The Environmental Sustainability of Brazilian Universities: Barriers and Pre-conditions

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Abstract

The aim of this paper is to discuss the application of sustainability in Brazilian universities, emphasizing the preconditions for implementation and the barriers and difficulties for its application. The methodology approach is based in a theoretical background and on the gathering of empirical evidence. Due to the scope of the study and the nature of the methodological approach, the survey, by no means, can be regarded as representative. However, since it is combined with the review of the literature, it builds a rough profile of the status of the sustainability in Brazilian universities. Larger studies can be undertaken at a later stage, provided that the necessary staff time and funding are available. The results indicate positive experiences and opportunities; risks, threats and obstacles;

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creativity and new solutions for Brazilian universities. This paper will be useful to academics and researchers interested in the topic of sustainability in higher education institutions in Brazil and other developing countries.

Keywords
Brazilian universities · Sustainability · Implementation

1 Introduction

The pressures on higher education today are intense (Barlett and Chase 2013), from legislators, society, work market and others, a fundamental transformation of higher education ensures that more students graduate with the skills and abilities to meet the challenges of the twenty-first century.

Implementing sustainability is not an easy task (Lozano 2006; Leal Filho 2011) it is confusing, time intensive, and with many uncertainties and various stakeholders that should be involved (Tilbury 2012 apud Waas et al. 2012). There is often resistance to change that is evident through the large number of barriers to change, that should be identified, addressed and overcome. Brazil, is not different, and maybe as a developing country, there are specific barriers that need to be explored.

At the end of the Decade for Education for Sustainable Development, UNESCO (2005–2014) many researches and analyzes are being conducted (Gonçalves et al. 2012) to show what have been developed in terms of objectives proposed 10 years ago. The focus of this paper is surrounding this topic in the moment that discusses the situation of Brazilian universities and brings some insights to promote sustainability.

Sustainability should not be understood to be a special subject but should be incorporated into the practices of each academic course (curriculum). This does not mean to insert into the curriculum a subject about environmental issues or sustainability but it means introducing an attitude and behavior pattern into each student as a future member of society and a future professional (Brandli et al. 2014).

According Leal Filho (2009), the levels of implementation of sustainability in university systems may be found at roughly three different stages of evolution. According the author these are as follows:

Stage 1: the principles of SD are not universally understood, there are not significant efforts towards promoting sustainability in university operations and no systematic projects that try to promote sustainability either holistically or in the context of specific subjects.

Stage 2: the principles of SD are widely understood and there are significant efforts towards promoting sustainability at university operations. There are projects which try to promote sustainability in the university as a whole or in the context of specific subjects, as well as in research and extension.

Stage 3: in this stage are the universities which fulfill requirements at level 2 and committed to sustainability on a long-term basis doing so by means of sustainability policies (ISO 14001 or EMAS for European universities), the existence of various

senior members of staff who oversee its sustainability efforts and the existence of centrally-funded sustainability projects.

The author commented that it is not possible to measure the actual numbers of universities at the different stages, but to present an estimate based on the available literature and conferences on SD held over the past 10 years. The result is that around 20 % of the universities are found in stage 1, especially in developing countries (Brazil's case); around 70 % of the universities are found in stage 2, with an uneven distribution towards industrialized nations and towards North American and western European countries; up to 10 % of the universities are found in stage 3, almost exclusively in North America, Western Europe and Australia/Oceania.

Many universities have not succeeded in implementing the principles of sustainable development, according Leal Filho (2011) the reasons are lack of institutional interest, limited resources and staff involvement. The problems in implementing sustainability in higher education are influenced by social, political and economic issues. They can be categorized in perception, attitude, perspective, focus and cost-effectiveness (Leal Filho and Manolas 2012).

Waas et al. (2012) synthesize the barriers that higher education encounters in working toward sustainability. They show that these barriers could be related to understanding of sustainable development (SD), paradigm shift, resources and leadership (Fig. 1).

Disciplinary organizational structure hindering integrative thinking and interdisciplinary cooperation and learning
SD is perceived as an "add-on", not a built-in aspect of higher education
Lack of vision and prioritization/leadership of SD among higher education leaders
Lack of awareness, common understanding and knowledge of sustainability in higher education and its consequences
Perceived lack of scientific basis of sustainability
Confusion about SD
Broadness of SD
Lack of coordination and vision to change sustainability policies and education at government level
Little or no motivation or realism
Sustainability is considered to be radical
Changes into curricula are translated into budget claims
Overcrowded curricula
Sustainability is considered to have little or no relevance to the discipline, its courses and research
Lack of (financial) resources and uncertainty about the required efforts/resources to engage and implement sustainability
Threat to academic credibility of scholars and teachers

Fig. 1 Barriers that higher education encounters in working toward sustainability. *Source* Waas et al. (2012)

The aim of this paper is to discuss the application of the sustainability in the Brazilian universities emphasizing the barriers and difficulties of the implementation and the preconditions for this implementation.

