II methods to evaluate 27 Indonesian university websites. The entropy method assesses four indicators: visibility, presence, openness and excellence of the website performance. The PROMETHEE II method was conducted to provide a complete ranking of university websites from the best to the worst, based on a pair-wise comparison of alternatives along each recognized criterion. The entropy method resulted in 0,3; 0,17;0,23; and 0,27 for visibility, presence, openness and excellence weights, respectively. The website ranking using PROMETHEE II method was not significantly different from the ranking generated from the webometric ranking system. To conclude, the use of entropy as a more objective method followed by PROMETHEE II is a reasonable alternative of the webometric system for ranking university websites, at least in the Indonesian context.

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Keywords: webometrics; websites, Entropy; Promethee

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1. Introduction

Indonesian Higher education institutions have extensive efforts with the goal of improving quality. One of the efforts is having accreditation or certification on the basis of external quality assessment to verify compliance on specific standards and criteria. QS “World University Ranking”, Academic Ranking of World Universities (ARWU), the CWTS Leiden Ranking and the Webometrics Ranking are four university ranking systems that are accepted as a global approach. Webometrics is the result of a quantitative study where the webs are analyzed using essentially four types of indicators, which are : visibility, presence, openness and excellence [1]. Current methods of evaluating universities have various biases and drawbacks. To obtain a correct classification requires very expensive processes in resources and time. First, however, it is necessary to cite some definitions of what is understood in the international literature by webometrics and to examine the webometrics indicators most used by the researchers who have been dedicating themselves to working with this new field of Information Science. In this sense, it should be noted that webometrics arose with the need to measure the information that began to be made available in the network, with the advent of new technologies. It can therefore be defined as a quantitative method of analyzing information available on the World Wide Web, comparable to the already known fields of bibliometrics, scientometrics and informetrics, used to measure information in print and other traditional media. Among the first authors to refer to this new metric are Almind and Ingwersen [2]. They define webometrics as "the application of computational methods to the World Wide Web". For them, the new method aims to investigate communication models, the identification of areas of research, historical studies on the development of a discipline or domain and the evaluation of research by countries, institutions or individuals. Other researchers who have also contributed to the establishment of the first definitions in this field are Abraham and Foresta [3]. For them, webometrics is "an original technique that is born with the purpose of elaborating cognitive maps and mathematical models of the WWW to understand its functioning as a model of social, cultural and political organization of cyberspace." Lennart Björneborn [4] defined web-design as the "study of the quantitative aspects of the construction and use of information resources, structures and technologies on the Web, using bibliometric and computational approaches". The objective of this webometrics ranking is, therefore, to measure the activity and visibility of universities as indicators of their impact and prestige. The position in this method of classification summarizes the overall performance of the university, provides information for students and teachers and reflects the academic commitment to the dissemination of scientific knowledge. The ranking is elaborated from the data published in the open web, not in the intranets, that are indexed by the search engines. In this way, presence and impact web indicators allow an evaluation of university activities, the services offered, the quality of teaching and research, and the importance of scientific, technological, economic and cultural results are transmitted to society.

This paper presents a webometrics analysis of the main Indonesian university sites based on the method of Entropy and Promethee. The main purpose is to find out which sites stand out because they have the highest number of page, links received, and publications. To perform the evaluation of webometrics ranking, one possibility is to combine one method to obtain the criteria weight values. In this sense, an "objective" Entropi method, can be combined that generates point weights with PROMETHEE Method in particular, admit the existence of incomparable alternatives. This leads the decision maker to investigate under what criteria the alternatives show good behavior and under which their performance is deficient, then proceed to make the best choice according to their own scheme of preferences.

2. Method

The method for obtaining the weights of criteria of a new webometrics ranking is the entropy method. After determining the weights in interval form by using the proposed method, then must be followed by ranking. This research used an integrated PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluations) methodology to benchmark a set of websites. PROMETHEE is an outranking method for a finite set of alternative actions to be ranked and selected among criteria, which are often conflicting. It also allows the use of quantitative as well as qualitative criteria when evaluating alternatives. The variables that are measured;