Steps toward sustainability in higher education institutions.
Management practices on focus.

Abstract

The purpose of this research is to assess the state of management efforts towards sustainability in higher education institutions. The analysis is based on two main sources of data. On the one hand an analysis of the performance level of one institution using single case study. On the other hand a secondary analysis of case-studies from around the globe. Sustainability its being integrated into management objectives in higher education institutions. The analysis shows that sustainability-oriented practices are being developed in complex ways due to its variety of contexts of application. This research provides a state of the art regarding sustainability in higher education institutions. It has the potential to aid any organization to better reflect, incorporate and institutionalise sustainability related concepts. However, this research is limited by the time and funding to be able to analyse a global phenomenon.

Keywords – Sustainability, Sustainable development, higher education institutions, management by objectives.

"Today we do not know what we have to do, but we have to act now because the consequence of non-action could be disastrous. We will be forced to live 'as if we were free.'"

Slavoj Zizek (2010)

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To my family and friends, for their unconditional support to all my initiatives, I love you all.

Steps toward sustainability in higher education institutions. Management practices on focus.

"I like to wash,

the dust of this world

In the droplets of dew'"

Matsuo Basho (1644-1694)

Section I. Insights to sustainability management systems

Relevance
Background
Dissertation aims

Section I. Insights to sustainability management systems

Relevance

Higher education institutions are different all around the globe. However, all of them are linked to local and global communities. Many of these institutions are run as businesses while others keep a traditional approach to education and knowledge making. All of them have a structure that echoes over the communities with which they are involved.

The last two decades have shown a worldwide flourishing of interests and actions taken by higher education institutions regarding their own environmental performances (Bekessy et. al., 2007: 302). This phenomenon represents one of the many areas in which universities are getting involved to gain control of the ways in which they influence the communities with which they interact.

During the last decade, this growing interest and practice were transferred to the area of sustainability (Ferrer-Balas et. al., 2008: 296; Boström, 2012: 9). The growing interest on sustainability issues is manifested in the increasing number of declarations (Kurland, 2011: 396), reports and journal articles (Reumano & Pipere, 2011: 111) that can be found regarding sustainability in higher education institutions.

By seeking to gain control of their multiple outcomes, many higher education institutions are adopting specific management systems (Clarke and Kouri, 2009). A management system is usually based on management by objectives (Lundberg et. al., 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, this essay focuses on those related to sustainability.

The relevance of higher education institutions as important actors in the global arena is well exemplified by Waheed and colleagues (Waheed et. al., 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. (…) 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." (Waheed et. al., 2011: 358)

Global problems such as those identified by the European Commission related to climate change,

threats to public health, the pressure on vital natural resources, poverty, ageing populations, and traffic-related pollution (von Oelriech, 2004: 135), set the stage of this dissertation. Many scholars agree that the global problems that we face today are highly interlinked (Dahl, 2012). To significantly address these problems, higher education management practices may have the potential to contribute to sustainability. Hence, an approach as the one presented here can contribute to research regarding sustainability-oriented practices in higher education institution (Emanuel & Adams, 2011: 85).

Background

As stated before, many higher education institutions have been adopting specific management systems to gain control of their multiple outcomes (Clarke and Kouri, 2009). More than a decade ago, the ISO became the most prominent definition for an environmental management system (Herremans & Allwright, 2000: 169). The ISO definition stated that an environmental management system was "the part of the overall management system that includes the organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, achieving, reviewing and maintaining the environmental policy" (UNEP DTIE, 2012). Most environmental management systems were based on ISO models and they were initially developed for the private sector, more precisely for industry and business corporations (Lundberg et. al, 2009). However, during the last decade these models were adapted to include organizations of public administrators. Since then, city councils, state-supported companies and other governmental organizations have implemented and certified different environmental management system models (Daddi et. al, 2011; Lundberg et. Al, 2009).

Nowadays, international organizations such as United Nations Development Programme are supporting the implementation of environmental management systems on a global scale (UNDP, 2012). In addition, some State governments are also taking into account the values of environmental management systems as part of their own environmental policy, and some of them are even demanding its implementation in both the private and the public sectors (Sammalisto & Brorson, 2008).

Besides the ISO based models there are several others (Clarke and Kouri, 2009). The choice of one of them by an organization depends on the elements that drive their decision. Moreover, drivers are identified as the sum of the factors that prompts an organization to undertake transformation:

"different drivers influence whether the organization undertakes the environmental management system and the focus within it" (Clarke and Kouri, 2009: 972).

Regarding environmental management systems in higher education institutions, Clarke and Kouri (2009) have identified that drivers have been evolving over time. These authors also describe three generations of drivers remarking that "they influence the goal behind the environmental management system, if it is formal or informal, the environmental interactions chosen, the type of indicators that are monitored, the primary audience that it is targeted, and the port of reporting that is done within the university's management system" (Clarke and Kouri, 2009; 973).

During the last decade, the universe of environmental management systems in higher education institutions has been growing constantly (Clarke and Kouri, 2009). Indeed, the variety of approaches constitutes by itself a diverse universe. A case study can be useful in order to become aware of strengths and weaknesses among opportunities and limitations on the implementation of a specific management systems in higher education institutions.

Recently, environmental management systems have been complemented with broader sustainability approaches that include social, cultural and economic variables (Fonseca et. al., 2011; Lozano, 2011; Palma et. al., 2011). Indeed, the debates around the state and possible future of sustainability management systems in higher education institution show that it is a contested field. It is still unclear how sustainability should be addressed by the institutions adopting or adjusting management systems in higher education (Clarke and Kouri, 2009; 971) .

Fortunately, scholars around the world are sharing their experiences, and generating a growing corpus of information regarding sustainability practices in higher education institutions (Reumano & Pipere, 2011: 111). Sustainability approaches state that environmental problems are embedded in the social universe that provides them with meaning (Djordjevic & Cotton; 2011). Social, cultural and economic variables are also being discussed and displayed on the academic and public spheres.

Dissertation Aims

The relevance of the present research is linked to current discussions regarding sustainability approaches in higher education institutions. Here it is important to clarify the potential of higher education institutions management system's in the striving towards global improvements in the environmental, social, cultural, and economic fields. Therefore, this dissertation aims to investigate and evaluate best practice in and attitudes towards higher education institutions management systems regarding their incorporation of sustainability. The overall goal of this dissertation is to highlight the most successful practices and their obstacles regarding the incorporation of sustainability in higher education institution management systems.

This dissertation highlights elements of contrast in the comparison between a case study, and secondary analysis of case-studies from around the globe. The main case that I have selected can be considered exemplary of the actual circumstances and conditions of many higher education institutions around the globe (see Section IV). I find that such comparison may serve to create a compendium of successful practices and common obstacles in the incorporation of sustainability in higher education practices. Hence, the analysis presented here is useful for higher education institutions in order to better reflect, incorporate and institutionalise sustainability related concepts.

The hypothesis that drives my research is that: *there is an on-going global trend in higher education institutions towards the incorporation of sustainability oriented practices into their management systems.* Motivating this research stands the present question: *How are management systems being modified to incorporate sustainability into higher education institutions?*

In addition, some secondary questions are included in this dissertation: *Is there currently a global trend in higher education institutions management practices focusing on deeper understandings of sustainability and, if so, what are the main aspects considered by management systems to focus on sustainability related concepts?*

In sum, the dissertation is an assessment of the most successful practices and their obstacles along the overall activities of higher education institutions. It is based on a discussion about sustainability oriented practices given at the University of Granada and 23 other case studies from the literature. The conceptual framework developed for this dissertation is designed to address sustainability

attending to its multidimensional understanding. Measures have been taken to raise recommendations regarding how to incorporate sustainability multidimensional values into institutional practices. However, to maintain the size of this Master Thesis reasonable, the cases discussed are mainly those identified with a multidimensional understanding of sustainability.

Finally, the outline of this dissertation is:

- A review of the literature about higher education institutions focusing on the construction of a conceptual framework to assess sustainability in relation to management practices.

- An investigation of sustainability oriented practices at the University of Granada.

- Recommendations regarding ways in which sustainability efforts are being implemented and possibly improved.

> "*Words are flowing out like endless rain*
>
> *into a paper cup*
>
> *They slither wildly as they slip away*
>
> *across the universe*"
>
> **Lennon / McCartney (1968)**

Section II. Conceptual framework

Sustainability in higher education institutions
Trends in practice
Areas of implementation
Assessment tool

Section II. Conceptual framework

Sustainability in higher education institutions

In a publication known as the Brundtland Report (1987), a panel of experts forged the original definition of 'sustainable development'. It states that 'sustainable development' concerns: "meeting the needs of the present generation without compromising the ability of future generations to meet their needs" (Brundtland, 1987). Indeed, "given its comprehensive nature, sustainability is considered by many to be a cornerstone of future global economic stability and vitality" (Weber et. al., 2009, 178). However, "some have objected to the term 'sustainable development' as an umbrella term since it implies continued development, and insist that it should be reserved only for development activities" (Emanuel & Adams, 2011: 87). The original term was later adopted by Agenda 21 program of the United Nations in 1992 (Agenda 21, 1992)

The concept has evolved from this rather vague and mostly qualitative notion to more precise specifications defined many times over in quantitative terms (Moldan et. al., 2012: 4). Nowadays, sustainability is a multidimensional concept (environmental-social-economic) that refers to a global system of complex interactions and levels (Dahl, 2012).

Scholars are starting to raise concerns about the ethics and role that higher education institutions play in the global arena (Mero, 2011; Parker, 2007; Rogers et. al., 2012; Rappaport, 2012; Savelyeva & McKenna, 2011). Some have argued that higher education institutions have the potential to re-direct efforts to align them with current trends of global sustainability (see Brundiers, 2011; Chalkley 2006; Djordjevic & Cotton, 2011; Emanuel & Adams, 2011; Ferrer-Balas 2008; Hansen 2006; Lozano, 2006; Wals & Jickling, 2002). For instance, Mero (2011) summarizes this potential stating that "solutions to global unsustainability require a new generation of interdisciplinary leaders who embrace complexity, interconnectedness, uncertainty, and change." (Mero, 2011: 279). Reinforcing this perspective, Parker (2007) shows us that universities are not "only" the educators of future generations of professionals, "they also possess the intellectual capacity and resources to effectively integrate educational initiatives into their mission and programs" (Parker, 2007).

In the area of higher education institutions, sustainability is understood in multiple and contrasting ways. The field of higher education institutions mirror sustainability debates of the diverse fields where it is being incorporated (see Waheed et. al. 2011; Brundiers et. al., 2010). Regarding the understandings of sustainability in higher education institutions, there is a distinction to be made

between environmental sustainability and multidimensional sustainability. Often, discussions around sustainability practices tend to focus on environmental sustainability. However, "it has gradually been acknowledged that economic and social sustainability do indeed have their own merits" (Moldan et. al. 2012: 6). Undoubtedly, sustainability is a complex and multidimensional concept (Velazquez et. al., 2006: 811) that moves through economic, social and environmental fields.