2 The Brazilian Universities

The level of achievement of Brazilian universities does not compare with European universities (Leal Filho 2009), neither with North American universities (Barlett and Chase 2013).

The Brazilian higher education consists of 2,377 higher education institutions, according to data from the Ministry of Education (MEC). Of this total, 85 % are colleges, 8 % are universities, 5.3 % are technology centers, and 1.6 % are technological institutes. This means that there are around 190 universities in Brazil (Ranking Universitário Folha 2012).

In Brazil few universities have implemented Environmental Management Systems in their campuses. Although there are some examples that need to be mentioned as the UNISINOS, the first university in Latin America with ISO 14001 Certification (Venzke et al. 2012). This scenario is quite different from that showed in Disterheft et al. (2012b) for European universities, where current state of Environment Management System (EMS) implementation processes and practices is an advanced level with many universities using ISO14001, EMAS and EMS.

Generally, as commented by Tauchen and Brandli (2006) and Brandli et al. (2011), most of the environmental actions that have been adopted in Brazilian universities are isolated and do not consider a systemic vision.

As the largest Brazilian university and the third in Latin America with an academic community of over 106,000 people, since 1997 the University of São Paulo has the Permanent Program and Energy Efficiency—PUREUSP (PUREUSP 2012), evaluating the potential for 20 % energy savings for the University. In addition to prescribing some measures to control energy consumption, it has a monitoring system for consumption (SISGEN) that identifies indicators for the seven campuses. The cost impact of natural resources constitute a strong impulse also to environmental and social measures, dealing with paper consumption and with water management (PURA program), and to establish parameters for the calculation of the ecological footprint and CO_2 emissions (USP 2009).

Although cooperation exist with other international universities such as the Universidad Autónoma de Madrid (UAM), the USP does not yet have a formal EMS or ISO14001 certifications. This is mostly due to political and economic reasons.

3 Methodology

The research method used in this study consisted of a background analysis (with a review of the literature), complemented with the collection of empirical evidence. A questionnaire with four questions below was sent by email to a sample of 10 experts

Table 1 Surveyed institutions in Brazil

University	Federal state in Brazil	Month and year of foundation	Number of students
Federal university of Bahia	Bahia	April 1946	27,600 students
University of Brasilia	Brasilia	April 1962	30,727 undergraduates and 8,913 graduate students
Estadual university Paulista (Unesp)	São Paulo	January 1976	35,000 graduate students
			12,000 mil postgraduate students
University of Southern Santa Catarina Unesul	Santa Catarina	November 1964	30,000 students in graduate, posgradutate and distance education
Estadual University of Roraima	Roraima	November 2005	3,000 graduate students
Federal Institute of Education, science and technology from Rio Grande do Sul	Rio Grande do Sul	December 2008	6,200 students

working in some Brazilian universities, of which 6 were returned. For the selection of the surveyed institutions was made a random sampling, considering the spatial distribution in country.

Due to the scope of the study and the nature of the methodological approach, the survey, by no means, can be regarded as representative. However, since it is combined with the review of the literature, it builds a rough profile of the status of the sustainability in Brazilian universities. Larger studies can be undertaken at a later state, provided that the necessary provisions for staff time and funding are available. The surveyed institutions can be seen in Table 1.

The questions posed to the experts were as follows:

What is the status of sustainability in your university?

How do you see the implementation of sustainability in Brazilian universities nowadays?

What are the main barriers to the implementation of sustainability in your university?

What must be done to promote sustainability in Brazilian universities?

The next section presents the results gathered, the analysis and its implications. The transcriptions in the text were freely translated to English.

4 Results and Analysis

4.1 Status of Sustainability in the Brazilian Universities

The respondents have shown that most universities do not have institutionalized sustainability programs within the framework of the management of the whole university. Sustainability actions are isolated, sometimes guided by ideologies.

Those universities which reported an institutional approach to sustainability have stated that their efforts are still in the early stages. About the green actions, the waste management is the action more cited among the universities.

