Tracking 'eco' footprint in university web pages

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Abstract - **Higher education institutions (HEIs) in less developed countries such as Indonesia might start taking the initiative to create plans for incorporating sustainability and environmental literacy in teaching, research, operations and outreach. However, the portrait of the campus sustainability initiatives among HEIs are not much explored. This paper fills the gap by investigating campus sustainability (eco-campus) activities from university web content. The sampling frame is HEIs accredited "A" by the Directorate General of Higher Education, and the selected samples are 4 HEIs located in Surabaya. A series of steps are performed to reveal eco campus related contents. The findings indicate that the majority of contents are student theses and published scientific papers; quite minimum are contents on eco-campus operation and engagement.**

Keywords − **eco-campus, sustainability, sustainable campus, university, Surabaya**

I. INTRODUCTION

Campus sustainability has become a global issue for university management as universities need to both reduce the environmental impact of their daily operation and also generate knowledge through research in sustainability area [1]. Therefore, universities could facilitate their students in developing capacities and behaviors on sustainability. Global actions have been made to promote the importance of sustainability education such as through sustainability declarations [2] and the United Nation's "Decade of Education for Sustainable Development" (2005-2014).

The term campus sustainability basically refers to sustainability initiatives implemented by higher education institutions. The widely accepted definition of sustainability is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." [3]. The comprehensive definition campus sustainability is proposed by Velaquez et al. (note: they use the term sustainable university) as "a higher educational institution, as a whole or as a part, that addresses, involves and promotes, on a regional or a global level, the minimization of negative environmental, economic, societal, and health effects generated in the use of their resources in order to fulfill its functions of teaching, research, outreach and partnership, and stewardship in ways to help society make the transition to sustainable lifestyles" [4].This definition covers three components of sustainability - economic, social and environmental – as interdependent and mutually reinforcing pillars as reported in UN World Summit 2005 [5]. In line with Velaquez's definition, Alshuwaikhat and Abubakar emphasized the three areas of campus sustainability initiative: (i) university environmental management systems, (ii) public participation & social responsibility, and (iii) sustainability teaching and research [6]. In summary, the components of sustainability and the area where sustainability initiatives accomplished by universities/colleges could indicate the comprehensiveness of campus sustainability.

Campus sustainability has been practiced widely among universities in developed countries. On the other hand, Indonesian higher education institutions still have little knowledge and awareness on a campus sustainability initiative (which in Indonesia is named "eco-campus"). An investigation of Indonesian university sites ranked in the UI Green Metrics 2012 (conducted by University of Indonesia) show that only four out of the top ten have some dedicated web pages for campus sustainability programs [7,8]. Their sustainability efforts are still partial, not integrated into university systems, with only limited actions on the environmental management [2].

Implementing campus sustainability initiative should not be accomplished as a project but a continuous process. In this process, the targets and the ways to achieve them are evolving, for example because of technological innovation. Therefore, it is important to track or evaluate the campus sustainability achievement. A prior study has identified 17 sustainable higher education assessment tools and investigated their comprehensiveness, novelty and popularity [9].

This paper takes a different stance by looking at sustainability related activities indirectly, through university websites. Currently, university websites are used as a main communication channel to university stakeholders. The advancement of web technology has made it easier to publish web content in the form as text, image, audio, and video. As eco-campus initiatives and any other sustainability related activity give the pride to universities - it is very likely that any information about their plan, implementation, and achievement will be published in their websites. Therefore, the investigation of web content is suitable for revealing the eco-campus related activities.

II. METHODOLOGY

Research on campus sustainability can be placed into four methodologies: positivist/empirical–analytical, interpretivist or hermeneutic, critical, and post-structural [10]. This paper investigates campus sustainability implementation empirically through published web content, thus it adopts the empirical-analytical post positivism paradigm, in which content analysis is one of the methods used. The study adopts a web content analysis method for HEI websites. It limits the investigation on the textual web content, as text is the dominant content among university websites.

The sample of HEIs is determined through the following process. First of all, the sampling frame is taken from the published list of HEIs accredited "A" by the Ministry of Research Technology and Higher Educations. Furthermore, the sampling frame is limited to East Java Province, where a big number of HEIs reside. There are ten institutions accredited "A" in this province, in which five of them are located in Surabaya. Among these five, three are universities, one institute of technology, and one polytechnic. As the Directorate General of Higher Education differentiates polytechnic with university/institute, this study excludes polytechnic in the sample. Therefore, the sample of this exploratory study consists of four HEIs, as shown in Table 1.

As this research is exploratory and there is no prior knowledge about the actual sustainability-related web-contents, this study implements 2 stages of data collection. The first stage is aimed to determine suitable classification of web content produced by Google Search. It consists of the following three steps.

Step 1:
- Typing "eco*" site:name.ac.id, e.g. *"eco*" site:ubaya.ac.id* in Google Search page (google.co.id), and specifying the time period as year 2013 to 2015 to obtain the recent eco-campus related activities. Fig. 1. Presents a piece of results.

