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Management Practices Towards the Embeddedness of Sustainability in European Universities

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This research observed and evaluated the sustainability practices in universities. This study emphasizes the connection between theory and practice in research frame. It is intended by this research using content analysis of UI GreenMetric, universities' websites and sustainability annual reports observing universities' practices related to sustainability to answer the research question, which is: How are university managements embedding sustainability-oriented practices in sustainability focused European universities as far as CORE system (Curriculum, Operations, Research, and Engagement) is considered? The employed research methodology mainly relies on content analysis of the studied universities from the UI GreenMetric Sustainable University assessment and ranking index. The UI GreenMetric Sustainable University assessment and ranking index was selected since it considers the Operations, Curriculum, Research, and Engagements (CORE system) of universities with indicators such as Setting and Infrastructure, Energy and Climate Change, Waste, Water, Transportation, and Education. This covers the triple bottom line of sustainability (Environment, Economy, and Society) and other indexes like GASU, AASHE, STARS and others, focused mostly on operational Eco-efficiency. UI GreenMetric index is the first and the only ranking that measures each participating university's commitment in developing an "environmentally friendly" infrastructure. The total sample of the study observed and evaluated in this study are five (5) top European Sustainable Universities according to UI GreenMetric sustainable ranking index. The result shows a significant progress in Operational practices except in the area of Campus Setting and Infrastructure. There was a less significant progress in the Curriculum, Research, and Engagement practices of the CORE system of sustainability-oriented practices which are being integrated into the studied universities. This research provides a state of the art result regarding the embeddedness of sustainable practice in European universities. It has the potential to help any university to better integrate sustainability in their management system.

Keywords: management and sustainability practices, content analysis, system CORE, European universities

Introduction

The concept of sustainability, developed by the Brundtland Report defined sustainability as "development

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that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development) (UNWCED, 1987), foregrounds of the interconnections of the economic, social, and environmental aspects (the "triple bottom line") of corporate actions. In recent years, several definitions of sustainable higher education institutions have emerged (Madeira, Carravilla, Oliveira, & Costa, 2011). Alshuwaikhat and Abubakar (2008) argued that a sustainable campus should be environmentally healthy, with a prosperous economy through energy and resource conservation, waste reduction and with efficient environmental management; it should promote equity and social justice and export these values to the community. According to Milutinović and Nikolic (2014), the vision of sustainable development in higher education is a world where everyone has the opportunity to benefit from a quality education and learn the values, behaviours, and lifestyles required for a sustainable future and for positive societal transformation (Jorge, Madueno, Cejas, & Pena, 2013).

Therefore, in the last few decades, an increasing number of higher education institutions have been engaged in embedding/incorporating and institutionalizing sustainability into their systems (Ceulemans, De Prins, Cappuyns, & De Coninck, 2011; R. Lozano, Lukman, F. J. Lozano, Huisingh, & Lambrechts, 2013; Shephard & Furnari, 2013). This is due to the increased level of consciousness in society for sustainability issues and the significant impacts of campus activities on both the environment and communities (Alshuwaikhat & Abubakar, 2008; Lazano, 2006). In addition, the increasing importance of declarations, charters, and partnerships for fostering transformative sustainable development is demonstrated by the more than 1,000 university leaders who ratified their commitment to sustainability by signing the Talloires Declaration, the Kyoto Declaration, and the Copernicus University Charter (Calder & Clugston, 2003).

Nevertheless, sustainable development in higher education is still far from being embedded into a holistic and organic manner by university leaders (Lee, Barker, & Mouasher, 2013; Milutinović & Nikolic, 2014). A number of scholars have called for more comprehensive embeddedness of sustainable development into their systems, rather than only as "add-ons" to existing practices, by engaging in fundamental and radical changes (Fadeeva & Mochizuki, 2010; Ferrer-Balas, Lozano, Huisingh, Buckland, Ysern, & Zilahy, 2010; Koester, Efli, & Vann, 2006). The slow rate of commitment in universities presents a tremendous challenge to higher education institutions and society in becoming sustainable (Jorge et al., 2013). Therefore, it is necessary to analyze how universities have been contributing towards the embeddedness of sustainability practices in universities (Leal, 1997; De Castro & Jabbour, 2012). This contribution will occur within the context of education, research, outreach/engagement, and the administrative management of the university itself (Alshuwaikhat & Abubakar, 2008; Jabbour, 2010).

The purpose of the present study links to current discussions regarding sustainability approaches in universities. Universities have begun to recognize the need to reflect the reality that humanity is affecting the environment in ways which are historically unprecedented and which are potentially devastating for both natural ecosystems and us. Since universities are the integral part of the global economy and since they prepare most of the professionals who develop, manage, and teach in society's public, private, and non-governmental institutions, they are uniquely positioned to influence the direction of a sustainable society. Thus, as major contributors to the values, health, and wellbeing of society, higher education has a fundamental responsibility to teach, train, and research for sustainability.

The success of universities in the twenty-first century will be judged by the ability to put forward a bold agenda that makes sustainability and the environment a cornerstone of academic practice. This is a great

concern among some universities, for example, to increase their students' awareness and commitment to sustainable practices. As a result, student organizations and special events have emerged to focus on sustainable practices regarding transportation, construction, energy, waste, food, water, and landscaping (Emanuel, 2010). By seeking to embed sustainability in the system, many higher education institutions are adopting specific sustainable management systems (Clarke & Kouri, 2009). A management system is usually based on management by objectives (Lundberg, Balfors, & Folkeson, 2009), in which the principal aim refers to the process of directing and controlling employees and work units, and motivating them towards performances regarding specific set of objectives. Although, higher education institutions are interested in performing under a variety of objectives in their management system, this research focuses on those related to sustainability (Gomez Vecchio, 2012).

Also, the relevance of higher education institutions as important actors in the global arena is well exemplified by Waheed, Khan, and Veitch (2011), who argue that:

> The main general objectives of all higher education institutions are to educate students; to preserve and refine existing knowledge while producing, disseminating, and applying new knowledge; and to define and assist in finding solutions for problems in society. Knowing that sustainability for universities can be seen as a necessity, not to avoid the cost of deteriorating social, environmental, and economic systems, but also to create new opportunities to improve the rate and extent of human development.

This implies that universities are expected to prepare students to develop the ability to embed social, environmental, and economic considerations in future decision making (Lozano et al., 2013; Sibbel, 2009). Among the most relevant competencies for future decision makers are to understand the complexities of sustainability and to convert the knowledge of education for sustainable development (ESD) into systemic, anticipatory, and critical thinking and actions (Rieckmann, 2012). This development is essential, as future professionals will be working globally with companies that increasingly have sustainability on their agenda (Kiron, Kruschwitz, Haanaes, & Von Steng Velken, 2012). This development puts high demands on universities to embed sustainability into the management practices of the universities so that this intelligence permeates all activities as a university identity (Steiner, Sundstrom, & Sammalisto, 2013).

To significantly address these problems, university management practices have the potential to contribute to the embeddedness of sustainability (Gomez Vecchio, 2012). Hence, an approach as the one presented here can contribute to research regarding sustainability-oriented practices in universities (Emanuel & Adams, 2011). It is the above problems that set the stage of this study in observing management practices towards the embeddedness of sustainability in top sustainability focused European universities. In summary, this study is organized into the following sections. The second section focuses on the theoretical background in the form of literature review. The third section introduces the methodology, findings, and evaluations. The fourth section presents the primary results and conclusions of this study. In the next section, the theoretical background of this study in the form of literature review will be considered.

Literature Review

In 1983 the UN General Assembly, which is the main deliberative, policymaking, and representative organ of the United Nations, created a commission called the World Commission on Environment and Development. The commission releases yearly reports in which sustainable development was discussed and highlighted. The Commissions' 1987-reports, Our Common Future, is perhaps the most revered and acknowledged, and often

spoken of as the Brundtland Commission Report. In this report the winged words: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” were expressed (United Nations World Commission on Environment and Development) (UNWCED, 1987).