This scenario means that there is not a formal policy for sustainability and structured framework for managing the environmental impact of the university activities like the a Environmental Management System (EMS).

As a respondent commented:

> …We have not yet … institutionalized programs focusing on the actions and decisions of sustainable orientation. However, the institution is taking several actions that aim to reduce direct and indirect impacts on the environment. But there are isolated actions that are not systemic or actually institutionalized through program to sustainable practices.…

> …In the Brazilian universities sustainability is seen from a really early stage…

Furthermore, most of the sustainability actions found, focus on green campus, missing the approach to sustainable education.

The sustainability is reported in the social balance sheet.

With regard to federal higher institutions, two comments are to be mentioned:

> The disorganization in public universities puts the theme of sustainability away.

> Federal universities are still discussing the creation of centers for these purposes.

4.2 Barriers for the Sustainability in Brazilian Universities

The respondents identified several commons barriers: lack of mandatory strategies from the institutional program that motivate staff, professors and students to engage in sustainability; the lack of interest in sustainability; lack of knowledge about sustainability; and the activities including teaching, research, and university management that leave no space for the implementation of sustainability measures.

Other problems may also be added the list:

1. Cultural change
2. Importance attributed to sustainability
3. Lack of cooperation networks between universities
4. Government policies to encourage the implementation of education for sustainability and sustainable practices on campus, especially from Ministry of Education.
5. Lack of resources or available funding for sustainability projects.
6. Lack of staff and a senior member of staff who can implement and oversee sustainability efforts. This could be in terms of size and team's background.
7. Lack of projects between companies and universities, and R&D projects.

Many of these barriers can be explained as are organized societal levels of participation presented by Disterheft et al. (2012a). According the authors, the educational sector at the macro level involves the international and national framework of educational policymaking; at the meso level, it involves the governance of the institutions and their organizational structure and at the micro level, it refers to the concrete learning settings and spaces for participation in institutions and their communities.

Beyond these, there are more contextual barriers that can be observed in development countries (macro level): there is a lack of sustainable-related practice in the day-to-day of the population; there is a lack of sustainability practices in the city life including sustainable transport, formal mechanisms for selective collection of municipal waste, investments in water and efficient energy consumption; and there are intrinsic difficulties for the population to (attend) comply with the legislation/and/or not sufficient environmental legislation. All of these issues are affected by the role of the university.

One of the challenges of the educators is developing in themselves and in their students, mindsets and habits that enable people to live sustainably. In this point, maybe the role of the university is more evident in developed countries.

The Fig. 2 presents the link between the participation processes in higher education for promoting sustainability practices and for fostering citizenship and democratic values, and the barriers in developing countries like Brazil.

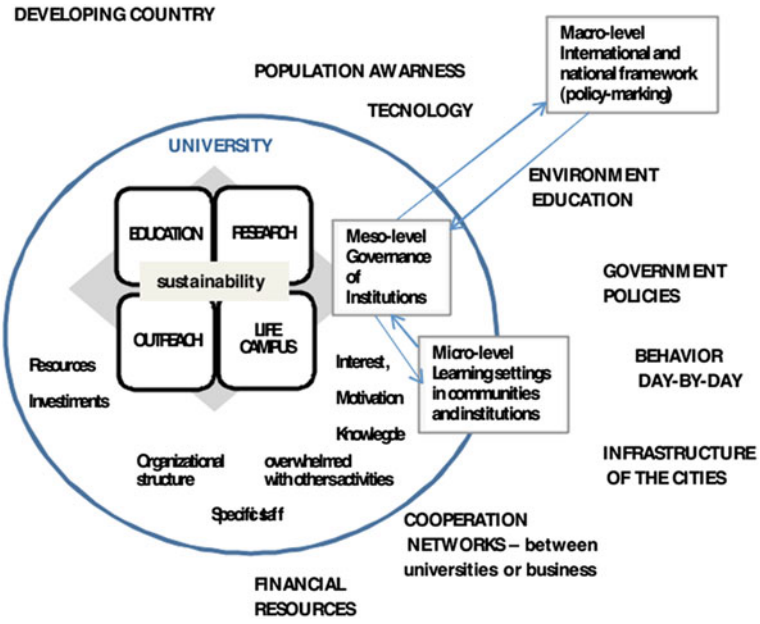

Fig. 2 Barriers that university encounter in implementing sustainability in developing countries. *Source* the authors

4.3 Pre-conditions for the Sustainability in Brazilian Universities

Brazilian universities must realize the importance of their role in society with respect to education for SD by educating leaders and advancing knowledge, and by developing an institutional understanding, culture, and planning for the integration of sustainability.

