Sustainable university: methods of implementation and assessment tools

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Abstract
Universities can cause environmental impacts as expressive as a small town. This work aims to analyze the theoretical and practical aspects of the methods for implementing sustainability and the assessment tools available in the current international literature, contributing to the university in the pursuit of sustainable development.

Keywords: Sustainable development, Sustainable university, Sustainability assessment.

INTRODUCTION

Humanity has reached a high level of industrialization and economic growth at the cost of deep environmental degradation, loss of biodiversity and climate changes (Zhao and Zou, 2015). The world is currently facing its greatest challenge since the formation of the first societies: associate certain level of economic growth that provides minimum welfare conditions of the population with the slowdown of environmental degradation and the use of natural resources (Amaral et al., 2015). The current development model of society has surpassed certain planetary boundaries and if it does not occur a profound paradigm shift in the near future, the increase in these disorders should generate a substantial risk to destabilize the Earth system and the conditions that allowed human evolution in last 11,500 years (Steven et al., 2015). The international community supports the concept of Sustainable Development (SD) in order to create an ecologically and socially fair world, in addition to ensuring the needs of future generations (Zhao and Zou, 2015). The political meaning of the term sustainability arose from the publication of the Brundtland Report by the World Commission on Environment and Development (WCED) in 1987. Over the past 25 years, the concept of SD has undergone a refining process. In 1992, in the United Nations Conference on Environment and Development (Rio 92), it was proposed the Agenda 21 in which States agreed a number of specific commitments in the sphere of public policies to implement the principles of sustainability as a

desire of moving to a new development model for the twenty-first century (Castañeda and Quintero, 2015). It is imperative that practices and strategies in line with sustainable development achieve volume and scale in all sectors of society. The university has a strategic position in the context of society in the search for the SD, especially with regard to the formation of future stakeholders and the possibility of incorporating sustainability in university management as a basis for campus operations (Alshuwaikhat and Abubakar, 2008; Nejati and Nejati, 2013; Yuan et al., 2013). The search for a sustainable campus model has attracted the attention of political actors, managers of Higher Education Institutions (HEI) and academic community at large, exerting increasing pressure on the HEI to reduce the economic, social and environmental impacts of their operations. Universities are also increasingly seeking ways to affirm their commitments to sustainability (Alshuwaikhat and Abubakar, 2008). Despite the theme of sustainable development is much in evidence at the present time, the study on sustainability in the context of universities is still an increasing search field (Nejati and Nejati, 2013). The objective of this study is to analyze and discuss the theoretical and practical aspects of tools for implementation and evaluation of sustainability on college campi.

SUSTAINABILITY AND HIGHER EDUCATION INSTITUTIONS (HEI)

Sustainable university

According to Alshuwaikhat and Abubakar (2008), universities are complex systems composed of activities of different natures involving scientific laboratories, experimental plants and farms, social and educational activities, energy supply and use, transportation, besides interaction and recreation practices. Other activities on college campi can also promote environmental impacts directly or indirectly, such as administrative activities, commuting and food services (Lukman et al., 2009). Figure 1 presents a model of university as an integrated system. According to Ramos et al. (2015), most of HEI efforts to address SD focus on one of the system elements. However, the authors show that there is a tendency of institutions to seek for more holistic and systemic approaches.

Figure 1 – University model as an integrated system. Adapted from Cortese (1997).

Since the Declaration of the United Nations Conference on the Human Environment in 1972, there are references on the importance of sustainability in higher education (Amaral et al., 2015). Since then universities seek for commitments by joining volunteers to different tools to achieve sustainability, developing projects and initiatives to incorporate this concept into their systems,

as the Declaration of Talloires, signed in 1990 by more than 300 university administrators from 40 different countries (Alshuwaikhat and Abubakar, 2008; Amaral et al., 2015). In 1991, 16 Canadian universities adhered to the Declaration of Halifax (Arroyo, 2015). In 1993, about 400 universities signed the Declaration of Swansea, stating the intention to drive forward efforts to the issue of economic and technological development with environmental preservation (Alshuwaikhat and Abubakar, 2008). In 1996 it was formed in the UK the Environmental Association for Universities and Colleges (EAUC) in order to support the implementation of sustainability in the higher education sector. More recently, in 2006, it was created the Association for the Advancement of Sustainability in Higher Education (AASHE), a professional association for-profit that works with a network of institutions from North America to develop the theme of sustainability in universities (Amaral et al., 2015). At the international level it was launched in 2007 the International Sustainable Campus Network (ISCN) for the purpose of establishing a global forum to support the exchange of pieces of information, dissemination of best practices, and solutions to integration and implementation of sustainability in operations of university campi (ISCN, 2015).