Sustainable development rests on three pillars, economic, environmental, and social as mentioned above. These three dimensions are often used in various development programs and can be seen as the triple bottom line. It is important that each dimension gives equal consideration to ensure a sustainable outcome (Rogers, Jalal, & Boyd, 2008).

Figure 1 shows that to achieve a sustainable result a fine balance must be reached between the three components. If one dimension overwhelms the others, the outcome will be unbalanced and unsustainable (Ahlberg, 2014). For sustainable development to be achieved holistically, education for sustainable development is needed to be taught in the universities because universities have a major part to play in the achievement of sustainable development.

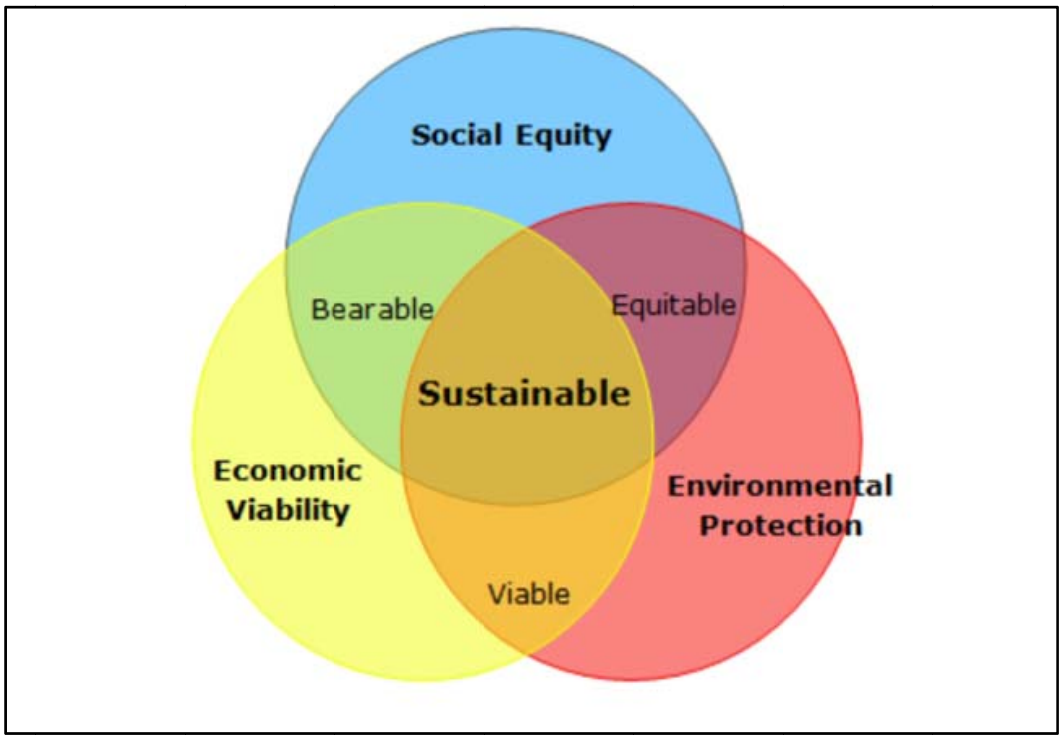

Figure 1. Pillars of sustainability.

Education for Sustainable Development

Blewitt (2010) opined that a new graduateness as well as a new approach to university education is required. The International Association of Universities (IAU, 2006) acknowledges that universities have not been producing graduates with the skills, motivation, and knowledge necessary to promote sustainability. Despite some considerable advances in Education for Sustainable Development (ESD) in various places there has been no curriculum main streaming of sustainability as there has been with equal opportunities. This is partly due to a lack of knowledge and to some extent a suspicion that sustainability and, its sister concept sustainable development, are inexact, unscientific, and too controversial to be operationalized effectively. The

theory and practice ESD is not always easy to grasp. It relates to the social, economic, cultural, ethical, and spiritual dimensions, will differ according to time, place, and culture and, in curriculum terms, invite a trans-disciplinary, systemic, and holistic approach that addresses value, attitude, affective, skill, and knowledge development. Wals and Jickling (2002) write:

> Integrating aspects of sustainability cannot be realized without thinking very critically about the re-structuring of didactical arrangements. This re-orientation requires ample opportunity for staff members and students to embark on new ways of teaching and learning. For this to happen they have to be given the opportunity to re-learn their way of teaching and learning and to re-think and to re-shape their mutual relationships. These new didactical arrangements pre-suppose a problem orientation, experiential learning, and lifelong learning.

Helpfully, as part of the decade for ESD which we are now over half way through, UNESCO (2005) has identified a number of key ESD characteristics. ESD:

(a) is based on the principles and values that underlie sustainable development;

(b) deals with the well-being of all three realms of sustainability—environment, society, and economy;

(c) promotes life-long learning;

(d) is locally relevant and culturally appropriate;

(e) is based on local needs, perceptions, and conditions, but acknowledges that fulfilling local needs often has international effects and consequences;

(f) engages formal, non-formal, and informal education;

(g) accommodates the evolving nature of the concept of sustainability;

(h) addresses content, context, global issues, and local priorities;

(i) builds civil capacity for community-based decision making, social tolerance, environmental stewardship, adaptable workforce, and quality of life;

(j) is interdisciplinary. No one discipline can claim ESD for its own, but all;

(k) disciplines can contribute to ESD, and uses a variety of pedagogical techniques that promote participatory learning and higher order thinking skills.

Selby (2007) stresses the urgency of our global predicament seeing the role of Higher Education (HE) as needing to prepare us for contraction. Climate change, excessive resource use, and overpopulation require formal and informal education to help nurture alternative and localized conceptions of the "good life" together with more holistic ways of mediating and interpreting reality. Learning in HE needs a keener appreciation of complexity, such as the multiple ramifications and reverberations of human action. Selby also recognizes the inherent complacency or lack of engagement in the view that the academy exists only for disinterested contemplation and reflection. HE certainly needs to offer learners this space, but overall the sector needs to do more than monitor the demise of yet another human civilization. HE must therefore be focused on more than simply delivering employability or servicing the business as usual economy. It must encompass: a civil component—community engagement going beyond encouraging student and staff volunteering; a political component—skills of decision making, leadership, conflict negotiation, and values/moral education; and, our rights and obligations to other people, other species and the planet as a whole. It needs to be more eco-centric. Graduates need to prioritize actions, balance environmental, social and economic costs and benefits, understand the needs and perspectives of others and, through both a generic understanding of sustainability and through their own disciplinary knowledge and expertise, be able to work in an inter-professional and intercultural manner. For Calder and Clugston (2003), one way of developing a sustainability curriculum in HE is to develop

learning around the key concepts of sustainability rather than a set of concepts located within each traditional disciplinary area. This needs to be married to a trans-disciplinarility and Mode 2 knowledge (Gibbons, Limoges, Nowotny, Schwartzman, Scott, & Trow, 1994) which, as Harloe and Perry (2005) discuss, is key to HE successfully engaging with a diverse range of intellectual, economic, and social interests where both knowledge creation activities and research findings are disseminated interactively, in real and virtual time, and where research groups are networked globally with participants from a range of public, private, and third-sector institutions. This will lead to the embeddedness of sustainability knowledge and skills in universities in an effective way.

Embeddedness of Sustainability in Universities

The need for sustainable development (SD) has become increasingly evident, implying that universities are expected to prepare students to develop the ability to integrate social, environmental, and economic considerations in future decision making (Lozan et al., 2013; Sibbel, 2009). Among the most relevant competencies for future decision makers are to understand the complexities of sustainability and to convert the knowledge of education for sustainable development (ESD) into systemic, anticipatory, and critical thinking and actions (Rieckmann, 2012). This development is essential, as future professionals will be working globally with companies that increasingly have sustainability on their agenda (Kiron et al., 2012). This development puts high demands on universities to integrate SD into the functions of faculty and staff so that this intelligence permeates all activities as a university identity (Steiner et al., 2013) and is not only offered piecemeal in single course activities. The transformation towards university ESD requires three elements to function: SD orientation integrated in university activities, education about sustainable development, and education for sustainable development in society (McKeown, Hopkins, Rizzi, & Chrystalbridge, 2002).