Step 2:
- Observing each link produced from Google Search from page 1 to page 10. Copying each result to MS Excel spreadsheet. Investigating the search result.
- Doing this step for all 4 institutions.

Step 3:
- Comparing and classifying the results from 4 institutions.
- Creating empirical content categories.

Step 3 generates the following categories: (i) student thesis & paper, (ii) scientific paper, (iii) student innovation & competition, (iv) organized events, (v) eco-campus, and others.

Fig. 1. Excerpt of Google search result

TABLE 1

SAMPLE OF FOUR INSTITUTIONS

Institution names	URL	Category
Universitas Airlangga (Unair)	unair.ac.id	Public
Institut Teknologi Sepuluh Nopember (ITS)	its.ac.id	Public
Universitas Surabaya (Ubaya)	ubaya.ac.id	Private
Universitas Kristen Petra (Petra)	petra.ac.id	Private

Source: forlap.dikti.go.id

Furthermore, the second stage is implemented to use those categories and to collect detail web content. This stage contains the following steps:

Step 4:
- Creating an MS Excel table with the following heading titles: No – search – eco word – webpage title – file type – year posting – category – unit URL

Step 5:
- Searching eco words through Google Search page by typing "eco*" site:name.ac.id (name = unair, its, ubaya, petra) and specifying the time limit as year 2013 to 2015.

Step 6:
- Filling up the table for 5 pages of the search results, for each university. The decision of 5 pages instead of 10 pages as stated in Step-1 is taken by considering the fact that after page 5, the results are mostly irrelevant.

Step 7:
- Screening the search results for their relevance. The irrelevant results are deleted.

Step 8:
- Tabulating, organizing, and analyzing data.

The results of step 8 are presented in the following sections.

III. RESULTS

As shown in Table 2, those four leading institutions exhibit varieties in the number of study programs, lecturers, and students. For instance, the two public institutions, ITS and Unair, have much bigger size than the two private ones. This is the typical current condition among Indonesian HEIs.

The results from Google Search show that some links contain irrelevant content. For example, some links go to the word 'economics' or a person named Umberto Eco. Some others have relevant eco-related words (e.g. eco-design), but these words only appear as listed links in News menu (Fig. 2). This kind of result is also considered irrelevant. As shown in Table 3, ITS has the highest percentage of relevant eco content, as it implements eco-campus program in the institution level.

The results of relevant eco-words are presented in Table 4 and 5. The word 'eco-campus' is on the top list for Unair and ITS, might because both institutions implement the eco-campus initiative. Conversely, the term eco-campus only appears as one count for Ubaya and none for Petra (data are not explicitly shown in Table 5). It might indicate that both institutions might have not strongly implemented eco-campus programs.

TABLE 2

SAMPLE PROFILE

Institution	Study programs	Lecturers	Students
Unair	173	1.508	28.454
ITS	64	985	11.626
Ubaya	21	321	8.021
UK Petra	18	278	7.936

Source: forlap.dikti.go.id

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Fig. 2. Irrelevant eco-related word

TABLE 3

RELEVANCY OF ECO WORDS

Eco word	Unair	ITS	Ubaya	Petra	Total
Relevant	39 (78%)	49 (98%)	28 (56%)	41 (82%)	157 (78%)
Irrelevant	11 (22%)	1 (2%)	22 (44%)	9 (18%)	43 (22%)
Total	50	50	50	50	200

TABLE 4

RELEVANT ECO WORDS (1)

Unair		ITS	
eco-campus	9	eco-campus	17
eco-friendly	5	eco Marathon	5
eco-efficiency	4	eco-green	3
bio-eco	2	eco-office	3
eco-green	2	eco fashion	2
eco-resorts	2	eco urban	2
eco-tropical	2	eco-driving	2
13 others	1	eco-lodge	2
		eco-resor	2
		11 others	1

TABLE 5

RELEVANT ECO WORDS (2)

Ubaya		Petra	
eco-friendly	6	eco-design	9
eco-design	5	eco-friendly	8
eco-addicted	3	eco interiors	4
kid-eco	2	eco-city	2
eco-tourism	2	eco-efficiency	2
eco-sustainable	2	eco-hotel	2
Eco Green Park	2	eco-social	2
6 others	1	eko wisata	2
		10 others	1

Table 6 shows the year when the web content was published or posted. It appears that Unair and ITS have the highest number of content published on 2013, while Ubaya and Petra on 2014.

Table 7 shows that student theses, papers, and blog articles contribute 40% of the eco-related content. Scientific paper is in the second place with 22%. These two categories represent the output of academic research. This finding confirms the web sub-domains (Table 8 and 9) in which the contents are located. The web sub-domains listed below Unair such as web, journal, and adln.lib belong to both categories. Similarly, the findings show digilib for ITS, repository and journal for Ubaya, and student journal, repository, dimensi interior and dimensi sub-domains for Petra.