In the sphere of higher education institutions scholars are already calling for concrete actions (Savelyeva & McKenna, 2011; Rogers et. al., 2012; Rappaport, 2012). They acknowledge that environmental improvement ("greening") is equal to business as usual. The current challenge is to answer the complex socio-environmental problems linked to the multidimensional understanding of sustainability.

Due to its complex nature (Borström, 2012: 5), there have been a proliferation of various frameworks to achieve sustainability. Management, and organizational change theories are the ground on which are based the most common frameworks that deal with sustainability in higher education institutions (See Lozano, 2011; Waheed et. al. 2011). Frameworks are meant to suit different temporal and geographical scales as well as situational contexts (Boström, 2012: 5). As a result, efforts in higher education institutions to engage in sustainability-oriented practices are wide and diverse (Ferrer-Balas et. al., 2008; Clarke & Kouri, 2009).

Trends in practice

In Europe, a transformative process in higher education institutions started with the Bologna Declaration of 1999. The reforms in higher education institutions promoted by the declaration included many areas and activities, all of them based on the principle of sustainable development in accordance with ongoing international trends (Lukman & Gavlic, 2007: 104). Later on, this transformative process was boosted with the UNESCO declaration of the Decade of Education for Sustainable Development 2005-2014 (UNESCO, 1995-2011).

Back in 2001 the general trend among European and North American higher education institutions shows that there were few organizations pursuing environmental related initiatives (James & Card, 2012: 167). Nowadays, a decade later, higher education institutions around the world are beginning to engage in sustainability-oriented practices (Ferrer-Balas et. al., 2008: 296; Waheed et. al. 2011: 358). However, most of the sustainability progressive institutions are still situated in the United

States and Europe, especially those from Scandinavia and Austria (Lukman & Glavic, 2007: 107).

The engaging of higher education institutions in sustainability-oriented practices is being seen in a wide arrange of activities from campus greening to activities related to a more in depth understanding of sustainability (Ferrer-Balas et. al., 2008: 296). The are many factors motivating institutions to carry out transformations. This variety of factors driving institutions transformation are what explains the presence of a wide arrange of sustainability-oriented practices in higher education institutions. Key drivers for these transformations are most commonly not due to external forces. "Drivers tend to be based around internally-driven responsibilities for the environment, health and safety" (Clarke & Kouri, 2009: 973).

It is important to note that there is an evolution over time of the factors that promote transformation in higher education institutions. These factors, or drivers of transformation, have a history of almost two decades. Originally they were related to compliance to environmental regulations. They tended to be related to quality management and pollution prevention. Finally they reached a state where they are related to stakeholder participation, and multidimensional sustainability concerns (Clarke & Kouri, 2009: 973). Each generation of drivers is based on the last, hence they include the previous ones.

Nowadays, some scholars identify five main issues among the internal drivers for university transformation towards sustainability-oriented practices (Ferrer-Balas et. al., 2008: 296): 1) a visionary leadership, 2) the actions of lone innovators at the institution, 3) connectors of networks of people across the institution, 4) the existence of a coordinator unit, and finally 5) the size and complexity of the institution. Among the external drivers are the pressure of peer institutions, and the availability of funding (Ferrer-Balas et. al., 2008: 296). The implication of these drivers is explained in the following sections.

Areas of implementation

In a quantitative causality based study lead by Waheed and colleagues (2011), the authors showed that economic development, social equity, and sustainability education are the major factors to achieve sustainability in higher education institutions (Waheed et. al. 2011: 366). Less significant in descending order are health and safety issues, energy requirements, institutional enhancement, and international research and development trends (Waheed et. al. 2011: 366).

However, from qualitative perspectives many scholars prefer to focus on the areas to be

considered in order to achieve sustainability in higher education institutions (see Hills, 2011; Christensen et. At, 2009; Ferrer-Balas et. al., 2008; Lukman & Glavic, 2007; Velazquez et. at., 2006). Regarding the areas, 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 et. At, 2009; Ferrer-Balas et. al., 2008). For instance, Christensen and colleagues (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.) (Christensen et. At, 2009; 9). Similarly, different definitions focus on the activities as a C.O.R.E. system (Hills, 2011: 87). 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: 87).

Models like these are based on assessments as the one of Lukman & Glavic (2007). Lukman & Glavic (2007) argue that desirable outcomes of sustainability-oriented practices are those fostering "research, technical development and innovations within a knowledge-based society" (Lukman & Glavic, 2007, 107). Lukman and Glavic (2007) also argue 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 (programmes, curriculum, teaching methods), operations, forming networks and reporting to stakeholders (assessment tools, sustainability indicators)" (Lukman & Glavic, 2007: 107).

In general, sustainability-oriented practices in higher education institutions are those that lead to environmental protection, economic performance, and social cohesion. A more specific list of key characteristics of sustainability in higher education institution has been suggested by Ferrer-Balas and colleagues (2008). These researchers point out five concept areas (Ferrer-Balas et. al., 2008). These areas involve: 1) Problem solving orientation pertinent to societal goals, addressing the complexity and uncertainties of real problems associated with the future; 2) a transformative education of the typical one-way process of learning for a model that leads towards a more interactive and learner-centric education with a strong emphasis on critical thinking; 3) a clear and strong emphasis on effective inter and transdisciplinary research; 4) Networks of resources that effective link varied expertise around and beyond campus, 5) Leadership and vision commuted to

long term transformation accompanied by proper assignment of responsibility and rewards (Ferrer-Balas et. al., 2008: 296). As can be seen, the first three characteristics are mainly related to education and research activities pointed by the CORE system. The last two, are linked mostly with operations and engaging regarding a modification of the structure of responsibility and rewards, and for examples support to the networks that move beyond campus.

Although, there are many dimensions of change in the process towards sustainability in higher education institutions, achieving sustainability "follows surprisingly parallel development tracks, even though each institution offers its unique set of challenges, goals, obstacles, funding sources and visions" (Weber et. al., 2009: 173). Coincidently, scholars have focused on these "parallel development tracks" in order to assess sustainability in higher education institutions (see Weber et. al., 2009; Lukman & Glavic, 2007; Velazquez et. at., 2006).

One of the most widespread methods of systemically assessing all the dimensions of these development tracks is the Deming spiral (Lukman & Glavic, 2007: 107). This spiral is a management philosophy of seeking improvements in a continual process based on a Plan/Do/Check/Act cycle (Velazquez et. at., 2006: 817). In sum, following the structure of a PDCA cycle as an organizational tool, it is possible to reflect upon the comprehensive process behind the transition towards the incorporation of sustainability in higher education institutions (see figure 1).

Figure 1. PDCA cycle. Source: Lukman & Glavic, 2007

The PDCA cycle is a highly structured model, "boxed" by its characteristics. However, this limitation can be complemented by incorporating more reflective approaches such as the one proposed by Weber and colleagues (Weber et. al., 2009). Weber and colleagues (2009) offer a model based on reflective exercises to 'build', 'strength', and 'reassess' sustainability practices in higher

education institutions (Weber et. al., 2009: 174). The construction of a framework of sustainability assessment in higher education institutions is enriched by the integration of 'structured' and 'reflective' approaches to management systems.

Assessment tool

The framework proposed here (see table 1) focuses on the extent to which the structured, and reflexive approaches are applicable to the case studies chosen for this study. Results from this framework will be used to assess whether there is evidence to suggest that the aspects featured by each approach, together with a normative assessment, are visible in higher education institutions that are moving towards sustainability.

Reflexive approach in the assessment tool

The series of steps proposed by Weber and colleagues (2009) to achieve sustainability in higher education institutions can be broken down in three categories: 1) building a foundation, 2) strengthening, and 3) reassessment and planning (Weber et. al., 2009: 174).

Building a foundation involves a series of steps that aid to build a basis for the development of successful sustainability strategies (Weber et. al., 2009: 174). *Strengthening* consists of the steps to institutionalise progress, and to make possible the distribution of sustainability related responsibilities across the institution (Weber et. al., 2009: 174). Finally, *reassessment and planning* are the steps that stand to solidify progress emphasising in the long-term vision and planning (Weber et. al., 2009: 174).

Structured approach in the assessment tool

The model based on the PDCA cycle has four phases linked in a logical sequence that lead to continuous improvements to bring the process to a higher level (Lukman & Glavic, 2007: 107). In this framework, the PDCA cycle will be assessed with regard to the specific relation to sustainability of each one of the following aspects:

Planning, the first phase, involves developing the policy of the institution:

- Assessment of the institution context-based "concept and definition of what a sustainable university is about" (Velazquez et. at., 2006: 812). This aspect will be analysed because it is the first meaningful step in facilitating institutional change (Lukman & Glavic, 2007: 107).

- Assessment of the institutions policy, which consist of main statements such as vision and goals, mission, organization structure, and strategy (Lukman & Glavic, 2007: 108).

Doing encompasses 'day-to-day' given activities in higher education institutions:

- Assessment of overlapped activities in higher education institutions. For instance,

sustainability principles in education need to be integrated into research and vice versa, as well as research and operations or engaging activities (Lukman & Glavic, 2007: 109).

Checking comprehends quality control, and understanding of the institution performance:

- Assessment of the means of control. One of the major control tools used by university leaders are environmental audits, rather than sustainability ones (Velazquez et. at., 2006: 816). However, all the three dimensions of sustainable development should be comprehended as a sustainability indicator (Lukman & Glavic, 2007: 110).

Acting is solving the problems identified along the process:

- Assessment of the solutions presented. Such solutions should foster innovation and development, and they should be included in a sustainability report (Lukman & Glavic, 2007: 110).