The role of universities in ESD has been encouraged in many declarations and initiatives. Many programs for ESD have according to Leicht (2013) been “good”, but they commonly depend on active individuals, resulting in a lack of a more holistic approach that connects SD to other discourses in education (ibid.). That shortcoming is addressed in one of the latest initiatives: the Higher Education Sustainability Initiative and the Rioþ20 Treaty on Higher Education to ask universities, in addition to the previous declarations, to commit themselves to actions for ESD (Copernicus, 2013; Dlouhá, Huisingh, & Bartron, 2013).

Although faculty and staff in universities still perceive sustainability as peripheral to their functions (Wals, 2014) and are in the early stages of the learning process (Mulder, Segalàs, & Ferrer-Balas, 2012), they are the change agents who can and will engage in the ESD (Barth & Rieckmann, 2012). Universities are now progressing from the “bolting-on stage” of SD (Sterling, 2004), starting to face the challenge and building in more systematic changes for SD (Wals, 2014). The next stage requires universities to equip leaders, faculty, and staff with a perception of sustainability in the academic context they can apply to their functions at the university. For this change to become a transformation (Sterling, 2004), SD needs to be integrated in all university activities and be transformed into practical actions, which call for innovative educational cross-disciplinary approaches (Warburton, 2003) and a thinking paradigm (McKeown et al., 2002).

Lazano (2006) expressed that the future leaders, decision-makers, and intellectuals of the social, political, economic, and academic sectors are created, formed, and shaped within the world’s higher education institutions. Even though each university is unique, all of them have the same basic system. Lazano (2006) also considers the main actors in universities to be as follows: (a) the academic directors; (b) the professors; and (c)

the students. Ideally the concepts of SD should be integrated into the policies, approaches, and learning of all members of these stakeholders; in practice this is almost impossible in the first stages of SD incorporation into the university's system. This system, according to Cortese (2003), has five dimensions: (a) Education (referring to courses and curricula); (b) Research, both basic and applied; (c) Campus operations; and (d) Community outreach. These dimensions must also be assessed and reported in an ongoing manner which leads to a fifth dimension; (e) Assessment and reporting. It should be noted that these dimensions are interdependent.

Other scholars have stressed the basic types of activities given in higher education institutions assessing the main elements in this transformative process towards sustainability (Hills, 2011; Christensen, Thrane, Herreborg Jørgensen, & Lehmann, 2009; Ferrer-Balas, Adachi, Banas, Davidson, Hoshikoshi, Mishra, Motodoa, Onga, & Ostwald, 2008). For instance, Christensen et al. (2009) identified that the main activities are related to the fields of operation and maintenance, teaching, research, and outreach (which is engagement and cooperation with local communities, companies, the media, etc.). Similarly, different definitions focus on the activities as a CORE System (Hills, 2011). The abbreviation stands for Curriculum, Operations, Research, and Engagement. The CORE model is presented as a "campus-wide guide for holistic implementation of campus sustainability initiatives" (Hills, 2011). Lukman and Glavic (2007) argued that models like these are based on assessments as the one that desirable outcomes of sustainability-oriented practices are those fostering "research, technical development and innovations within a knowledge-based society". Lukman and Glavic also argued that incorporating sustainability-oriented practices into everyday activities involves a further identification of variables such as "management performance (vision, mission, statement, strategy, and sustainability council/coordinator), education and research (programs, curriculum, teaching methods), operations, forming networks and reporting to stakeholders (assessment tools, sustainability indicators)". The construction of a framework of sustainability assessment in universities is enriched by the CORE model in approaches to management practices. This study adopts this model as we consider a sustainability assessment tool that considers this CORE model.

Sustainability Assessment Tools

According to the sustainability model (Figure 2), sustainability refers to the holistic and interconnected phenomena of economic, environmental, and social aspects (Lazano, 2009). Sustainability oriented practices are always multidimensional and are organized within the economic, environmental, and social dimensions. Strictly one-dimensional activity (e.g. Environmental) hardly exists, since it is always related to economic and social effects. University's performance aspects such as research, education, and environmental protection are interconnected and multidimensional too. They should all be evaluated when the sustainability of the University is under consideration. Research, development, investment, and matriculation are aspects, which are closely linked with an economic dimension of the development of universities. Thus, in order to organize the university performance into the sustainability idea, the assumption has been made that these four aspects represent mainly the economic dimension of the university's performance. Education and student services were assumed to relate mainly to the social dimension, while resource usage, emissions, and waste represent environmental dimensions of the university's performance. In this way, all the three perspectives of sustainable development have been covered by the proposed three dimensions (Lukman, Krajnc, & Glavič, 2010).

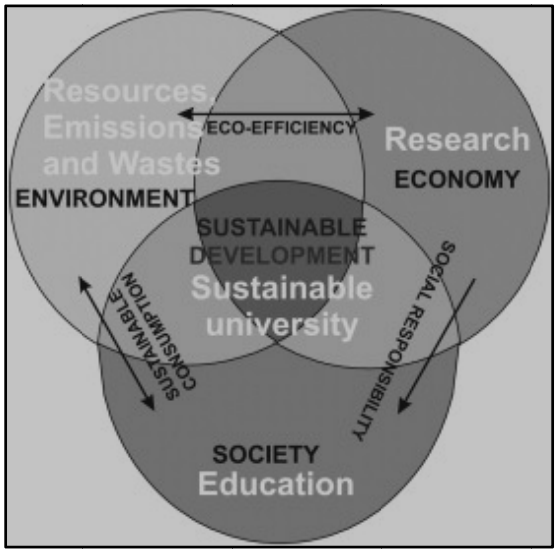

Figure 2. A sustainable development model (Lukman et al., 2010).

The assessment of sustainability in universities has been examined with a number of critical reviews and meta-analyses on the use of various assessment tools. Shriberg (2004) examines the criteria for a number of assessment tools and draws conclusions about the state of sustainability practice. He highlights a number of important considerations which are based on the analysis: decreased consumption, the centrality of sustainability education, cross-functional integration, cross-institutional integration, and incremental, systemic progress. Rankings and indicators are not the only kind of assessment for sustainability in universities. Pope, Annandale, and Morrison-Saunders (2004) evaluate a number of different approaches to sustainability assessment found in the literature to determine their potential contribution to sustainability. They state that many of these are examples of "integrated assessment" derived either from environmental impact assessment (EIA) or strategic environmental assessment (SEA) and extended to also include social and economic considerations, thus reflecting a "triple bottom line" (TBL) approach to sustainability. They conclude that "assessment of sustainability" requires that the concept of sustainability be well-defined and that principles-based approaches to developing sustainability criteria are more appropriate than TBL approaches, seeing the TBL conception as having "inherent limitations".

Lozano (2006b) reports on a tool for a Graphical Assessment of Sustainability in Universities (GASU). In it, three approaches to assess and report sustainability are utilized, namely accounts, which are constructions of raw data that are then converted to a common unit: monetary, area, or energy; narrative assessments which combine text, maps, graphics, and tabular data; and indicator-based systems which can include text, maps, graphics, and tabular data. Some analyses reflect different conceptions of "sustainability"". Hak, Moldan, and Dahl (2007) present a scientific assessment of sustainability indicators. Ness, Urbel-Piirsalu, Anderberg, and Olsson (2007) categorize sustainability assessment tools with the goal of going beyond an environmentally focused conception of sustainability to a wider interpretation. Fadeeva and Mochizuki (2010) report on a project in the Asia Pacific to develop an alternative university appraisal system that would potentially become a viable alternative to the existing higher education ranking and assessment systems. Ferrer-Balas et al. (2008) provide a system for allowing the university to meet the challenge of integrating the university with the sustainable development paths of society. Lukman et al. (2010) present an empirical method for weighting the

data. Ramos and Pires (2013) provide an integrative analysis of sustainability indicator approaches, frameworks, and initiatives. They see two main, opposing schools of thought on sustainability indicators, those taking a technical or expert-oriented approach and those which are more participative or citizen-oriented.