TABLE 6
YEAR OF PUBLISHING WEB CONTENT

Year	Unair	ITS	Ubaya	Petra	Total
2013	18	19	3	6	46
	(46%)	(39%)	(11%)	(15%)	(29%)
2014	8	13	16	22	59
	(21%)	(27%)	(57%)	(54%)	(38%)
2015	13	17	9	13	52
	(33%)	(35%)	(32%)	(32%)	(33%)
Total	39	49	28	41	157

TABLE 7
CATEGORY OF WEBPAGE CONTENT

Category	Unair	ITS	Ubaya	Petra	Total
student thesis & paper	21	18	8	16	63
	(54%)	(37%)	(29%)	(39%)	(40%)
scientific paper	6	3	7	19	35
	(15%)	(6%)	(25%)	(46%)	(22%)
eco-campus	5	12	1	0	18
	(13%)	(24%)	(4%)	(0%)	(11%)
organized events	4	7	5	1	17
	(10%)	(14%)	(18%)	(2%)	(11%)
student innovation & competition	1	9	4	1	15
	(3%)	(18%)	(14%)	(2%)	(10%)
other	2	0	3	4	9
	(5%)	(0%)	(11%)	(10%)	(6%)
	39	49	28	41	157

TABLE 8
WEB DOMAIN (1)

Unair		ITS	
web.unair.ac.id	12	digilib.its.ac.id	24
journal.unair.ac.id	7	www.its.ac.id/berita	20
adln.lib.unair.ac.id	7	5 others	1
international.unair.ac.id	3		
www.unair.ac.id	3		
fh.unair.ac.id	2		
5 others	1		

TABLE 9
WEB DOMAIN (2)

Ubaya		Petra	
		repository.ubaya.ac.id	10
		studentjournal.petra.ac.id	15
www.ubaya.ac.id	6	repository.petra.ac.id	8
journal.ubaya.ac.id	5	dimensiinterior.petra.ac.id	5
industrikreatif.ubaya.ac.id	3	dewey.petra.ac.id	2
3 others	1	dimensi.petra.ac.id	2
		puslit2.petra.ac.id	2
		7 others	1

IV. DISCUSSION

The investigation of eco-related content in the university websites reveals some differences between public and private HEIs. First, public institutions have bigger size in terms of the number of study program, number of lecturers, and number of students than private ones (Table 2). This fact could produce higher number of eco-campus web-content.

Second, the term eco-campus is used more frequent on public than private institutions (Table 4 and 5). This shows that those public institutions are intentionally implementing eco-campus initiative. The Environmental Agency of the Surabaya city government has been promoting Surabaya Eco Campus program and giving eco-campus award since 2010 (http://lh.surabaya.go.id). Therefore, it is reasonable that HEIs in Surabaya in general are more familiar with the term eco-campus.

Third, within year 2013 – 2015, both public universities show the biggest eco-contents published on 2013, while private ones on 2014 (Table 6). This difference might be interpreted in relation to their responses toward eco-campus initiative. Public universities with some advantages in size and resource indicate their earlier action in implementing eco-campus in the region (eco leadership).

Fourth, eco-content mostly comes from student thesis (final project) and journal/conference papers (Table 7). In the recent years, the words eco, sustainability, green, renewable have been the popular terms for research topics and conference titles. As Table 7 presents, both categories - student thesis and journal papers - on average contribute 66% of the total content. In contrast, organized events related to eco-campus are only 11% on average. Similarly, the content about eco-campus policy, strategic plan, organization and management as presented in the category "eco-campus" is also 11% on average. The findings might indicate that sustainability topic is quite popular adopted in research, although the real sustainability operation and activities is still quite minimal.

Fifth, the detail exploration of the research titles (not shown in Table 5) shows that those research projects have addressed the regional and global issues. The appearance of those scientific documents could be supported by the action of universities to increase their 'internet visibility' by publishing their PDF files online in the links like repository, journal, and studentjournal (Table 8 and 9). This effort is also motivated by the recent race among Indonesian universities to increase their position in "the web metrics university web ranking" (webometrics.info). In addition, the Directorate General of Higher Education has released the decree (SK 152/E/T/2012) that requires students to publish scientific articles.

Finally, as eco-contents mostly appear in research and publication rather than on eco-campus operations or campus engagement activities, there are still many areas for universities to implement eco-campus initiatives.

V. CONCLUSION

This paper has presented eco-related activities among four leading HEIs in Surabaya through identifying eco-

footprint in their official web pages. The findings indicate that the majority of eco-related contents are student theses and published scientific papers; and quite minimum contents on eco-campus operation and engagement. This fact represents the gap between the real condition and the ideal comprehensive framework found in literature e.g. [4]. Therefore, this study suggests the university management to do more serious actions to implement eco-campus with a comprehensive framework.

This study could have some limitations as the information analyzed is solely based on the contents published in the institution websites. There might be some eco-campus activities, which are not covered and published in the websites. It might be some previously relevant web contents have been removed.

Despite its limitations, this paper has made contribution in providing an alternative method to evaluate and compare eco-campus activities among universities. Further studies could employ bigger sample to obtain more comprehensive findings.

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