To improve the efforts for the implementation of sustainability in Brazilian universities, some points should be considered:

4.3.1 Investing in Support

In order to have a structure for the sustainability, top-down policies and full-time equivalent Environmental Management Staff must be considered.

Universities should o raise more support, in terms of staff capacity, financial support and investments.

Political support is closely related to the financial support for implementation of sustainable projects and as such, It is important that rectors and other officials of the HEI support sustainable initiatives and to add them to the institutional strategic planning.

One of respondents said:

> *Personally, I believe the campus is very large. So, such initiatives should be enforced because there is hardly any awareness by so many people.* This is an important point of view because successful experiences in sustainability show their need to influence people without authority (Newman 2013).

4.3.2 Know the Benefits

Understand the financial benefits (water, energy, food, waste management, etc.).

Understand the environment benefits; View sustainability as a commitment universities would take on not to be the best but to approach global issues including clime change, disasters and conflict, ecosystem management, harmful substances, and resource efficiency.

To view the sustainability as a criteria of quality and competitiveness, a national ranking about sustainability could motivate the universities to implement it, as the People and Planet Green League in UK, and AASHE in US. This standardized instrument would measure the progress of the HEI toward sustainability and achieve recognition. *Using this self-assessment and rating system, institutions can benchmark their sustainability progress over time and compare with others* (AASHE 2014). Also, Waas et al. (2012) recommended to develop an assessment frameworks and indicators to assess the progress of sustainability in higher education at the institutional, regional, national and international levels and to communicate regularly to all—internal and external- stakeholders.

4.3.3 Educate and Train

Develop an institutional understanding about the topic of sustainability, and include it in the educational process. According Porritt (2012) the starting point is staff training and preparation. *Only then can we begin to embed sustainability more widely into university programmes across the curriculum. As educators, we have a huge responsibility to embed sustainability into what we do across the board, not just for those students who choose to take subjects that directly relate to issues around sustainability, but for the whole student body. In essence, we should be preparing students for the work of the world, not just the world of work.*

As a respondent commented.

> *Change and learning. Aware teachers, managers and other staff are not only about the subject but also related to learning and education in general (greater understanding regarding these topics and also their relationship to sustainability). Go beyond the mainstream. Change into a place of knowledge generation and not Knowledge reproducing (as seems to be today).*

4.3.4 Involve People/Stakeholders

Sustainability must be funny and bring some news every time that to engage the students and staff in campaigns with a sustainability focus.

Engage the community and external stakeholders (as for example business-university partnerships). Universities could be very important actors in any specific sector, in terms of research as well as the education and training of employees. In exchange, they could get more clean technology investments in environmental management in their campus activities or even project funding (R&D).

4.3.5 Politics/Cooperation Networking

In terms of the country, and based on the barriers mentioned, there is an eminent necessity for the government policies to encourage and value the implementation of education for sustainability and sustainable practices on campus, especially from Ministry of Education. The National System of Higher Education Assessment (Sinaes) analyzes the institutions, courses and student performance. The evaluation process considers aspects such as teaching, research, outreach, social responsibility, management of the institution and faculty. As the information is used for institutional orientation of higher education and to support public policies, it could include some sustainability criteria.

In this way, it is important to promote the cooperation between networks in universities in Brazil and with other countries. There are good examples as Ecocampus in UK which provides and support a flexible approach to EMS implementation in HEI (http://www.ecocampus.co.uk).

Waas et al. (2012) suggests that government subsidy programes should stimulate sustainability in HEI initiatives and collaboration and networking at all levels (regional, national, international).

The universities should engage with the Regional Centers of Expertise (supported by the United Nations University). In Brazil, there are three regional centers, one in Curitiba/SC; Rio de Janeiro/RJ and São Paulo/SP.

5 Conclusion

Incorporating sustainability is a social issue that should obviously be born in the university as a resource for teaching, research and outreach, by doing so, disseminating a sustainable posture, skills, development, knowledge and technologies.

In Brazil there are many barriers be overcome, some inherent in the process of incorporating sustainability and cultural change widely discussed in the literature and other related to the current context of the country and state of involvement of these universities with the topic.

However, several successful sustainability efforts by HEI may show how the university is capable and dynamic, and how it could be applied to the Brazilian reality. With regard to the stage of sustainability in Brazilian universities, future research will be necessary to develop a better understanding of the current situation and ways to organize and promote sustainability in Brazilian universities.

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