Boer (2013) discusses and critiques the concept of sustainable development and education for sustainability. He evaluates a number of evaluation frameworks: STARS, Auditing Instrument for Sustainability in Higher Education (AISHE), ARISE: Assessing Responsibility in Sustainable Education, and the Audit and certification method which reflects ISO methods. On the other hand, frameworks such as STARS are more useful for Higher Education Institutions located in developed countries (Canada and the US). Thus, more frameworks to analyze the sustainability of Higher Education Institutions are necessary (Saadatian, Sopian, & Salleh, 2013). For example, the results of a survey conducted by Saadatian and colleagues indicate that some variables suggested by the literature to assess the sustainability of higher education are not completely adheres to the Malaysian context (2013). Some studies provide innovative ways to develop appraisal or assessment systems that can achieve societal goals. There are also many case studies of implementing sustainability in universities. The experiences of the president of a small college in the U.S. who instituted sustainability throughout the institution are found by Thomashow (2014) who uses a three-level framework for organizing his sustainability agenda:

1. aspects of infrastructure which include energy (sustainable), food, and materials (consumption, design, waste);

2. aspects of community which include governance (leadership, mission), investment (capital, endowments), and wellness (wellness, fitness, vitality, service, gratitude, individual eco-community relations);

3. aspects of learning, including curriculum, interpretation (visitors, ecology, awareness), and aesthetics (stewardship, campus canvas, graffiti, wind turbines).

Koshy, Nor, Sibly, Rahim, Jegatesen, and Muhamad (2013) reported on a case study using a tool called Sustainability Assessment Methodology (SAM) that monitors the implementation of sustainability at a university in Malaysia and can produce ratings. Other case studies include those in RMIT University in Australia (Holdsworth & Caswell, 2004), and universities in New Zealand (Miller, 2011).

It can be seen that a great deal has been written about sustainability, sustainability in higher education and assessment, measures and ranking of sustainability. However, most of these are in regional, national, or local contexts or case studies of single university's attempts to establish and measure sustainability. There is still relatively little in the literature on global sustainability assessment and rankings in higher education.

UI GreenMetric a global sustainability assessing and ranking tool for university addresses this lack as can be seen in Tables 1 and 2 below. The mission for the assessment and ranking of UI GreenMetric was that it is of interest and accessible to universities in developing countries as well as to those in developed countries. It provides an entry-level tool for assessing campus sustainability efforts. The assessment and ranking emerged out of a number of disparate concerns and realizations regarding the challenge of introducing sustainable concepts in a Sustainability Environmental Assessment (SEA) context. The other aspects of the mission of the assessment and ranking are that it is global in scope, raise awareness in sustainability and are the drivers of change (Lauder, Sari, Suwartha, & Gunawan Tjahjono, 2015).

Table 1

The UI GreenMetric Categories Used in the Assessing, Ranking and Their Weighting Sustainability in Universities

Category	Percentage of total points (%)
1 Setting and infrastructure (SI)	15
2 Energy and climate change (EC)	21
3 Waste (WS)	18
4 Water (WR)	10
5 Transportation (TR)	18
6 Education (ED)	18
TOTAL	100

Table 2

Indicators Used in Assessing and Ranking Sustainability in Universities by UI GreenMetric

No. categories and indicators	Points weighting
1. Setting and infrastructure (SI)	15%
SI 1 Open space area/total area	300
SI 2 Open space area/total people	300
SI 3 Area on campus covered in forested vegetation	200
SI 4 Area on campus covered in planted vegetation	200
SI 5 Non-retentive surfaces/total area	300
SI 6 Sustainability budget/total university budget	200
Total	1,500
2. Energy and climate change (EC)	21%
EC 1 Energy efficient appliance usage	300
EC 2 Renewable energy usage policy	300
EC 3 Total electricity use/total people	300
EC 4 Energy conservation program	300
EC 5 Green building	300
EC 6 Climate change adaptation and mitigation program	300
EC 7 Greenhouse gas emission reduction policy	300
Total	2,100
3. Waste (WS)	18%
WS 1 Recycling program for university waste	300
WS 2 Toxic waste recycling	300
WS 3 Organic waste treatment (garbage)	300
WS 4 Inorganic waste treatment (rubbish)	300
WS 5 Sewerage disposal	300
WS 6 Policy to reduce the use of paper and plastic on campus	300
Total	1,800
4. Water (WR)	10%
WR 1 Water conservation program	500
WR 2 Piped water	500
Total	1,000

(Table 2 continued)

No. categories and indicators	Points weighting
5. Transportation (TR)	18%
TR 1 Total cars entering/total people	200
TR 2 Total bicycles/total people	200
TR 3 Transportation policy on limiting vehicles on campus	400
TR 4 Transportation policy on limiting parking space	400
TR 5 Campus buses	300
TR 6 Bicycle and pedestrian policy	300
Total	1,800
6. Education (ED)	18%
ED 1 Sustainability courses/total courses	300
ED 2 Sustainability research funding/total research funding	300
ED 3 Sustainability publications	300
ED 4 Sustainability events	300
ED 5 Sustainability organizations (student)	300
ED 6 Sustainability website	300
Total	1,800
TOTAL	10,000

Setting and infrastructure. The campus setting and infrastructure information will give the basic information of the university consideration towards a green environment. This indicator also shows whether the campus deserves to be called Green Campus. The aim is to trigger the participating university to provide more space for greenery and in safeguarding the environment, as well as the development of sustainable energy.

Energy and climate change. The university's attention to the use of energy and climate change issues is the indicator with the highest weighting in this ranking. In our questionnaire, we define several indicators for this particular area of concern, i.e. energy efficient appliance usage, renewable energy usage policy, total electricity use, energy conservation program, green building, climate change adaptation and mitigation program, greenhouse gas emission reduction policy. With this indicator, universities are expected to increase the effort in energy efficiency of their building and to care more about nature and energy resources.

Waste. Waste treatment and recycling activities are major factors in creating a sustainable environment. The activities of university staff and students on campus will produce a lot of waste, therefore some programs and waste treatments should be among the concern of the university, i.e. recycling program, toxic waste recycling, organic waste treatment, inorganic waste treatment, sewerage disposal, policy to reduce the use of paper and plastic in campus.

Water. Water use on campus is another important indicator in GreenMetric. The aim is that universities can decrease water usage, increase conservation program, and protect the habitat. Water conservation program, piped water use are among the criteria.

Transportation. Transportation system plays an important role on the carbon emission and the pollutant level in university. Transportation policy to limit the number of motor vehicles on campus, the use of campus bus and bicycle will encourage a healthier environment. The pedestrian policy will encourage students and staff to walk around campus, and avoid using private vehicle. The use of environmentally friendly public transportation will decrease carbon footprint around campus.

Education. This criterion has 18% of the total score. This expansion of the criteria based on the thought that university has an important role in creating the new generation concern with sustainability (GreenMetric, 2014).

In the next section, the methodology applied in this study will be briefly illustrated.

Research Methods

Design and Validity Process of the Study

Research could be seen as an important tool for advancing knowledge and machinery for accomplishing a purpose and to resolve fundamental conflicts. Therefore, research methodology involves all natural and scientific means and process of finding facts. Research work is incomplete without data collection and proper understanding of the relationship between facts and events. For the purpose of these, it verifies the source of data collection and the research method employed to accomplish the aim and objectives of this study. It gives details of instrument used, data collection, and evaluation of the gathered data. In order to achieve the aims of this study, the present analysis was designed to meet the methodological requirements of scientific research. As a scientific criterion, a research design is based on its reliability and validity (Bryman, 2006). In qualitative and quantitative social science, "reliability and validity are conceptualized as trustworthiness" (Golafshani, 2003).