Normative assessment in the assessment tool

As it was mentioned above, there are five main characteristics of sustainability in higher education institutions, as they were point out by Ferrer-Balas and colleagues (2008). In sum, these five key characteristics can be summarized as principles of normative assessment that regard the existence of the following aspects:

1. education and research orientation towards societal problem solving.
2. transformative education, to prepare students capable of addressing complex sustainability challenges.
3. trans and interdisciplinary research orientation.
4. networks of resource sharing around the campus.
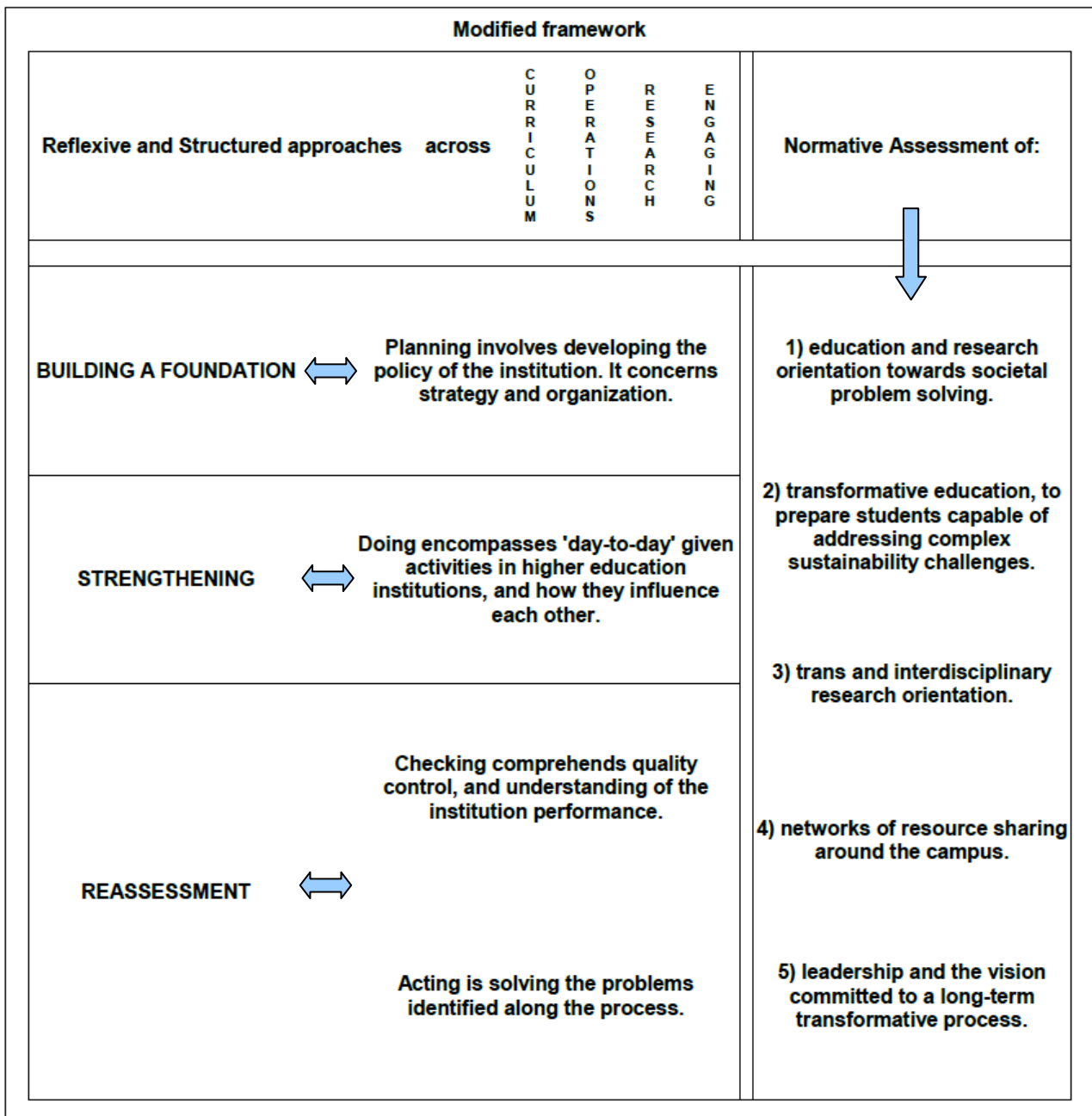5. leadership and vision committed to a long-term transformative process.

Modified framework

Reflexive and Structured approaches across	C U R R I C U L U M	O P E R A T I O N S	R E S E A R C H	E N G A G I N G	Normative Assessment of:

BUILDING A FOUNDATION ⟺ Planning involves developing the policy of the institution. It concerns strategy and organization.

1) education and research orientation towards societal problem solving.

STRENGTHENING ⟺ Doing encompasses 'day-to-day' given activities in higher education institutions, and how they influence each other.

2) transformative education, to prepare students capable of addressing complex sustainability challenges.

3) trans and interdisciplinary research orientation.

Checking comprehends quality control, and understanding of the institution performance.

4) networks of resource sharing around the campus.

REASSESSMENT ⟺

Acting is solving the problems identified along the process.

5) leadership and the vision committed to a long-term transformative process.

Table 1. Assessment tool. Sources: (Hills, 2011; Weber et. al., 2009; Ferrer-Balas et. al., 2008; Lukman & Glavic, 2007; Velazquez et. at., 2006)

In sum, the assessment tool presented here comprises the steps that lead to the implementation of sustainability practices in higher education institutions. This assessment tool is structured in a follow-up that discloses all the elements that higher education institutions should address in order to incorporate multidimensional sustainability related concepts. These elements are stressed from a

reflexive and a structured approach that allow the researcher to assess if the normative aspects mentioned are being achieved in a case study. In addition, the structure of the assessment tool allows the researcher to present examples from other case studies introducing successful practices and common barriers in the achievement of sustainability in higher education institutions.

"I can change the world, with my own two hands

Make a better place, with my own two hands

Make a kinder place, with my,

with my own two hands

...

but you have to use,

use your own two hands."

Ben Harper (2003)

Section III. Research design

Strategy
Literature review
Data generation, documents
Data generation, interviews
Data analysis, quality procedures
Language considerations

Section III. Research design

Strategy

In order to achieve the aims of this dissertation, the present analysis was designed to meet the methodological requirements of scientific research. As a scientific criteria, a research design is based on its reliability and validity (Bryman, 2006: 29). In qualitative social science "reliability and validity are conceptualized as trustworthiness" (Golafshani, 2003: 604). Trustworthiness of a research defines its quality and it is achieved commonly by triangulation (Golafshani, 2003: 604). In sum, the reliability and validity of this research is based on the triangulation achieved by the convergence of multiple and different sources of information that form the terms and categories of the study (Golafshani, 2003: 604).

It is important to note that for a qualitative case study it is impossible to reach reliability (Bryman, 2006: 55). The case presented here does not intend to become a typical case that can be used to represent the state of the art regarding environmental management systems in higher education institutions. Hence, the findings derivative from the present dissertation cannot be generalized to other institutions. However, the main case presented here may be considered as exemplary of other institutions experiencing similar circumstances and conditions as the University of Granada. In sum, the implication of this design is to become a source of comparison, but not to generalize its findings to other cases beyond the cases studied here (Bryman, 2006: 56).

The central issue of concern for the present research is the quality of the theoretical reasoning in which the case engages (Bryman, 2006; Golafshani, 2003). In this regard there are two essential issues to point out: on the one hand this research places particular care to the relevance of the literature reviewed to construct the theoretical framework of the assessment tool presented here. On the other hand, the research places special attention to the degree in which the data used here interconnects with the theoretical arguments generated in order to answer to the proposed research question. In sum, research's truthfulness of this design answering the question *"How are management systems being modified to incorporate sustainability into higher education institution?"* lies on the quality of the assessment tool elaborated to assess sustainability in higher education institutions.

Last but not least, the design of the case study of the University of Granada was conducted following a single case research strategy (Bryman, 2006). For the main case study, I was engaged during a period of three months as a participant in one of the research institutes of the University of

Granada. Although I did not take field notes, ethnographic observation took place during the time that I was engaged with the institution. Hence, the research methodologies employed for this dissertation comprise of a bibliographic review, document analysis, and interviews. A detailed exposition of those can be found in the following sections.

Data analysis, quality procedures

Techniques of thematic content analysis were applied to process documents and interviews (Burnard, 1991: 461; Bryman, 2006: 554). The data generated by these techniques aid to convert unstructured textual information into an analytical corpus of data (Bryman, 2006: 538). However, some considerations regarding this method should be raised. The themes and subthemes chosen arose from the reading and re-reading of the transcripts of the interviews, the information gathered in form of documents, and mostly from the themes already present in research studies from the literature reviewed (Bryman, 2006: 554). The analytical corpus of data (of analysed documents and interviews) generated by this procedure was structured into several themes that, later on, were organised by its relevance regarding the aims of this dissertation. Finally, the assessment tool proposed for this dissertation was applied being used to analyse the themes elaborated by this the thematic content analysis.

Literature review

The conceptual framework and its assessment tool aim to bring light over the research question asking *"how are management systems being modified to incorporate sustainability into higher education institution?"*. Seeking to find evidence answering the question presented here, the research process was decomposed in two parallel paths. On the one hand the research focused, as explained above, on an analysis using single case study (Bryman, 2006: 52). On the other hand the research added secondary analysis of case-study from around the globe (Bryman, 2006, 297).

For the literature review I have moved from two different points of departure. On the one hand, I followed a systematized criterion by reviewing two leading journals in the field, namely the "International Journal of Sustainability in Higher Education" and the "Journal of Cleaner Production". On the other hand, I followed a second source of information by the reading of a published Ph.D. thesis (Ammenberg, 2003) that deals with environmental, and sustainability management systems.

The two strategies mentioned for the review and a cross-reference analysis helped me to identify a total of 70 publications. To ensure that the review reflects current cutting-edge approaches, the time frame for the review was focused on publications of the last decade. In addition, important references prior to 2002 were also analysed. Furthermore, supported by the idea that "case study research are in a position to generalize by drawing on findings from comparable cases investigated by others" (Bryman, 2006: 57), I highlighted the most relevant case studies among these publications. The criteria used is based on the selection of cornerstone publications (the most referenced and paradigmatic articles and books), and the most recent findings on the field.

The ultimate goal of the literature review was to identify the "diverging strategies and practices undertaken by key players of sustainability initiatives in order to be able to generate initial meaningful insights about organizational institutional areas and issues for exploring how to effectively implement sustainability in university contexts" (Velazquez et. at., 2006: 811). Among the many contributions to the field of sustainability issues in higher education institutions, I have selected a total of 23 case studies from around the globe. The cases, referenced many times among specialists, were selected for being the most paradigmatic ones.

As it was mentioned, the assessment tool proposed for this dissertation was applied to analyse the themes of the thematic content analysis. It was used to analyse the performance of the University of Granada, as well as to evaluate sustainability oriented practices implemented at other case-studies. Therefore, the dissertation is an assessment of the most successful practices and their obstacles along overall activities of the institutions included in the case studies analysed here. In sum, the dissertation is based on a discussion about sustainability oriented practices given at the University of Granada and the other 23 case studies from the literature.

Data generation, documents

After the assessment tool was generated with the literature review, an analysis took place of the public documents released by the University of Granada. There is a consistent corpus of documents of this institution available online, although the oldest documents are from 2005. The corpus is integrated by environmental policies, reports on environmental management works, sustainability reports, environmental declarations, manuals of environmental management, and other relevant documentation (http://vcabd.ugr.es/ accessed October 2011; moved later by its administrator to http://dcab.ugr.es/ accessed March 2012).

The data gathered for the case study, collected through the official web page (www.ugr.es accessed March 2012) constitutes a corpus of 11 documents elaborated by the "Unit of Environmental Quality" of the University of Granada. I have decided to focus on the documents released by this department, because it is the office that leads the implementation of the environmental management system at the university.

Regarding the validity and quality of this corpus of official documents, there are few elements to consider: authenticity, representativeness, and meaning (Bryman, 2006: 516). The authenticity of the documents is granted by its official origin evidencing that they are genuine. The second element to be considered is their representativeness, here it is important to note that reports (such as the documents analysed here) are always associated to a particular state of the art which may be affected by the interest of who elaborates them. However, they are official and represent the institutions (Bryman, 2006: 527). Regarding meaning, the documents are clear and comprehensible for any intellectual audience. In addition, it is important to mention that because I was able to interview some of the authors of such documents, the accuracy of the documents and their authorship was validated by those who have produced them.