Castañeda and Quintero (2015) state that the concept of sustainable university or Sustainable Campus (SC) has been approached in recent years as a management strategy. In their study, Amaral et al. (2015) present the definition of sustainable university associated with environmental, economic and social concerns about their activities. The authors point out the need for universities to "lead by example": minimizing environmental, economic, social and workers health impacts, and keeping the effort for energy and resources conservation, waste reduction, promotion of social justice and the notion of equity. According to Cortese (1997), in a SC model managers must understand and articulate the objectives of SD with the position of HEI as leading institutions to create a sustainable society.

Arroyo (2015) draws attention to the fact that the actions about the sustainability in HEI be influenced by factors such as cultural, bioregional, economic and political diversity of each institution. The author also draws attention to the tendency of universities to focus on the environmental dimension of sustainability at the expense of the economic and social dimensions. Because of the diversity and complexity of the contexts in which universities are inserted, there is not available a clustered model of Sustainable Campus. Thus, it is necessary to analyze how each university understands and implements actions in the pursuit of sustainability (Zhao and Zou, 2015).

Methods for implementing a Sustainable Campus (SC)

The intensification of environmental issues and the maturing of the concept of sustainability during the last decade increased the level of awareness of HEI on the impacts caused by its activities (Amaral et al., 2015). The search for sustainable university campus runs through the preservation of the environment, promotion of economic development and generation of benefits for society (Alshuwaikhat and Abubakar, 2008). The most recent studies indicate that Higher Education Institutions are opting for three basic methodological approaches to implement sustainability on their campi: green buildings; adaptation to ISO 14001 or EMAS (European Union Eco-Management and Audit Scheme); and sustainability reporting (Alshuwaikhat and Abubakar, 2008; Amaral et al., 2015; Castañeda and Quintero, 2015; Geng et al., 2013.). The concept of green building or high-performance buildings are being explored in various institutions around world in an heterogeneous way and can be summarized as a set of projects

designed under a perspective of sustainable design, based on energy eco-efficiency criteria, conservation of natural resources, local economic development, among others (Alshuwaikhat and Abubakar, 2008). Amaral et al. (2015) describe the green building initiatives as an energy strategy combined with a political initiative that seeks to reduce emissions of greenhouse gases, as buildings account for more than half of global CO_2 emissions. The authors suggest the full and thorough adoption of energy certification programs and rational use of water in buildings of campi, such as LEED (Leadership in Energy and Environmental Design) or BREEAM (Building Research Establishment Environmental Assessment Method) systems. Another procedure widely used by universities to promote sustainable environmental management is the implementation of ISO 14001. This standard guides the organization about the impacts of their products, services and operations on the environment. Because it is a comprehensive approach, the adoption of ISO 14001 seeks to promote environmental awareness among the academic community and its surrounding geographical area, in addition to continuously improve the environmental performance of the institution (Alshuwaikhat and Abubakar, 2008; Amaral et al., 2015; Castañeda and Quintero, 2015). Another audit system being adopted with increasing frequency is the EMAS (Eco-Management and Audit Scheme), which is more demanding than ISO 14001. This system can provide a higher degree of difficulty in implementation, however when performed with the involvement of the academic community, especially students and researchers, it offers the opportunity to acquire hands-on which are especially useful in the pursuit of sustainability (Alshuwaikhat and Abubakar, 2008; Amaral et al., 2015). Another important practice that is being quite disseminated through IES are the Sustainability Reporting (SR), which seek to provide input to the decision-making process in order to meet the organization's changing challenges through the transparent communication of its values, actions and performance for Sustainable Development (SD) among stakeholders (Ceulemans et al., 2015).