The central issue of concern in this research places special attention to the degree in which the data used here inter-connect with the theoretical arguments generated in order to answer the proposed research question, "How are university managements embedding sustainability-oriented practices in sustainability focused European universities as far as CORE system (Curriculum, Operations, Research, and Engagement) is considered?" which lies in the quality of the assessment tools elaborated to assess the embeddedness of sustainability practices in European universities.

This study presents secondary research (quantitative research) based on content analysis methodology using the published data on UI GreenMetric and universities' websites which are related to sustainability to analyze the sustainability-oriented practices of the five selected top sustainability focused European universities according to the ranking of UI GreenMetric 2014 and 2015. One of the most suitable instruments to analyze the contents of a website is content analysis, applied by many researchers. Content analysis is a rigorous method for document analysis, mainly known as a systematic way to reduce the sources and quantitatively analyze the documents' characteristics (Jupp, 2006; Onwuegbuzie, Leech, & Collins, 2012).

However, content analysis can also be performed qualitatively, in order to identify themes and elaborate on the theory (Berg, 2001; Krippendorff, 2004). A study of the Modern Hebrew literature on the web by Bar-Ilan and Groisman (2003) is a perfect example of this method applicability. Another application of content analysis refers to research about websites of the Fortune 100 companies where content analysis is mentioned as a good approach for analyzing the website's components in different issues such as characteristics, fields of action and reflection of the mission and vision in action (Perry & Bodkin, 2000). There has been another study using content analysis on ethical statements of Turkish companies that emphasizes the justifiability of this method for evaluating ethical concepts of the companies such as vision, mission, ethical principles and other related issues (Halici & Kucukaslan, 2005). The application of content analysis in the mentioned research as well as other similar studies (Chatov, 1980; Cressey & Moore, 1983; Mathews, 1987) shows that it is possible to analyze social communication and social reporting using the content analysis method which has been frequently used since the 1970s (Stevens, 1992). Generally, content analysis is argued to be a "distinctive approach to analysis" which seeks to quality the content of a text in "a systematic and replicable manner" (Milne & Adler, 1999).

Instrumentation

This study observed and evaluated the embeddedness of sustainability practices in top sustainability focused European universities. It is intended by this research using content analysis of data gathered from UI GreenMetric sustainability assessment index 2014 and 2015, universities' websites or sustainability annual reports to observe universities' practices related to sustainability to answer the main question of the research question, which is: How are University managements embedding sustainability-oriented practices in sustainability focused European universities as far as CORE system (Curriculum, Operations, Research, and Engagement) is considered?

The UI GreenMetric Sustainable University assessment and ranking index was selected since it considers the Operations, Curriculum, Research, and Engagements (CORE system) of universities with indicators such as Setting and Infrastructure, Energy and Climate Change, Waste, Water, Transportation, and Education which involves curriculum, research, and engagements. This covers the triple bottom line of sustainability (Environment, Economy, and Society) and the CORE system which other indexes like GASU, AASHE, STARS and others don't consider but focus mostly on operational eco-efficiency. UI GreenMetric index is the first and the only ranking that measures each participating university's commitment in developing an "environmentally friendly" infrastructure. Also, the UI GreenMetric Sustainable University assessment and ranking index were designed to be used in developing countries and developed countries, while other assessment indexes were majorly designed to work favorably in only developed countries without considering the developing countries.

Data Collection

The total sample of the study observed and evaluated in this study are five (5) top sustainability focused Universities in Europe, according to UI GreenMetric sustainable ranking index 2014 and 2015. The research sample includes: University of Nottingham, University of Oxford, and University of Bradford from the UK, University College Cork National University of Ireland, Cork from Ireland and Universitat fur Bodenkultur Wien from Austria (2016).

The data collection was carried out in October 2015. We have three (3) universities from the United Kingdom, one university from Ireland and one university from Austria making it to the five top sustainability focused universities in the Europe according to the UI GreenMetric sustainability assessment and ranking index 2014 and 2015. This research studied the content of the UI GreenMetric index, the university official sustainability website pages and some of their sustainability annual reports to analyze management practices towards the embeddedness of sustainability practices in the selected universities.

In order to qualify and quantify the data, the researcher used descriptive data analysis to determine the authenticity of the situation at stake. Descriptive data analysis involves the calculation of percentage distribution. The formula used in calculating percentages in this study is:

$$\frac{\text{University Total Score in each Category}}{\text{UI GreenMetric Total Score in each Category}} \times \frac{100}{1} = \%$$

This method of data analysis was used because percentage explains precisely the state of things without the complexities of other statistical methods. The data analysis used in this study involves tables, charts, and diagrams which describe the common sustainability practices in the selected universities. Table 3 shows the sustainability website links of the selected universities.

Table 3

Selected Top Sustainability Focused European Universities and Their Sustainability Website Links or Sustainability Annual Report Links

Ranking	University	Sustainability website
1	University of Nottingham	http://www.nottingham.ac.uk/sustanability/news.aspx
2	University College Cork National University of Ireland	https://www.ucc.ie/en/greencampus/about/
3	University of Oxford	https://www.admin.ox.ac.uk/media/global/wwwadminoxacuk/localsites/estatesservices/documents/environment/environmentalsustainabilityreports/Sustainability_Report_2013.pdf
4	University of Bradford	http://www.brad.ac.uk/environment
5	Universitat fur Bodenkultur Wien	http://www.boku.ac.at/nachhaltigkeit.html

Research Results

The findings of the study showed that, though to different extent, top sustainability focused universities in Europe have taken sustainability seriously and announced this in their websites. Table 4 presents the result of the UI GreenMetric assessment and ranking 2014 and 2015 for the selected universities in Europe and their scores on each indicator.

Table 4

UI GreenMertic 2014 Sustainability Assessment and Ranking of Selected Universities With Indicators

CORE system				Operation										Curriculum, research & engagement	
UI GreenMetric sustainability indicators		Total score		Setting and infrastructure		Energy and climate change		Waste		Water		Transportation		Education	
		10,000		1,500		2,100		1,800		1,000		1,800		1,800	
Ranking/University		2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
1	University of Nottingham	7,803	7,267	689	724	2,100	1,700	1,800	1,800	990	996	1,650	1,139	574	908
2	University College Cork National University of Ireland	7,553	7,070	627	692	1,890	1,600	1,725	1,725	1,000	900	1,675	1,144	637	1,009
3	University of Oxford	7,400	6,963	642	626	1,770	1,458	1,800	1,725	995	898	1,625	1,207	568	1,049
4	University of Bradford	7,372	6,716	453	667	1,920	1,550	1,800	1,800	995	998	1,525	1,055	678	646
5	Universitat fur Bodenkultur Wien	7,246	6,548	590	622	1,890	1,525	1,800	1,800	690	676	1,300	761	976	1,164

Source: Adapted from http://greenmetric.ui.ac.id/overall-ranking.

Table 4 shows that the University of Nottingham from United Kingdom stands in the first place, according to UI GreeenMetric index in 2014 and 2015 with the total score of 7,803/2014 and 7,267/2015, with strong points in Energy and Climate Change, Waste Reduction, and Water Conservation. This is followed by University College Cork National University of Ireland from Ireland with a total point of 7,070 in 2015. University of Oxford has third with the total score of 6,963 in 2015 and the University of Bradford from United Kingdom occupied the fourth place with the total score of 6,716 in 2015, while Universitat fur Bodenkultur Wien from Austria made it to the fifth place with the total score of 6,674 in 2015 with strong points in Waste Reduction, Energy and Climate Change and Water Conservation in 2014 and 2015.