Finally, there are some brief considerations to be made. In the arena of qualitative content analysis, documents have a distinctive ontological status that makes them be part of a separate reality that should not be taken as a transparent representation of an underlying social reality (Bryman, 2006: 527). However, the documents analysed here were written with a distinct purpose in mind, they are a constructed image of the institution for which they stand for (Bryman, 2006: 527; Gertz, 1973: 9). Hence, the present dissertation operates at the level of the construction that these corpuses of documents were meant to generate. The analysis of such images was motivated by the research questions highlighted in the previous chapter.

Data generation, interviews

Interviews are a two-way method of information gathering and exchange; this method of data generation can lead to finding important information not contemplated by the initial questionnaire when it is observed under a thematic content analysis (Burnard, 1991: 461; Bryman, 2006: 554). The interviews were planed as semi-structured; however, in practice were not tied to a strict interview guide. They were guided by (but not restricted to) questions created upon information available in the literature review and the document analysis (Bryman, 2006: 442). This approach

was chosen since it allows access to the broad understandings of the interviewees (Bryman, 2006: 437). The interviews were planned to be recorded and transcribed shortly after each interview (Bryman, 2006: 451).

The interviews were also planned to be directed to the staff of the "Unit of Environmental Quality" at the University of Granada to gain an insight into their activities and attitudes towards environmental and sustainability practices. The semi structured plan for the interview focused on two main topics: facts of the organization, and the personal perspective of the respondents (Bryman, 2006: 445). The issues framed for organization were: 1) the composition of the environmental department; 2) the position of the department in the university structure; and 3) the relation of the environmental department with the rest of the Academic Units. The personal perspective of the respondents focused on: 1) the election and implementation of environmental management system; 2) their considerations regarding the elaboration of reports; 3) the selection of objectives; 4) their considerations regarding the identification of new environmental aspects; and 5) their considerations regarding sustainability.

I found that the use of interviews was a successful choice. However, not all the people that I wished to contact were interviewed. Just two out of three key actors were personally contacted, while the third one (due to operative problems at the institution related to schedule handling) was contacted only by email. The interview carried out was conducted in person, this had facilitated better information exchange and enabled the discussion about the authorship and validity of the documents obtained (Bryman, 2006: 516). Hand-written notes were taken to convey the recording, in addition a check list and a summary of what was said was written (Bryman, 2006: 452).

Although a second interview was not possible, I maintained conversations be e-mail with the third actor involved in the "Unit of Environmental Quality" (Bryman, 2006: 642). In such conversations some of the questions planned for the interviews related to the facts of the organization were introduced. The e-mail interview was also included in the thematic content analysis. However, and besides the issue of having only one interview, the limitations of the analysis due to this lack of information its being compensated by the incorporation of more official documents than initially planned. Nevertheless, it is important to mention that the interview achieved is highly relevant and productive since it opened the opportunity to directly interview the author of the documents analysed here.

Language considerations

It is important to note that all the documents of the University of Granada are written in Spanish, while the interviews and other verbal interchanges were carried out in the same language. I found it difficult to get specific translation to technical words and expressions that appeared during the process of information gathering and data analysis. Hence, I took the liberty of translating all the technical Spanish words and expression into English based on my previous knowledge in environmental and sustainability issues. It is more than probable that some words do not correspond to their appropriate technical translation. I would like to advise the reader that some translations presented here answer to an interpretative approach of their Spanish form. In order to orientate the reader I will use inverted commas each time that I present a free translation of such words.

"In the eyes of several stakeholders, the sustainability of colleges and universities appears as a mystery."

Alberto Fonseca and colleagues (2011)

Section IV. Case studies

University of Granada governance structure
University of Granada environmental quality reports
Case studies found in the literature

Section IV. Case studies

University of Granada governance structure

The University of Granada has been chosen for this analysis because of its more than 10 years of experience with environmental management systems. I have decided to focus on the department of the university which lead the implementation of the environmental management system since its origins, namely: 'Unit of Environmental Quality'. Although the University of Granada is mainly working with a framework based on environmental sustainability, information disclosed in the documents and in the interviews show that the institution also deals with and manages broader sustainability frameworks.

The University of Granada is a public organization with headquarters in Granada and campuses in Ceuta and Melilla. It was founded in 1531, and today its 47 locations are dispersed around the old town of Granada. Today, there are more than 60,000 students, 3,500 professors, and 2,000 administrative and technical operators.

The 'Unit of Environmental Quality' is the office that deals with the coordination of the environmental system management at the university. It rests on the 'Environmental Quality and Welfare Delegation', which is one of the four 'Delegations of the Chancellor Department'[1]. Since 1996, the 'Unit of Environmental Quality' is the department that has carried out the implementation of the environmental management system (Figure 2 shows the position of the 'Unit of Environmental Quality'). Currently it acts as coordinator of the environmental system and participates on the 'Environmental Committee'. This committee is on charge to set the environmental objectives and goals for all the centres and institutions of the University of Granada (UG, 2009). It is integrated by the 'Delegation of the Chancellor for Environmental Quality and Welfare', among the 'Deans' and 'Directors of other centres'. The committee has the mandate of holding a minimum of one meeting per year.

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1   There are four Delegations of the 'Chancellor Department', and other four small cabinets. The delegations rest on the 'Chancellor Department'. They include the 'Environmental Quality and Welfare Delegation', the 'Campus of Melilla', 'Technologies of Information and Communication', and 'Transference Innovation and Entrepreneurship'. The small cabinets stand for 'Coordination of Access', 'Coordination of University Residencies', 'International Excellence Campus', and the 'University Ombudsman'.
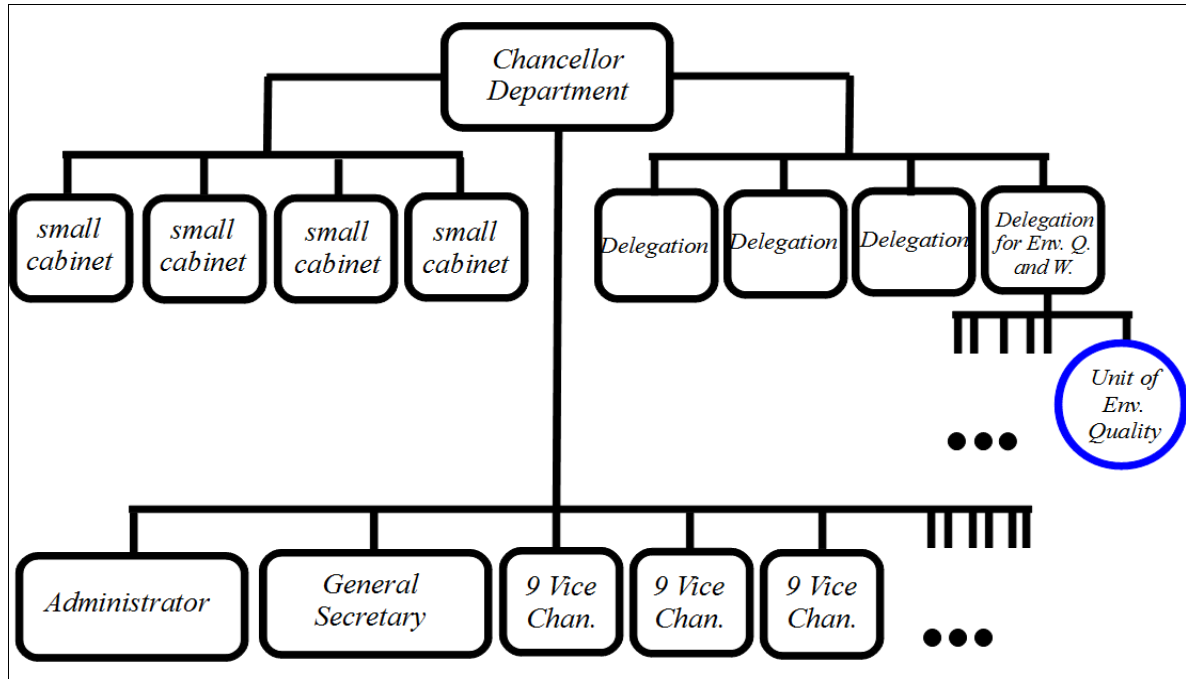
Figure 2. Position of the 'Unit of Environmental Quality' in the University of Granada leadership structure.
Source: "Equipo amplio de Gobierno 2011" (UG, 2010b)

There are also 'collegiate' and 'leadership' departments of governance at the university. Although, they do not deal directly with environmental issues, they complete the complex picture of the structure of governance at the university. Among the 'leadership' structures are the 'Chancellor Department', 'Administration', the 'General Secretary', and nine 'Vice Chancellors'.[2]

Granada University is also governed by 'collegiate' departments such as the 'Cloister' and the 'Government Council'. The 'Cloister' consist of the 'Chancellor', the 'General Secretary', the 'Manager', and three hundred members of the academic community. The 'Government Council' is integrated by the 'Chancellors', the 'General Secretary', the 'Manager', and fifty members of the academic community, twenty selected members of the 'Cloister', six 'Deans' of the main faculties, eleven 'Headmasters', and three member of the 'Social Council' who have no membership in the academic community.

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2   The 'Vice Chancellors' include 'Academic Organization and Faculty', 'University extension and Sports', 'Scientific and Research Policy', 'Students', 'Campus and Infrastructure', 'International Relations and Cooperation for Development', 'Technological Park of Health Sciences', 'Graduate and Post Graduate Teaching', and 'Quality control'.

University of Granada environmental reports

The 'Unit of Environmental Quality' offers a variety of documents online concerning environmental management at the university. For the aims of the study I am focusing the attention on: the 'Environmental Policy'; the 'Annual Environmental Declarations' (three of them of 2008, 2009, and 2010); the 'Environmental Actions 2008-2009'; 'Annual Reports of Performance' (five of them, from 2005 to 2009); and 'Documents of Awareness Campaigns' (seven of them from 2004 to 2009); a 'News Tabloid'; information about 'Waste Managing' at the university; a 'Study of the Ecological Food Print of the University of Granada'; and information regarding 'Other Environmental Aspects' (such as CO_2 emissions, sewage, and energy consumption).

I find that most of the documents mentioned follows the structure of an initial 2005 report elaborated by the department called 'Annual Report of Performance 2005'. The 2005 report is based on the ISO 14001:2004 guidelines, and includes a 'Waste Management Program', the 'Auditing Program', the 'Program of Training and Awareness', and 'Other Programs' such as Control of CO_2 and Noise Emissions, Control of Sewage, Evaluation of Suppliers, and the Implementation of the environmental management system itself.