Tools for assessing sustainability in HEI

Methods for assessing sustainability in universities are sets of operational and / or management measures that seek to assess the progress of an institution to a more sustainable environment (Amaral et al., 2015). Such tools allow to compare the universities development according to some sustainability variables, offering easy of information understanding for a range of stakeholders. They may take a technical approach directed to specialists or a participatory approach focused on the community at large (Lauder et al., 2015). Castro and Jabbour (2013) cite some techniques widely used by universities as the Graphical Assessment of Sustainability in Universities (GASU) method based on graphic display for easy viewing sustainability variables, and the Campus Sustainability Assessment Framework (CSAF), which it is a sustainability assessment tool designed especially for HEI in developing countries. The STARS (Sustainability Tracking, Assessment & Rating System) system is a framework that allows the identification and assessment of progress towards the sustainability of Higher Education Institutions through self-report (Amaral et al., 2015). The STARS feature is one of the most used in the world because it provides a framework for the understanding of sustainability that allows meaningful and objective comparisons, facilitates information sharing and builds a sustainability development network in HEI internationally (Lauder et al., 2015). The STARS tool has the advantage of offering a set of holistic indicators that are already being measured by universities, enabling a comparison between institutions (Arroyo, 2015) and allows university

managers to disclose their sustainability performance in a transparent manner (Castro and Jabbour, 2013).

DISCUSSION AND ANALYSIS OF AVAILABLE METHODS AND TOOLS FOR SUSTAINABLE CAMPUS

Amaral et al. (2015) present a review work with an overview of the different approaches used by universities to implement, evaluate and prepare sustainability reports. The authors emphasize the excessive concentration of current studies at the operational levels and on environmental issues, which neglects the aspects of education, research and community outreach. Alshuwaikhat and Abubakar (2008) describe the most widely cited practices in the literature to develop the concept of Sustainable Campus, considering the organizational diversity of HEI. The systematic and integrated approach presented by the authors (Figure 2) tries to be adjustable to the priorities of each university according to its social, economic and territorial contexts.