Considering the analysis of Figures 3 and 4, it is obvious that the five top sustainability focused European universities performed significantly better in the general embeddedness of sustainability practices in 2014 than in 2015 according to the result of UI GreenMetric sustainability assessment index. There was a general decrease in the overall performance in all the selected five top sustainability focused European universities in 2015.

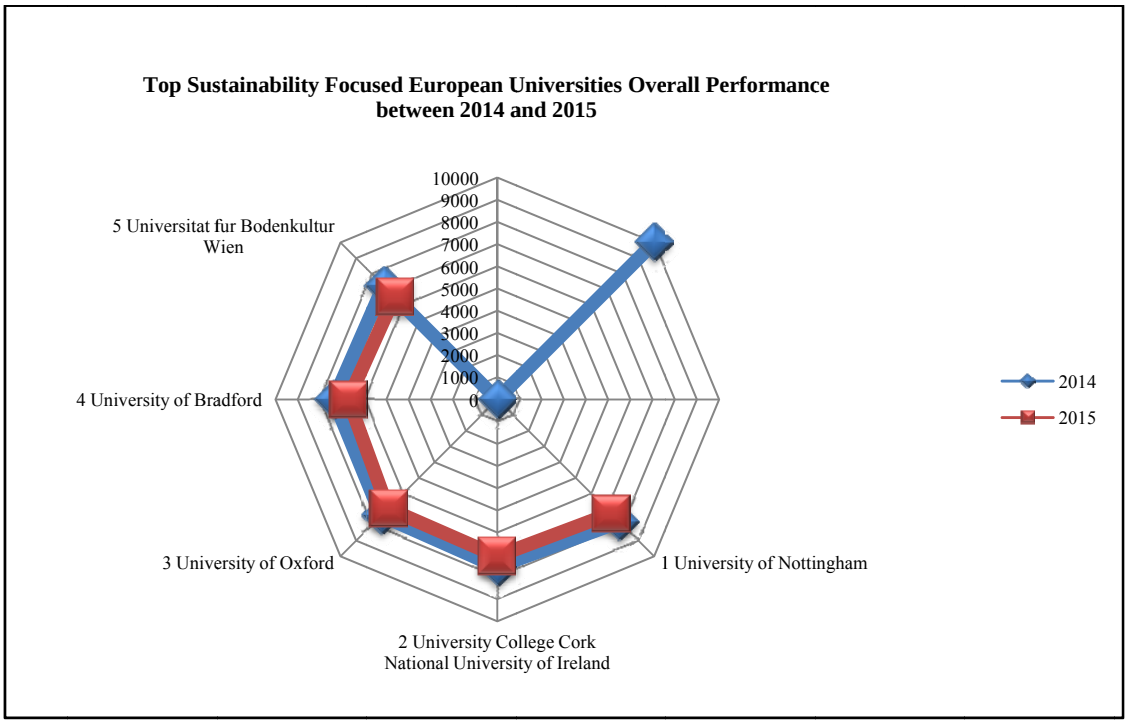

Figure 3. Analysis of the top sustainability focused European universities overall performance between 2014 and 2015 with Radar Chart.

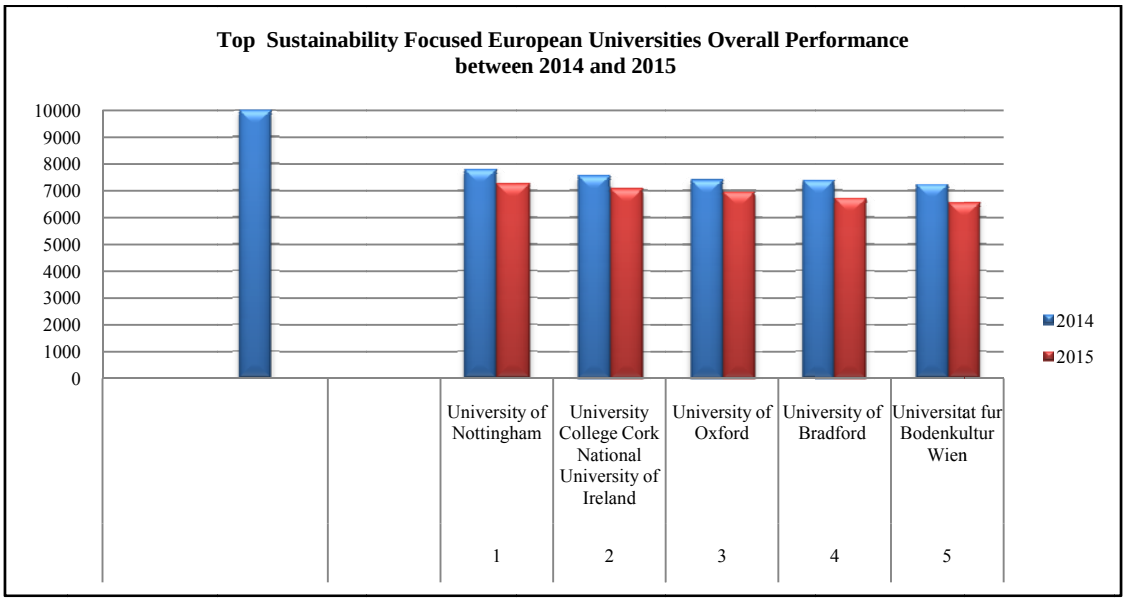

Figure 4. Analysis of the top sustainability focused European universities overall performance between 2014 and 2015 with Bar chart.

Table 5 presents the percentage analysis of the selected top sustainability focused European universities on the management practices towards the embeddedness of sustainability practices in 2014 and 2015 using the CORE system. The Operational aspect of the system involves the Setting and Infrastructures of the universities, Energy and Climate Change, Waste, Water, and Transportation, while the Curriculum, Research, and Engagement (Outreach) are all under Education according to the UI GreenMetric sustainability assessment indicators.

Table 5

Percentage Analysis of the Top Sustainability Focused European Universities on the Management Practices Towards the Embeddness of Sustainability Using CORE System

CORE system		Operation										Curriculum, research & engagement	
UI GreenMetric sustainability indicators		Setting and infrastructure		Energy and climate change		Waste		Water		Transportation		Education	
		100%		100%		100%		100%		100%		100%	
Ranking/University		2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
1	University of Nottingham	45.9	48.2	100	80.9	100	100	99	99.6	91.7	63.2	31.9	50.4
2	University College Cork National University of Ireland	41.8	46.1	90	76.1	95.8	95.8	100	90	93.1	63.5	35.4	56
3	University of Oxford	42.8	41.7	84.3	69.4	100	95.8	99.5	89.8	90.3	67	31.6	58.2
4	University of Bradford	30.2	44.4	91.4	73.8	100	100	99.5	99.8	84.7	58.6	37.7	35.8
5	Universitat fur Bodenkultur Wien	39.3	41.4	90	72.6	100	100	69	67.6	72.2	42.3	54,2	64.6

Analysis and Discussion

Operation (Setting and Infrastructure, Energy and Climate, Waste, Water, and Transportation)

Table 5, Figures 5 and 6 show that the five top sustainability focused European universities are making significant progress in the areas of Energy and Climate Change, Waste, Water, and Transportation under the Operation in CORE system except in the area of Setting and Infrastructure which consists of Campus setting, Total areas on campus, Areas on campus covered in forested vegetation, Areas on campus covered in planted vegetation (including lawns, gardens, green roofs, internal planting), Total ground floor area of buildings, Number of academics staff and administrative staff, the University budget for Sustainability effort and Retention: Non-retentive surface for water absorption on campus. Figures 5 and 6 show that in the area of Setting and Infrastructure, which gives the basic information of university consideration towards a green environment, there was lack of significant commitments recorded by all the universities with 30%-48% scores in both 2014 and 2015. This shows that all the five university campuses are still far from being called Green Campus because they have not attained the aim of Setting and Infrastructures which is for universities to provide more space for greenery and in safeguarding the environment, as well as the development of sustainable energy.