The 2005 report serves as the structure for all the documents that came before it, namely: the 'Annual Reports' from 2006 to 2009, the 'Environmental Measures 2008-2009', and the 'Environmental Declarations' from 2008 to 2010. However, and besides some textual repetitions in structure and paragraphs of all these documents, the development of the environmental management system of the university can be found in this corpus. It has been reflected there in the form of objectives, targets, projects, and measures taken. Following this documents it is possible to find the tendencies that constitute the historic development of the University of Granada in the field of environmental and sustainability management.

Case studies found in the literature

Among the literature there are many case-study about higher education institutions. As it was stated in the methodological section, the selection of the cases was based on that they are the most paradigmatic ones, being referenced many times among specialists. More than a half of the cases selected correspond to publications of the last two or three years. Hence they comprise a compendium of cutting-edge practices at institutions at the forefront regarding sustainability.

The 23 cases included in the study were analysed under the assessment tool proposed in the

conceptual framework. As a result, such analysis led to the identification of eight articles where a clear understanding of sustainability as a multidimensional concept was displayed.

It is important to note that not all the papers show an explicit definition of sustainability. Some scholars find this phenomena as a common practice among higher education institution researchers (Fonseca et. al., 2011: 35). For these cases where a definition of sustainability was not available, an assumption of the implicit understanding was based on an analysis of the actions towards sustainability described in the papers. The following table of cases reviewed can help the reader to understand the broad picture of the group of cases, their location, and the main related activities focused on the papers.

Case					Area				
Institution	Year of publication	Location	Author	Sustainability main understanding	Overall performance	Curriculum	Operations	Research	Engagement
"UK post 1992 university"	2011	Europe	Djordjevic & Cotton	multidimensional	X				
University of Guelph	2011	North America	Brinkhurst et. al.	multidimensional	X				
California State University, Northridge	2011	North America	Kurland	multidimensional	X				
Portland State University (PSU)	2012	North America	Hamilton & Spaldning	multidimensional		X			
Dalhousie University	2011	North America	Buszard & Kolb	multidimensional	X	X	X		
University of British Columbia	2005	North America	Moore et. al.	multidimensional	X	X			
University of Technology	2011	Australia	Atherton & Giurco	multidimensional		X			
Brock University, St Catharines	2011	North America	Mitchell	multidimensional		X			
Yale University	2011	North America	Thurston & Eckelman,	environmental		X			
TERI University	2010	Asia	Jain & Pant	environmental		X			
University of Michigan	2010	North America	Marans & Edelstein	environmental		X			
Universidad Nacional (UNA)	2009	Central America	Barrientos Llosa et al.	environmental	X	X			
Aalborg University	2009	Europe	Lehmann et. al.	environmental	X		X	X	
University of Gävle	2008	Europe	Sammalisto & Brorson	environmental	X	X	X		
Universidad de Sonora, México	2008	North America	Taddei-Bringas et. al.	environmental	X				
Royal Melbourne Institute of Technology (RMIT) University	2007	Australia	Bekessy et. al.	environmental	X				
University of Glamorgan	2005	Europe	Price	environmental		X			
Lincoln University	2004	Australia	Spellerberg et. al.	environmental		X			
International Pacific College	2003	Australia	Fisher	environmental	X	X			
University of South Carolina	2002	North America	Barnes & Jerman	environmental				X	
Australian National University	2002	Australia	Carpenter	environmental	X	X	X		

Table 2. List of cases reviewed, and their main focus (Djordjevic & Cotton, 2011; Brinkhurst et. al. 2011; Kurland, 2011; Hamilton & Spalding, 2012; Buszard & Kolb, 2011; Moore et. al., 2005; Atherton & Giurco, 2011; Mitchell, 2011; Thurston & Eckelman, 2011; Jain & Pant, 2010; Marans & Edelstein, 2010; Barrientos Llosa et. al., 2009; Lehmann et. al., 2009; Sammalisto & Brorson, 2008; Taddei-Bringas et. al., 2008; Bekessy et. al., 2007; Prince, 2005; Spellberg et al., 2004; Fisher, 2003; Barnes & Jerman, 2002; Carpenter, 2002).

Most of the cases selected include institutions situated in developed regions; this element

corresponds with the global trends discussed above. This selection is based on the topics that were discussed in the original publications, topics that regard the activity areas pointed out in the CORE system. In answering the question *"how are management systems being modified to incorporate sustainability into higher education institution?"*, these cases are a strong element of comparison. They support examples of strategies and practices implemented in the process of incorporating sustainability related concepts in other higher education institutions. Even though some of the cases discussed only strategies or practices given at a specific activity area, measures were taken to address such cases in attendance to the most relevant elements of the assessment tool proposed here

"Sustainability will never be achieved.

It is a process.

There is always something more to do."

Potstra, 2008 (quoted in Mitchell, 2011)

Section V. Results, steps forward.

Assessing sustainability in higher education institutions
      Planing
      Doing
      Checking
      Acting
Implications

Section V. Results, steps forward

Assessing sustainability in higher education institutions

Based on this conceptual framework for assessing sustainability in higher education institutions, a complete assessment should focus on all the management aspects along the whole activity areas of higher education institutions. Namely, planning, doing, checking, and acting, in relation with the CORE system. However, regarding the level of complexity and extension of the present Master's thesis, the focus of the framework for assessing sustainability will be placed on the CORE system as a whole. Therefore, the assessment tool focuses mainly on the overall performance of the University of Granada as an analysis of its development. Nevertheless, in its sections *Planning* and *Doing* this dissertation also points out some relevant features concerning specific activity areas disclosed in the CORE system.

The framework developed for this dissertation is designed to address sustainability from a multidimensional perspective. However the University of Granada has an environmental management system designed to attain environmental sustainability. Measures have been taken to solve this methodological regard, as well as to raise concerns and recommendations regarding how to incorporate sustainability multidimensional values into its institutional practices. Hence, strategies and practices concerning sustainability aspects not included in the environmental approach of the University of Granada are also addressed here. This dissertation makes reference to the case studies selected from the literature to address multidimensional sustainability concerns.

The overall goal of this dissertation is to highlight the most successful practices and their obstacles regarding sustainability in higher education institutions. As it was mentioned at the beginning of this work, to maintain the size of this Master Thesis reasonable the cases discussed here are mainly those identified with a multidimensional understanding of sustainability.

Planning

Overall performance.

Regarding planning the first element to be determined in higher education institutions is their policy. The policy of the University of Granada was signed by its Chancellor in 2008. Although it mentions the contents of "Agenda 21", the main focus is set on the 'protection of the environment' (UG, 2010b: 5). The vision of the University of Granada is noticeable as the 'transference and expansion of scientific and technological knowledge, under the principles of solidarity with all the people of the world and future generations' (UG, 2010b: 5). Their main mission is to extend their environmental ethics along all the activities of the university, and spread it also in collaboration with all other institutions or corporations linked to the institution (UG, 2010b: 5). Some goals are also mentioned in their policy. Among others they refer to the prevention of environmental impacts, fulfilment of legal dispositions, and the constant improvement of methods (UG, 2010b: 5).

Strategy and vision involve the identification of a series of stakeholders involved in education, research, operations, and engagement activities. Hence, to be aligned with sustainability concerns governance and decision-making structure should reflect this identification granting inclusiveness and efficacy (Weber et. al., 2009). However, the environmental policy of the University of Granada has affected in a small degree its governance structure. This modification was based on the aggregation of an 'Environmental Committee' to the main university decision-making system (UG, 2007). The committee is composed of only by institutional representatives from the different centres of the institution, while stakeholders as students or other representatives of the surrounding community are not included. In addition, it can be inferred from the interviews that the efficacy of the committee is also being questioned (interview, 2012). It happens that the committee holds only one meeting a year in order to define objectives and develop policy. The rest of the time, the communication among all the university stakeholders gets centralized by the 'Unit of environmental Quality', a 'small office' with 'small operative power' integrated only by two staff members (interview, 2012).

Indeed, policy is one of the most important elements *building the foundation* for sustainability practices in higher education institutions. Besides the case of the University of Granada, there are other cases in which policy is more successfully aligned towards all dimensions of sustainability. However, even in these contexts similar organizational obstacles arose. Commonly these obstacles are identified as communication problems that hinder the process of relationship building across the

organization. Based on classic models, communication involves at least three elements: the message, the channel, and the sender-receiver (Djordjevic & Cotton, 2011: 391).

In a case based on the UK, Djordjevic & Cotton (2010) show how the institution handles issues related to communication and sustainability. The authors analyse the barriers of communication within a large and complex organization. Among these barriers are: 1) message to complex and not sufficiently contextualised for the recipients, 2) sender and receiver do not share the same understanding about meaning and value of sustainability, 3) lack of authority of the sender with the group of recipients, 4) noise in the channel due to information overload, 4) an overly to-down approach to communication by the institution, and 5) an excessive focus on electronic channels over face-to-face interactions (Djordjevic & Cotton, 2011: 391). These barriers to communicate sustainability in higher education institutions are rooted mainly in three elements, 1) the contested definition of sustainability; 2) an unclear university strategy and mission; and 3) the expectations and resistance to change among stakeholders (Djordjevic & Cotton, 2011: 386).

In sum, given its complexity, without a clear delineation of the content of the sustainability message, a successful interpretation by the receiver is unlikely to be achieved (Djordjevic & Cotton, 2011: 387). Still, the content should be aligned with broader mainstream policies and structures of the institution to avoid 'disjointedness' of the sustainability message (Djordjevic & Cotton, 2011: 388). Djordjevic & Cotton identified that what plays a crucial role in communicating sustainability are the perceptual filters (Djordjevic & Cotton, 2011: 388). Indeed, when sender and receiver place different values on the message, they interpret it in different ways (Djordjevic & Cotton, 2011: 388). Recipients of sustainability communications (university stakeholder) need tailored messages recognising their individual contexts (Djordjevic & Cotton, 2011: 389). To achieve this, communication about sustainability should be a much more two way process (Djordjevic & Cotton, 2011: 390). These observations relate mainly to the message, and to sender-receiver interests and expectations. A discussion regarding problems concerning the channel is addressed in the following sections in relation to the development of networks that aid to *build the foundation* for sustainability across the organization.

Curricula

Regarding curricula, as stated in its policy since 2008 the University of Granada 'have the commitment of incorporating the environmental ethic in all the teaching activities...' (UG, 2010b,

5). The process of incorporating environmental sustainability into curricula is known as a curricula greening, and there are some key competences that a curricula greening involves. Regarding multidimensional sustainability, the key competences that should be included in courses and programs are well highlighted by Brundiers and colleagues (Brundiers et. al., 2010). The authors argue that education in sustainability should include three clusters of capacity-building pathways: 1) a strategic knowledge that include content and methodological knowledge, 2) a practical knowledge that involves competencies to link knowledge and action, and 3) a collaborative cluster involving necessary competencies to work in teams conformed by different knowledge communities (Brundiers et. al., 2010: 310).