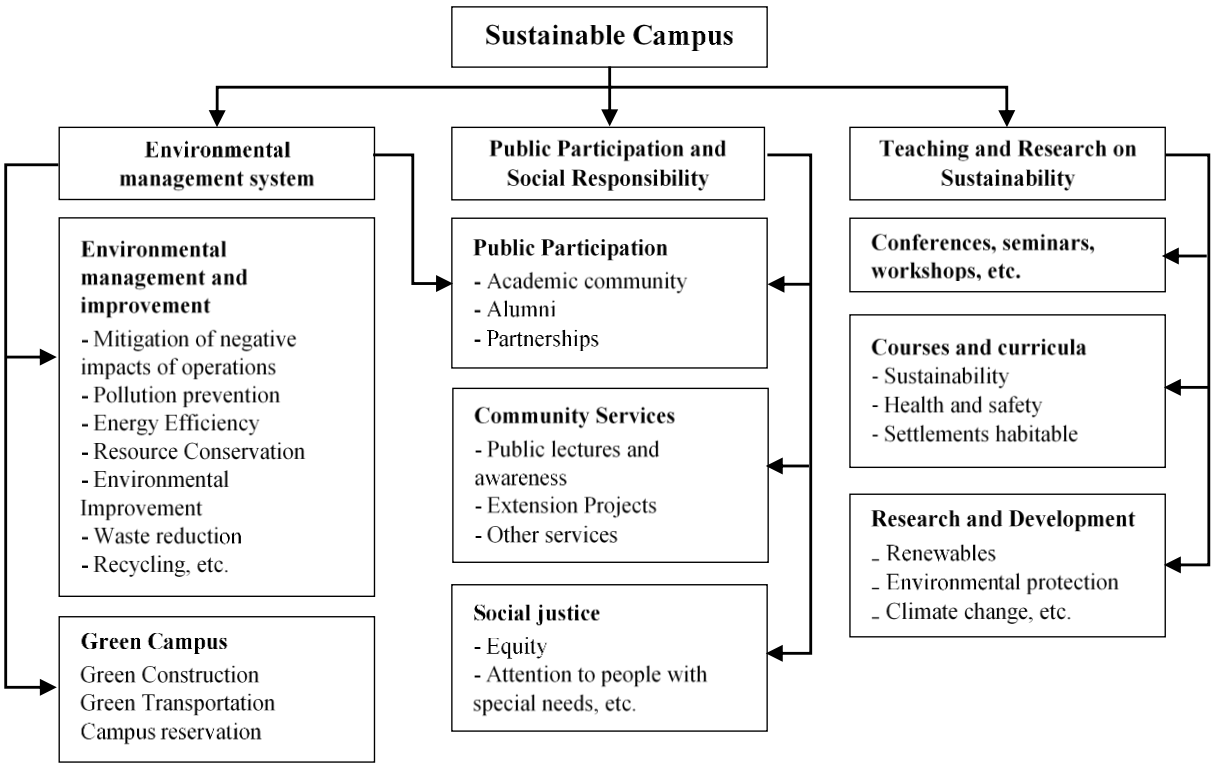

Figure 2 – Integrated model proposed by Alshuwaikhat and Abubakar (2008).

Zhao and Zouk (2015) describe the experience of Tsinghua University to implement a pioneering project, launched in the past decade, of a green university in an emerging country with a history of serious environmental problems and ecological damage. The authors present new data and elements for the theme, since in general the SD strategies widely spread in the literature relate to cases in North America and Europe. Along the same lines, Castro and Jabbour (2013) identify the main results found in the literature to measure the level of contribution of HEI for sustainable development and analyze the level of grip of an institution in India to an evaluation model of sustainability. Based on case studies at two universities in Canada, Arroyo

(2015) analyzes the impact of evaluation practices of campus sustainability in the process of organizational change, at strategic and operational levels, of these institutions caused by the implementation of a management system based on widely known models. Ceulemans et al. (2015) carried out a critical analysis of the concept of Sustainability Report (SR) in HEI, from the identification of the basic elements and emerging issues that guide the research on this topic in the literature. Considering the common corporate tools on SR, the results show the need to look for a more contextualized approach adjusted specifically to the environment and goals of the HEI.

The literature present a variety of perspectives on the implementation and evaluation of sustainability on college campi. The widespread models in the literature refer to specific contexts, making it difficult to prove their applicability in other real situations, considering the different environments involving Higher Education Institutions. In general the studies emphasize environmental and sustainability concerns at the moment of implementation a new campus, dealing with physical issues of location, infrastructure, facilities, transportation, etc., while the main current challenge is to adapt the HEI to the latent needs of next generations, academic community and its surroundings. The green building initiatives require a systematic approach that makes part of a continuous change process that must take place in a campus bearing in mind the effects of such changes to the academic community and its surroundings. To this end communication mechanisms and evaluation tools should be developed and incorporated into these initiatives, otherwise the efforts of managers run the risk of becoming fragmented. In terms of formulation of strategic policies, visions and goals in the universities, the studies point to the crucial need of adoption and prioritization of the three dimensions of sustainability by the managers: environmental concerns, economic management and social justice. The heterogeneity of sustainability assessment methods on campus demonstrates the degree of spraying of this scientific field today, which suggests a need for more practical case studies in order to complement and enrich the researches with more empirical evidences. The literature analyzed has shown that the methods for assessing sustainability in HEI have a priority on the results, leaving out of focus the deployment process, its factors and its organizational obstacles. A greater focus on the process of defining and implementing an evaluation method could leverage the learning potential of the internal and external communities of HEI.

CONCLUSIONS

Higher Education Institutions have a strategic position for the process of changing towards a sustainable society in various dimensions: their function of teaching and training future stakeholders; their ability to develop research and extension activities; their power to establish a new culture of management of its own operations to influence society. This study aimed to explore the main topics discussed in the literature on methods for implementation and evaluation of sustainability on college campi. In general, a sustainable university should build its own sustainability agenda according to their local challenges, seeking to combine deep organizational changes with teaching and research of the philosophical concept of sustainable development. The university should be able to bring to your daily routine sustainability practices, which should reflect the curricula at all levels. It is essential the implementation of environmental management tools, and also measurement and monitoring of issues related to sustainability. It is important that such transformations occur under a strong foundation on social justice, gender equality, promotion of human rights and respect of welfare conditions. Finally, studies have shown that

the scientific field that deals with sustainable campus or sustainable university has great potential for future research, especially the approaches that contextualize HEI located on developing and/or emerging countries.

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