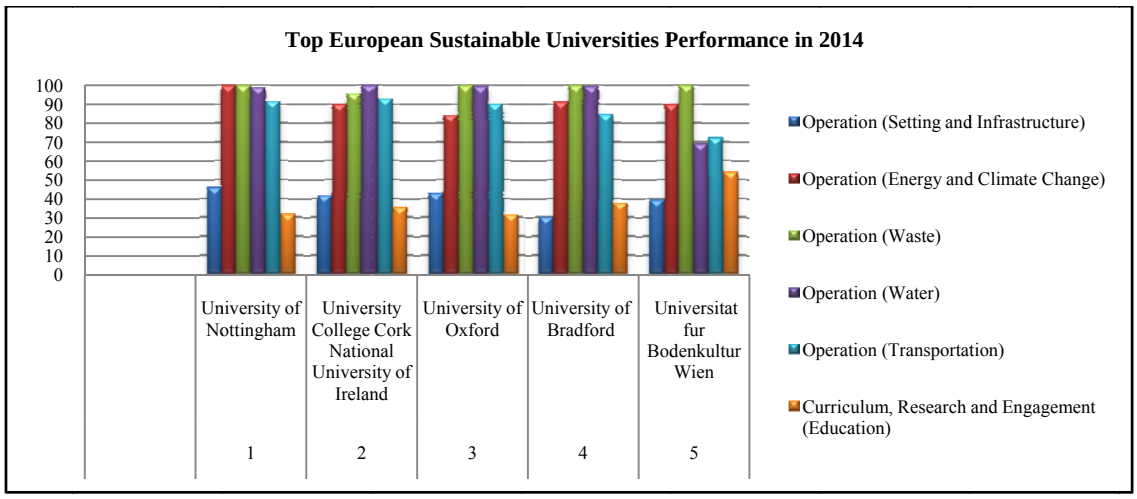

Figure 5. Analysis of the top sustainability focused European universities on the management practices towards the embeddedness of sustainability using Bar Chart in 2014.

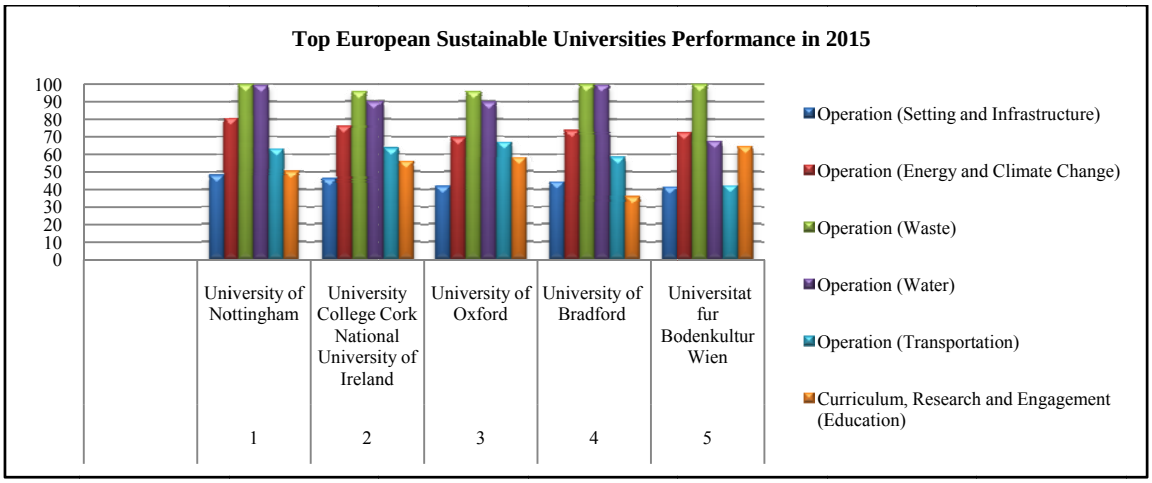

Figure 6. Analysis of the top Sustainability focused European universities on the management practices towards the embeddedness of sustainability using Bar Chart in 2015.

Figures 5 and 6 also present the chart analysis of the performance of the selected universities in energy conservation and mitigating climate change. This involves the energy efficient appliance usage, renewable energy usage policy, total electricity use, energy conservation program, green building, climate change adaptation, and mitigation program and greenhouse gas emission reduction policy. University of Nottingham leads with a strong 100% point in 2014 and 80.9% in 2015 followed by the rest four universities with above average points of 60%-90% records in both 2014 and 2015. This indicates that the five top sustainability focused European universities are very concerned about environmental issues and tried their best in mitigating climate change. Though based on the result of the analysis in Figures 5 and 6, universities are still expected to significantly increase their efforts in energy efficiency to attain a high extent of the Eco-efficiency level of sustainability in their universities.

In the area of waste that focuses on recycling program at the university, toxic waste recycling, organic waste treatment, inorganic waste treatment, sewerage disposal and policy to reduce the use of paper and plastic on campus activities are major factors in creating a sustainable environment. Figures 5 and 6 show that the

University of Nottingham, University of Oxford, University of Bradford, University College Cork National University of Ireland, and Universitat fur Bodenkultur Wien recorded 90%-100% scores in both 2014 and 2015. This shows that all the universities have been able to significantly manage the activities of university staff and students on campus to a large extent in reducing the production of waste through some programs and waste treatments which have been implemented and are being attained in these universities.

Furthermore, the area of water conservation involves universities decrease of water usage, water conservation program, piped water uses, and protection of the habitat. University of Nottingham, University of Oxford, University of Bradford, and University College Cork National University of Ireland recorded 90%-100% scores in both 2014 and 2105, while Universitat fur Bodenkultur Wien recorded 67%-69% scores in both 2014 and 2015. This shows that the studied universities have been able to significantly decrease their water usage on campus, increase water conservation program, and protect the habitat to a large extent in achieving water conservation, though more commitments are still required to achieve water conservation in the studied universities in order to be regarded as sustainable universities.

In the area of transportation, University College Cork National University of Ireland leads with a 93.1% score in 2014 and 63.5% in 2015. This is followed by the University of Nottingham with a 91.7% score in 2014 and 63.2% in 2105 and the University of Bradford with 84%-53% in 2014 and 2015. The University of Oxford recorded a 90.3% score in 2014 and 67% in 2015 while Universitat fur Bodenkultur Wien recorded between 42%-72% in 2014 and 2015. Knowing that, transportation system plays an important role in the carbon emission and the pollutant level in university. The managements of the studied universities have significantly implemented transportation policies to limit the number of motor vehicles on campus. The use of campus bus and bicycle was encouraged in a healthier environment. The pedestrian policy which encourages students and staff to walk around campus, and avoid using private vehicle and the use of environmentally friendly public transportation which decreases the carbon footprint around campus were implemented. Though, it is obvious that there is a general significant decrease in the universities' performance in 2015 than that was recorded in 2014, this shows that there is still need for more commitments from universities in this area of transportation in decreasing carbon footprint around campus.

Curriculum, Research, and Engagement (Education)

Curriculum, Research, and Engagement (Outreach) which form the rest of the CORE system are under education which includes: *Curriculum:* Number of courses related to environment and sustainability offered, total number of courses offered; *Research:* Total research funds dedicated to environmental and sustainability research, total research funds and number of scholarly publications on environment and sustainability published; and *Engagement:* Number of scholarly events related to environment and sustainability, number of staff and student organizations related to environment and sustainability and existence of a university sustainability website.