Coincidently, one of the objectives for the University of Granada proposed during 2009 was to boost environmental activities by the implementation of the 'Plan of Curricula Greening' (UG, 2009a; UG, 2009b). The plan consisted initially of a 'seminar' and 'research' about the state of 'greening' among several Spanish universities (including Granada). Although both activities were carried out, based on the interviews (interview, 2012) and on web content (UG, accessed May 2012), the results in the curricula greening are not so evident. Obstacles to the development of a curricula greening mentioned by the interviewee were 'the lack of resources', arguing that they were principally 'human' due to the 'lack of people dedicated to it' (interview, 2012). As stated in the University of Granada web page, it offers a total of 75 undergraduate and 184 graduate programmes (UG, accessed 2012). Regarding to the information published by the 'Unit of Environmental Quality', only 30 out of 259 programmes have at least one course related to environmental sustainability (UG, accessed May 2012). Although this information shows a lack of sustainability related courses, as it was highlighted by Palma and colleagues (Palma et. al. 2011), that the identification itself is an excellent departure point to deliberately address the interconnections and obstacles between sustainability and education.

The answers to the obstacles of the incorporation of sustainability into a curricula that the University of Granada and other institutions across the globe may be experiencing, can be found among successful experiences given in institutions at the forefront. The following example may help to visualize some of the obstacles to overcome.

In an assessment based in Canada, Moore and colleagues (2005) identified the many obstacles to move towards a curricula greening. The main ones are: 1) a lack of strategic vision, 2) a lack of institutional commitment, and 3) a diffuse decision-making structure (Moore et. al. 2005: 73).

Beside the fact that it is necessary to "turn principles into projects or programs" (Moore et. al. 2005: 77), these obstacles are rooted in the institutional strategy and governance structure put in place to manage sustainability. To move forward, in addition of signing agreements and policies regarding sustainability, top administrative levels should consider social and environmental factors in all decision making (Moore et. al. 2005: 74). Nevertheless, it is well known that in higher education institutions power is distributed in unusual ways, commonly concentrated in "particular pockets" and sometimes accessible by informal networks (Moore et. al. 2005: 74). Therefore, considering these informal networks, it might be able to move the sustainability agenda of the institution even faster by involving more people (Moore et. al. 2005: 75). As mentioned above, one of the most successful strategies for involving people is identifying and inviting them directly by locating the interest base for sustainability among campus stakeholders (Kurland, 2011; Moore et. al. 2005: 71).

Operations

Regarding operations, the main principles stated in the environmental policy of the University of Granada are 'prevention and reduction of environmental impacts', 'legal fulfilment', and increase awareness about environmental issues (UG, 2010). Indeed, these principles are strictly related with the identification of the environmental aspects for the institution.

The environmental impacts of the University of Granada are disclosed as direct and indirect, and were mainly assessed during 2007-2008 considering each one of the centres of the university (UG, 2008a). Such identification focuses in the considered 'significant' environmental aspects by the "Unit of Environmental Quality". These 'significant environmental aspects' include: 'solid urban waste', 'hazardous waste', 'equipment waste', 'sewage', 'water consumption', 'energy consumption', 'consumption of non-hazardous materials', and 'consumption of hazardous materials' (UG, 2008a).

Coincidently, some of the objectives displayed by the institution in the 2008 declaration focus on the improvement of the management of urban waste, the energy efficiency, the communication system, and the awareness of environmental issues in the processes of decision making at the University of Granada (UG, 2008a). Their reports also inform about the evaluation of suppliers and subcontractors, the identification of emergencies, and the programs of 'Environmental Awareness and Training' (UG, 2008a). The activities listed in the 'Program of Environmental Awareness and Training' were carried out by three institutional services, the 'Office of Energy and Maintenance', the 'Unit of Environmental Quality', and the 'Green Office' (a student's administration held by the

"Unit of Environmental Quality").

Experiences from other universities show similar identifications. However, considering the multidimensional understanding of sustainability, there are some important elements to point out. For instance in a case study based at Brock University, Mitchell (2011) have shown how running an assessment tool related to environmental sustainability and social justice aided to raise concerns about the significant role of the practices relative to each of them (Mitchell, 2011: 8). The author found that besides energy reduction and waste managing practices, there are at least three other main areas that regard operations in higher education institutions: 1) institutionalizing sustainability based on experiences from other campuses, 2) building campus capacity in form of full stakeholder representativeness and strength of the sustainability related committees, 3) increase the collaboration with local and national community-based organizations (Mitchell, 2011: 18). Mitchells recommendations for Brock University are indeed an example of other activities related with operations that regards a multidimensional understanding of sustainability and mainly involves the channels by where it flows.

Coincidently in a case study based in Sydney at the University of Technology, Atherton & Giurco (2011) show the objectives behind sustainability strategies at this institution (Atherton & Giurco, 2011). The main principles pointed out by the authors related to a multidimensional understanding of sustainability are: 1) to minimise social, environmental and economic cost, 2) to ensure equity, 3) to protect and improve human health, well-being and quality life, 4) to contribute to resilience and adaptability of surrounding communities, 5) to embed sustainability in transparent decision making (Atherton & Giurco, 2011: 71). Underlying, when a multidimensional understanding of sustainability is incorporated in operation activities, higher education institutions get pierced by a whole new category of values.

Research

Regarding research, to pursue the principles enlisted in its policy, research at the University of Granada should 'incorporate the environmental ethics' (UG, 2010b: 5). However, contrasting information is available online (UG, accessed May 2012). It is interesting to note that concerning research orientation only 15 out of 116 'Academic departments' have from one to two research groups dealing with environmental sustainability (UG, accessed May 2012). In addition, most of the researches mentioned and published by the "Unit of Environmental Quality" were led by staff of the

unit. Some examples of these researches are the one about the ecological foot print of the University of Granada (Cárdenaz Pais, 2012), and the one about students environmental awareness at one of the campus of the institution (Abderrahman et. at., 2011). These few examples published and mentioned in the reports highlight the lack of jointed efforts between the work done at the "Unit of Environmental Quality" and the work done by other researchers at the institution.

Experiences from other universities show successful practices to align research orientations with sustainability regarding for example societal problem solving, and trans- and interdisciplinary approaches. For instance, in a research of Sammalisto and Brorson (2008) the authors show that in Gävle University a policy criteria was set by which "85% of applications for research funding were assessed for environmental and sustainability aspects." (Sammalisto & Brorson, 2008: 302). In addition in a research based in Dalhousie University, Buszard & Kolb (2011) identified 150 university members already engaged in research related with sustainability issues (Buszard & Kolb, 2011: 83). The authors showed that a deep understanding of the human resources of the university is crucial in recognising the research potential of the institution (Buszard and Kolb, 2011).

Regarding research methodologies and orientations, there are important elements to note from an analysis of worldwide researches on education for sustainable development led by Reunamo and Pipere (2011). In their analysis using quantitative approach in international context, Reunamo and Pipere (2011) were inclined to find the methodological preferences and orientations of academic research on education for sustainable development (Reunamo & Pipere, 2011). As a result of their study, they show that in education for sustainable development researchers have a commitment to progressive social change (Reunamo & Pipere, 2011: 119). In addition, they also showed that "the longer the researcher had studied education for sustainable development, the more important the motives for environmental and societal change were" (Reunamo & Pipere, 2011: 120). The authors also highlighted the importance of the participative aspects of education for sustainable development research showing that research can best serve to sustainability by "giving objective, precise and timely information" (Reunamo & Pipere, 2011: 120).

Engagement

Regarding engagement activities, it is clear that they are concerned by the policy of the University of Granada. It mentions 'the responsibility of carrying out the transference and expansion of scientific and technological knowledge under the principles of solidarity with the people of the

world' (UG, 2010: 5). In addition, it also mentioned that in order to fulfil these requirements 'the collaboration of all the institutions and companies linked to the activities of the university is necessary' (UG, 2010: 5). Most of the engagement activities at the University of Granada are part of their 'Program of Environmental Awareness and Training'. Engaging activities that took place at the University of Granada are for example those carried out with: 1) NGO's like 'Madre Teresa' in activities such as fund-racing and awareness related with environmental sustainability (UG, 2005), 2) the Red Cross in planning manuals of environmental practices (UG, 2009b), 3) engaging with other universities like the 'Programme of Environmental Management of Spanish Universities' of the 'Conferencia de Rectores de Universidades Españolas' (UG, 2006), and 4) engaging with governmental institutions such as the Granada City Council in activities related with energy consumption and waste managing (UG, 2008b). There are many the examples of community engaging and outreach activities carried out by University of Granada in the area of environmental sustainability. Indeed, these activities highlight the efforts of the University of Granada regarding outreach activities. However, almost all of these activities were planned and carried out by the staff of the 'Unit of Environmental Quality', element that highlights the low degree of involvement of stakeholders of other institutional areas.

Nevertheless, there are some other successful experiences from institutions such as the Network of Southern Carolina Universities, or the one mentioned at Aalborg University. These experiences show how higher education institutions successfully engage in education, and corporative networks. For instance, the case of the Network of South Carolina Universities is a very interesting case regarding engagement in education networks. The case was studied by Barnes & Jerman (2002) highlighting that the strategy of the networks was to change the products of the institutions by "working with faculty to expand their teaching and research agendas, and with administrators and operations managers to ensure that the institutions are practising what the faculty are preaching" (Barnes & Jerman, 2002:33). The network included three higher education institutions, and it was planned to eventually reach all higher education institutions in the state of South Carolina (Barnes & Jerman, 2002: 33). Although the network was originally designed to focus on environmental sustainability, the example highlights the importance of collaborative efforts among higher education institutions to include a broader coalition of stakeholders such as external partners.

As it is displayed by Lehmann and colleagues (2009), the experience at Aalborg University shows how the institution has engaged successfully in several corporative networks. The authors pointed

out that the strategy of the institution specifically aimed to "straightforward outreach in the form of contributing in public debates to more complex engagement by taking part in multiple-stakeholder networks and clusters integration training, research and regional development" (Lehmann et. al., 2009: 1069).

Planning, assessment findings

In sum, *planning* strategies as shown by the University of Granada do not mirror completely the whole combination of characteristics that an institution incorporating sustainability should have. For instance, the analysis of the policy of the University of Granada shows that education and research objectives are oriented towards environmental sustainability. There is a lack of elements to interpret that they are oriented to address complex sustainability challenges associated with social and economic fields. However, since education and research already are concerned about their policy, the orientation of these areas to include societal problems in solving the social and economic fields is advisable and achievable. As it was shown with examples from other institutions, there are many strategies available to reflect and incorporate these values into policy and planning. There is still a chance for the University of Granada to incorporate these values clearly in policy development.

Finally*, planning* in the University of Granada only mirrors some of the sustainability values that are related to operation and engaging areas. Indeed, environmental sustainability concerns are raised at the institution. However, their relation with societal and economic areas is not distinctly draw by their policy. As it was showed with the examples, there are strategies to incorporate societal and economical concerns into planning activities. For instance, promoting networks of resource sharing along and beyond campus, or committing a policy to a long term process of institutional change based on multidimensional sustainability values. Briefly, this section shows one of the elements to be analysed later in this dissertation, namely the lack of empirical linkages between policy and practice.

Doing

Overall performance.