The UI GreenMetric sustainability assessment indicators illustrates that the five top sustainability focused European universities are really significantly below average performance. Though there was an improvement in 2015 compared to 2014 performance. Universitat fur Bodenkultur Wien leads other universities with a 54% score in 2014 and an above average of 64% in 2015 followed by University College Cork National University of Ireland with a below average of 35.4% score in 2014 and an above average of 56% in 2015. University of Bradford recorded a below average performance between 37.7%-35.8% in both 2014 and 2015. The above

findings, from Figures 5 and 6 show that the top sustainability focused European universities have not been able to significantly meet the sustainable expectations in Education (Curriculum, Research, and Engagement). This shows that the studied universities are yet to integrate fully in their curriculum more courses related to sustainability. In the area of Research, universities are yet to fully encourage research on sustainability related topics both to students and staff, which should be multidisciplinary and interdisciplinary research in sustainability. Universities have not significantly published researches with focus on sustainability-related issues. In the area of Engagement (Outreach), universities have not been able to significantly encourage enough sustainability activities/projects related to community services and development. This is very important considering the critical role universities have in creating the new generation concerned with sustainability since they prepare most of the professionals, who manage and teach both public and private institutions in the society because as major contributors to the values, health, and wellbeing of society, universities have a fundamental responsibility to teach, train, and research for sustainability. This development is essential, as future professionals will be working globally with companies that increasingly have sustainability on their agenda.

Table 6 shows the sustainability website links of the studied top sustainability focused European universities. This research also studied the content of the top sustainability focused European universities' official sustainability website pages and some of their sustainability annual reports to analyze the common sustainability practices in the studied universities.

Table 6

Top Sustainable Universities and Their Sustainability Website Links or Sustainability Annual Report Links

Ranking	University	Sustainability website
1	University of Nottingham	http://www.nottingham.ac.uk/sustanability/news.aspx
2	University College Cork National University of Ireland	https://www.ucc.ie/en/greencampus/about/
3	University of Oxford	https://www.admin.ox.ac.uk/media/global/wwwadminoxacuk/localsites/estatesservices/documents/environment/environmentalsustainabilityreports/Sustainability_Report_2013.pdf
4	University of Bradford	http://www.brad.ac.uk/environment
5	Universitat fur Bodenkultur Wien	http://www.boku.ac.at/nachhaltigkeit.html

Figure 7 shows a summary of the common embeddedness of sustainability practices in the studied universities. The common management practices towards the embeddedness of sustainability practices using the CORE system were gotten from the content analysis of the sustainability websites or the sustainability annual report of the five top sustainability focused European universities. Table 7 indicates that the five sustainability focused European universities have reported their sustainability commitments on their website pages which show that they are committed in making sure that they embed sustainability in the Curriculum, Operation, Research, and Engagement of the university as they pursue their sustainability policies and goals to achieve a sustainable campus.

Figure 7. Common management practices towards the embeddedness of sustainability in the top sustainability focused European universities using the CORE system.

Table 7

Content Analysis of the Sustainability Website or Sustainability Annual Report of Top Sustainability Focused European Universities Using CORE System

CORE system Ranking/University		Curriculum	Operation	Research	Engagement
1	University of Nottingham	√	√	√	√
2	University College Cork National University of Ireland	√	√	√	√
3	University of Oxford	√	√	√	√
4	University of Bradford	√	√	√	√
5	Universitat fur Bodenkultur Wien	√	√	√	√

Conclusion and Limitations

The research shows that all the five (5) universities studied are, in some way or another, embedding sustainability practices in their universities and announces it on their website content. It is obvious that from the findings made in this research in Figure 7, the studied universities have sustainability as part of their goal and have policies, strategic plans and have gone ahead to implement some of their sustainability goals in order to meet up with the demand that is on universities to bring about sustainable society starting from their management practices. Considering the UI GreenMetric sustainable university index and the analysis in Figures 5-7, the five studied universities have gone along in achieving the Operational aspect (Energy and Climate Change, Waste reduction/ recycling, Water conservation, and Transportation) of the CORE system except in the area of setting and infrastructure which demands universities to provide more space for greenery in safeguarding the environment, as well as the development of sustainable energy, in order to achieve a Green Campus all of which were below average based on their performance.

Also, in the area of Education which consists of Curriculum, Research, and Engagement in the CORE System, all the studied universities: University of Nottingham, University College Cork National University of Ireland, University of Oxford, and Universitat fur Bodenkultur Wien in 2015 performed just little above average point while University of Bradford performed below average and needed to really improve in this aspect of sustainability practices which is very important in the education of the students and the society about sustainability.

The focus of this research was on answering the question: How are Universities managements embedding sustainability-oriented practices in sustainability focused European universities as far as CORE system (Curriculum, Operations, Research, and Engagement) is considered? The analysis shows that sustainability policies and goals were followed with strategic plans to embed sustainability practice in the Curriculums, Operations, Research, and Engagement of the studied universities. The results also showed that there were significant progresses in the embeddedness of sustainability practices in the studied universities, especially in the area of Operation of the CORE system in terms of energy and climate change, waste reduction/recycling, and water conservation which are sub-categories of the UI GreenMetric Sustainability Index. Though there are also areas of the CORE system where there is less significant improvement in the embeddedness of sustainability practices in the studied universities, especially in the Setting and Infrastructure, Transportation in the Operation and the Education (Curriculum, Research, and Engagement) of the CORE system.

There is still need for the five studied universities to increase their embeddedness of sustainability practices in the Setting and Infrastructure of the university environment, transportation in the university and in the Curriculum, Research, and Engagement activities of the university. This is because sustainability as the triple bottom line of economic profitability, respect for the environment, and social responsibility will be unsustainable if one dimension overwhelms the others, the outcome will be unbalanced and unsustainable. So to receive sustainable results a fine balance must be reached between the three components of sustainability. This is why the studied universities should attain a fine balance between the three components of sustainability. For this is only the way, they can fully be regarded as sustainable universities that are working towards a sustainable society. So, from the findings of this research, the studied universities have not been able to meet up with the critical role they have in creating the new generation concerned with sustainability.

While this research observed the embeddedness of sustainability practices based on the assessment of UI GreenMetric sustainable ranking index, the website contents and sustainability annual reports of universities using the CORE system, the perceptions of their stakeholders about these sustainability practices were not measured. This is important, because the practices might not meet the stakeholders' expectations or even create a negative impression that the studied universities are just doing this simply for the sake of promoting themselves rather than as a commitment towards sustainability. Future studies can look into the effect of these practices on stakeholders' perception and loyalty on the universities. It was also observed that the studied universities are public European universities that topped the UI GreenMetric sustainability index. The performance of European private universities on the embeddedness of sustainability practices was not known. It will be important to look at a comparative study of public and private university's embeddedness of sustainability practices.

The recommendations that this research can make from the findings of this research which shows there are still areas of improvement in the embeddedness of sustainability practices for the studied universities are as follows: (a) Universities should engage more in the delivery of a sustainable campus infrastructure with all construction and refurbishment projects rated BREEAM (Building Research Establishment Environmental Assessment Methodology) excellent; (b) increase the number of people commuting by walking, cycling, and car sharing; (c) maximize biodiversity on campus and find more opportunities to create green environments; (d) create a sustainable food culture, providing fair-trade products where possible and working with local food partners to increase the demand and supply of seasonal, local, and organic food, (e) embed sustainable procurement by ensuring the university purchases from socially, ethically, and environmentally responsible businesses; (g) support the community and local, regional, and social enterprise through business community partnerships; (h) work hard in the provision of education for sustainable development; (i) engage more in the development of education potential for sustainable development by enriching learning across the formal and non-formal curriculum; (j) work for the promotion and advancement of education for sustainable development research in relation to enhancing the students and staff experience and building a more sustainable university; (k) advance the central role of education and learning in furthering the university's cross-institutional sustainability agenda—and in relation to sustainability leadership and profile in the Higher Education sector; (l) undertake substantial sustainability research to deliver solutions to the world's most pressing sustainability problems; (m) facilitate internal communications and enhance internal research interaction for sustainability; (n) promote sustainability research, making the Institute of Sustainability Solutions Research the single point of contact for organizations wanting to engage with the University on sustainability; (o) they also need to increase

the impact of sustainability research; (p) support understanding of multi-disciplinary funding; and (q) identify and communicate funding opportunities and support teams and their project ideas for sustainability research.

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