Besides policy, the reports of the University of Granada also concern other activities, and measures taken. As it was pointed out above, from an overall perspective the institution is focusing on environmental sustainability issues. However, based on an analysis of some of the practices put in place at the institution there are elements that concern other dimensions of sustainability. For example: 1) the creation of the 'Green Office', a student driven department (UG, 2007), initiative that promotes inclusiveness; 2) participation in the 'Spanish network of Sustainable Labs' in order to boost well-being and comfort of Lab staff (UG, accessed 2012), initiative that promotes social sustainability; 3) the installation of an office by the operations area of educational gadgets of energy efficiency (UG, 2008a), initiative that promotes interconnection of university activities; 4) a research led by the 'Unit of environmental Quality' to assess the institutions' ecological foot print (Cárdenaz Pais et. al., 2010), initiative that promotes an orientation towards societal problem solving; and 5) engage activities such as those that link the institution with governmental and non-governmental organizations mentioned above (UG, 2009b; UG, 2005), initiative that promotes networks of resource sharing.

Successful strategies as the ones mentioned above are also being practised in other institutions. However, institutions with a similar development process as the one of the University of Granada have moved forward *strengthening* the work done in these areas. As it was mentioned, *strengthening* leads to the institutionalization of the progress achieved. For instance, one common strategy to institutionalize such efforts is the work regarding institutional communication. The case studied by Brinkhurst and colleagues (2011), or the one analysed by Kurland (2011) are examples of these kind of experiences.

The first case mentioned, refers to the University of Guelph (Brinkhurst et. al. 2011). The authors pointed out that faculty and staff members also should be identified as "the" key stakeholders due to their potential "as the makers of lasting change" (Brinkhurst et. al., 2011: 344). Faculty and staff members are found to be critical leaders in efforts to achieve progress towards sustainability practices in higher education institutions (Brinkhurst et. al., 2011: 338). Brinkhurst and colleges have argued that discussions around top-down and bottom-up approaches related to institutional change and management structures in higher education institutions should incorporate a broader identification of stakeholders (Brinkhurst et. al., 2011). In sum a variety of stakeholders such as this

middle faculty members should be incorporated to communication networks, in order to include them as key interpreters of sustainability messages.

In the case of California State University, Kurland (2011) analyses the evolution of a campus sustainability network. A network that grew up from decades of achieving environmental sustainability on campus to become a sustainability network that reaches beyond campus borders (Kurland, 2011: 422). Displaying a similar development as the one of the University of Granada, California State University went across an initial phase related to its physical plant, energy conservation, and waste reduction. This initial network was later broadened to include the area of Academic Affairs creating a committee involving multiple stakeholders across the campus. Finally, the network was consummated, or strengthened, by the creation of an Institute for Sustainability (Kurland, 2011: 244). The qualitative big steps in this evolution were: 1) the cultivation of open collaboration focusing on long-term systemic thinking among the upper administration; 2) the ability to link research to practice which involves collective work in the form of collaboration with faculty and students; and, 3) an assessment locating the interest base for sustainability among campus stakeholders, as a multi-nodal approach which involves identifying and contacting people directly (Kurland, 2011).

Curricula, operation, research, and engagement

Doing encompasses day-to-day activities, and principally the ways in which they influence each other. Higher education institutions sustainability oriented activities are many times longitudinal practices that cut across the many activity areas of the institution. Therefore, the present section discusses the ways in which curricula, operation, research, and engagement activities get overlapped.

Regarding curricula, it was mentioned that curricula greening activities were set on 'stand by' at the University of Granada (interview, 2012). Fortunately, successful experiences from around the world are accessible in the literature. For instance, based on a case study from Portland State University Hamilton and Spalding (2012) argue that to assess performance regarding sustainability literacy an approach even broader than formal curricula is necessary. The authors argue that what is needed is "an interconnected web approach across formal curricula, co-curricular programs, and extracurricular activities" (Hamilton & Spalding, 2012: 23). Factors contributing to the success of such and interconnected web are: 1) a strong emphasis in networking where initiatives are not

confined to a department or program of study of their own, 2) collaborative partnership with students supported by a reframed credit system, and 3) intergenerational learning by seeking to connect more students with people making decisions (Hamilton & Spalding, 2012: 27).

Another successful experience is the one of Dalhousie University (Buszard & Kolb, 2011). The authors describe the possess of creating the College of Sustainability showing that among the main elements considered were also present 1) a mixed top-down and bottom-up approach, 2) open campus-wide consultative processes, 3) regular communication with all the stakeholders, and 4) a detailed background research about the institutions own human resources in the area of sustainability (Buszard & Kolb, 2011: 83).

There are also successful cases that link curricula and outreach activities, as the one at Aalborg University where "students (…) were to a larger and larger degree collaborating with the network during their studies and/or learning about it through classroom-based lectures. Some write their projects (or master theses) using the network (and its activities) as a case-study. Others focus on possibilities for transferring the partnership model to the Baltic states or to developing countries in Africa and Asia." (Lehman et. al., 2009: 1071)

Regarding operations, research, and engagement. There are just a few examples of linkages of these activity areas at the University of Granada. For instance, actions that link operations and research as the one mentioned of the assessment of the institutions ecological food-print carried out by the 'Unit of Environmental Quality' (Cárdenaz Pais, 2012), or the one published online about students environmental awareness at one of the campuses of the university (UG, 2012). Linkages like these are common among the literature, they are generally related with operations, research and outreach as in the case of Aalborg University (Lehman et. al., 2009).

In the case of Aalborg University this relation between the three activity areas is very clear. Lehmann and colleagues (2009) pointed out that in this case "research projects, e.g. in the form of PhD research, have come about as well, and the collaboration between the network and the university has gone from a selected few people to several research groups, and from one-way outreach (consultancy; university-to-network) to two-way learning and development." (Lehman et. al., 2009: 1071).

As it was mentioned, the University of Granada has being practising different outreach activities such as those related with governmental and non-governmental organizations (UG, 2009b; UG, 2005). It was seen in the section related with planning, that there are many examples of these

different kinds of engaging activities also available in the literature. As Lehmann and colleagues (2009) summarized it "university's engagement in regional sustainability initiatives (...) comes with a plethora of opportunities and the outcomes depend on wishes, needs and demands from other stakeholders. The role of the university is thus highly dependent on the context." (Lehman et. al., 2009: 1071). However, "there are undoubtedly learning opportunities in participating in networks with (...) pro-active organisations that have successfully implemented management structures to better cope with their environmental (and other) impacts and who continually manage to improve these." (Lehman et. al., 2009: 1072)

There is also empirical evidence of operation activities inferred from interviews and observations, namely, the lack of leadership commitment neglecting social sustainability and openness regarding knowledge sharing. The lack of leadership commitment is evidenced by: a) problems handling schedule by the chief of coordination of sustainability efforts (interview, 2012), and b) the existence of a sustainability section on institutions web page that is 'under construction' at least since the beginning of this research (October 2011) (http://dcab.ugr.es/pages/sostenibilidad-2011/sostenibilidad-2011).

Doing, assessment findings

In sum, *doing* in the University of Granada has incorporated some sustainability practices, but is still a long way from being fully strengthened and finally institutionalised. There are still a few elements that may be improved. For instance, just to mention some of them: 1) inclusiveness of a variety of stakeholders, 2) strengthening networks of resource sharing by active participation and the incorporation of more organizations, 3) a stronger interconnection among the different activity areas of the institution, and 4) a stronger leadership commitment evidenced by the commitment to achieve transformation of institutional structures, and to consider diverse stakeholders attitudes. Indeed such transformations are not easy to achieve in the short term. A discussion regarding this issue is addressed in the following sections. In synthesis, this section points out the second element stressed in the final section, namely the lack of leadership commitment.

Checking

Overall performance

The reports of the University of Granada reflect the interest of the institution for assessing their performance. This corpus of documents constitutes the institutions tool to measure progress. Regarding environmental management, the oldest document provided by the University of Granada is the 'Annual Report 2005' (UG, 2005). The document is structured in five sections each of them providing information about the different Management Programs of the university. The repeated mention of the 'current legislation' conveyed with the call of the 'legal limits' remarked by 'laws, decrees and ordinances', is an indicator of the strong emphasis set by the ISO 14000 norms. Although, they follow the same structure of the 2005 document, the 2006, 2007, 2008 and 2009 'Annual Reports' show a much more summarized content. Besides the 'Reports', the University of Granada has released a series of documents called 'Environmental Declarations' and 'Environmental Actions'. 'Environmental Actions 2008 – 2009' follow the same structure and list the same information released in the reports. The 'Environmental Declarations' and 'Actions' also repeats most of their structure and content.

In sum, the evolution of reporting in the University of Granada shows a clear tendency towards simplification with a strong emphasis on objective settings promoted by the ISO guidelines. Among continuities and discontinuities the most evident are the uninterrupted reference to the system of waste managing, and the presence of some interrupted plans such as the one about 'adaptation of curricula sustainability' or curricula greening. The documents provided by University of Granada assess exclusively environmental sustainability; therefore it is possible to measure at least the environmental progress of the institution. Based on the interviews (interview, 2012) and on the reports (UG, 2005; UG, 2006; UG, 2007; UG 2008a; UG, 2008b; UG, 2009a; UG, 2009b; UG 2010a; UG, 2010b), although the achievement of small goals (such as those related with waste managing, and energy consumption), it is possible to infer that there is a lack of a sense of institutionalization regarding progress in the development of the structures of management. The repetitive reference to a crystallized management structure, plus the discontinuation of key activities (such as curricula greening or research boosting) are evidence of the lack of strategies to overcome barriers to institutional change. However this is a discussion that regards the next section.

Among the case studies there is evidence of many ways of measuring progress. Most of them, as the case of the University of Granada, are based in reporting guidelines such as ISO 14000 series,

Social Accountability 8000 Standard, and the Global Report International (Lozano, 2011: 68). Reports give a picture of the overall institutional performance.

Nowadays, assessment attends to cover all the activity areas of the institution. Hence, this section discusses checking activities along curricula, operation, research, and engagement as a whole. Table III provides the reader with an idea of a brief reporting guideline supported by UK researcher Lozano (2011). Lozano's original research included 126 economic, environmental, social, and educational indicators of sustainability in higher education institutions (Lozano, 2011), Table III is just a brief summary of the most relevant ones.

Category	Aspect
Economic	
Direct economic impacts	Customers
	Suppliers
	Employees
	Providers of capital
	Public sector
Environmental	
Environmental	Materials
	Energy
	Water
	Biodiversity
	Emissions, effluents, and waste
	Suppliers
	Products and services
	Compliance
	Transport
	Overall
Social	
Labour practices and decent work	Employment
	Labour/management relations
	Health and safety
	Training and education
	Diversity and opportunity
Human rights	Strategy and management
	Non-discrimination
	Freedom of association and collective bargaining
	Child labour
	Forced and compulsory labour
	Disciplinary practices
	Security practices
	Indigenous rights
Society	Community
	Bribery and corruption
	Political contributions
	Competition and pricing
Product responsibility	Customer health and safety
	Products and services
	Advertising
	Respect for privacy
Educational	
Curriculum	SD incorporation in the curricula
	SD capacity building
	SD monitoring in curricula
	Administrative support
Research	Research in general
	Grants
	Publications and products
	Programs and centres
Service	Community activity and service
	Service learning

Table III. Source: Lozano (2011)

Lozano's (2011) identification of sustainability indicators is a plain example of the many possible

aspects to be reported. If the University of Granada is considering taking informed decision based on its reports, it is clear that the institution can improve its report system based on up-to-date guidelines. In addition, including other multidimensional aspects of sustainability is indeed a successful action to enrich their own knowledge of its institutional performance. There are also other techniques available to measure institutional progress. For instance, from the literature about sustainability in higher education institutions there is evidence of techniques of awareness measurement (Emanuel & Adams, 2011), or for example different sustainability assessment tools (Waheed et. al., 2011).

Regarding techniques of awareness measurement, it is interesting to note that this kind of practice was carried out in some of the campus of the University of Granada. For example, there is a study on awareness measurement at Melilla Campus of the University of Granada (Abderrahman et. al., 2011). In such analysis, Abderrahman and colleagues concluded that among staff and students there is a 'reductionist understanding of environmental sustainability' that do not include the human factor (Abderrahman et. al., 2011: 45). The authors also pointed out that even though the presence of a 'reductionist' understanding of environmental sustainability, there is a significant number of actors with a pro-active attitude towards environmental sustainability (Abderrahman et. al., 2011: 46). Coincidently, in a comparative study of sustainability awareness led by Emanuel & Adams (2011), the authors found that commitment towards sustainability can be considered as a meaningful factor assessing awareness (Emanuel & Adams, 2011: 89). The authors show that between two different institutions, even if sustainability knowledge was similar among student, there was a considerable commitment gap (Emanuel & Adams, 2011: 89). Emanuel & Adams (2011) concluded that students' commitment towards sustainability may be influenced by institutional leadership, showing that "students may be waiting and watching to see a demonstrable commitment to sustainable development practices from their university administrators" (Emanuel & Adams, 2011: 89). I believe that these techniques have potential at the University of Granada to assess awareness among stakeholder in order to indirectly measure leadership commitment.

Variants to the sustainability assessment tool presented in this dissertation are also an alternative to be considered. As it was mentioned before, Waheed and colleagues (2011) have developed a quantitative causality assessment tool to aid higher education institutions to take informed decisions (Waheed et. al., 2011).

Checking assessment findings

The University of Granada has much to win from applying a broad set of available techniques to measure progress towards sustainability. Well formulated and constantly improved reports are a cornerstone in developing a tool to inform sustainability-oriented decisions (Fonseca et. al., 2011). In addition, as Brinkhurst and colleagues (2011) summarize, "consistent, comprehensive assessment of campus sustainability initiatives and progress towards stated goals is a way to connect people working towards common goals and to gain a sense of direction. Clear communication of assessments can build momentum and strengthen motivation for campus-wide change. Such cohesion and sense of being part of a greater change is essential for initiatives that build into a self-sustaining movement" (Brinkhurst et. al., 2011: 350). In synthesis, this section shows the lack of criteria to issue environmental sustainability reports in the University of Granada. Such affirmation is based on the repetitiveness and chronological disorder that the reports show.

Acting - *What are the solutions presented along the CORE to foster innovation and development? How can these solutions be best institutionalised?*

This section deals with the issue of institutional change. Institutional change in higher education institutions cut across all the activities pointed out in the CORE system. In addition, there are many dimensions of change to be addressed. The already mentioned analysis by Ferrer -Balas and colleagues (2008) can bring some light to clarify these dimensions. Ferrer-Balas and colleagues (2008) have disclosed the process of institutions change in higher education institutions over three dimensions or axis: framework; level; and actors (Ferrer -Balas et. al., 2008). In this model, the three dimensions are constituted by multiple levels where: the framework regards the mechanisms of organization change in which a logical progression should be cultural change (legitimacy), structure change (decision-making and governance), and finally a technology change (new order of activities). Level regards to the degree in which the system is affected as a whole, its progression should be optimization (affecting operations), improvement (entailing step-function changes affecting structure), and renewal (affecting mainly culture and technology). Finally, actors' regards to the quantity and variety of stakeholder involved (Ferrer-Balas et. al., 2008: 300).

As it was mentioned, the diachronic analysis of the documents of the University of Granada shows the institutions' development in the field of environmental sustainability. Under the light of the external experiences, the progress achieved by the University of Granada as it is shown in the reports is an indication of a lack of strategies to overcome barriers of institutional change. Based on the dimensions of institutional change mentioned above, there are some important observations from the case study that evidence the lack of strategies, these are: 1) the lack of leadership commitment (framework) questioned by both, the unchanged decision-making process, and the absence of broad support to campus networks of knowledge exchange; 2) the lack of empirical linkages between policy and practice (level), regarding mainly education and research activity areas; 3) the lack of a clear and up to date criteria to issue environmental sustainability reports (level); and, 4) the lack of quantity and variety of stakeholders involved (actors).

There are many examples in the literature about strategies to overcome these and other problems. For instance, back in 2006 Lozano (2006) argued that the process of incorporating sustainability in higher education institutions was bound to face resistance from inside and outside stakeholders (Lozano, 2006). Lozano highlighted that it is important for the leaders "to be aware and to understand the barriers to change and conflicts that could arise in order to take the necessary steps

to prevent or to solve them." (Lozano, 2006: 795). Among his recommendations, the author pointed out that it is necessary to: 1) make sustainability explicit and clear in the universities' academic policies, strategy, and planning; 2) involve stakeholders in all the phases of the process; 3) communicate regularly, reducing the fear to change, by providing key and personalized information to all the stakeholders; 4) achieve a multiplier effect by identifying the individual already engaged in projects to share their experiences and knowledge; and 5) understand and meet individual needs (Lozano, 2006: 795). In sum, Lozano concluded that institutionalization of sustainability in higher education institutions "should be done incrementally and with the participation and empowerment of all the stakeholders to reduce the resistance to change and the appearance of unnecessary conflicts." (Lozano, 2006: 796).

There are also other scholars who have addressed these problems from the perspective of institutional change. For example Hitchcock & Willard (2011) wrote an interesting analysis of what social sustainability means for organizations in developed countries. Even though their article does not focus on higher education institutions, it highlights the important elements to which organization leaders should attend in order to assess successful sustainability institutional change. In this regard, Hitchcock & Willard show that for an organization to achieve sustainability, it involves challenging the current institutional models to take responsibility for a serious world problem (local or global) that the institution is well positioned to help solve (Hitchcock & Willard, 2011: 5). In other words, it means that it is necessary to break down with the existing management models and traditional ways of doing things.

Coincidently, Bekessy and colleagues (2007) evaluating lack of progress towards sustainability in higher education institutions have reached similar conclusions. The authors have analysed the reasons of the lack of progress towards sustainability in a case study based on the Royal Melbourne Institute of Technology University. Bekessy and colleagues argue that relying on small-scale activities oriented to raise awareness is unlikely to lead to permanent institutional change; they conclude that these kind of activities do little to affect the mainstream practices of a university (Bekessy et. al., 2007: 301). The analysis of Bekessy and colleagues (2007) demonstrates that "unless university leaders meet their most basic commitments, even the efforts of the most dedicated individuals are futile." (Bekessy et. al., 2007: 302). In addition, the authors identified five main barrier of change that prompted out from the case: 1) the autonomous nature of the academic and institutional structure that hinders multidisciplinary research and education; 2) financial and

budgetary constraints to support sustainability activities; 3) lack of leaderships accountability for the implementation of sustainability initiatives, highlighting that it is not shown as a serious priority for the institution; 4) the ambiguous definition of sustainability at the institutions; and, 5) limitations caused by the institutions' physical design hindering the incorporation of sustainable building design and infrastructure (Bekessy et. al., 2007: 312). In sum, as it was also mentioned by Lozano (2006), Bekessy and colleagues (2007) conclusions lead to focus on the importance of inclusiveness and leadership commitment and accountability in a genuine process of institutional change.

There is also one more remarkable study seeking successful strategies to overcome barriers of institutional change. To assess some of these barriers, Brinkhurst and colleagues (2011) have focused on the issue of staff participation. Analysing the dynamics of organization change in higher education institutions, the authors have identified interesting strategies for addressing challenges facing "middle-out" faculty and staff intrapreneurs (Brinkhurst et. al., 2011). Among the strategies highlighted by Brinkhurst and colleagues, the most relevant are: 1) official permission and encouragement, providing support for innovative problem solving; 2) empowerment through participatory decision making in partnership with faculty and students, promoting and including middle staff on decision-making bodies; 3) interdisciplinary community building, encouraging cross-disciplinary exchange; 4) curriculum change coordination and flexibility by promoting campus as research laboratory; 5) financial support and incentives by paying bonus and awards for successful initiatives; 6) recognition and celebration of effort supportive university leadership, encouraging institutional cohesion, networking, and loyalty; and, 7) creation of a supportive space for creative problem solving, and campus assessment and review by creating safe discussion space of a consistent and comprehensive assessment of progress. (Brinkhurst et. al., 2011: 349)

Acting, assessment findings

In sum, putting into contrast among the many experiences from around the world, the analysis of the University of Granada shows that *reassessment* to solidify progress is not being successfully addressed at the institution. The system put in place at the University of Granada is not answering to lasting institutional change. Although a management system regarding environmental sustainability had been set, after more than ten years of development, it is not leading towards significant improvements. The analysis presented here shows that most of the environmental activities at the

institution took place in a "club" small-scale fashion lead by the "Unit of environmental Quality".

In addition, based on their official reports, environmental practices at the university displayed two relevant conclusion: 1) they are not leading to cultural change among institutions stakeholders, as it is shown by the lack of participation of faculty, staff, and students; and, 2) there is a lack of strategies to solve problems, such as those related with sustainable environmental concerns not being institutionalized to achieve significant environmental goals related with education and research. The findings of this study also begs the question of why an environmental sustainability management system designed more than a decade ago has not had a constructive role in advising today's multidimensional sustainability agenda.

Based on this analysis I believe that there are a few critical steps to follow in order to achieve significant environmental measures that, in addition, may lead towards multidimensional sustainability practices at the institution. Firstly, an appropriate long-term budget should be assigned to encourage operations improvements, and faculty participation regarding sustainability oriented research and education. Secondly, networks of resource sharing among a broad coalition of stakeholders should also be encouraged and supported to provide inclusiveness and participation. In addition, support to these networks and the work done by its participants should be achieved by institutional recognition in the form of prizes, credits, and developing new institutional ways of acknowledgement. Thirdly, an extensive and well organised system of reporting should be put in to place to grant a sense of institutional achievement, and to be able of getting enriched with the scrutiny of the international public.

Implications

This dissertation deals with two complex issues. On the one hand the huge universe of sustainability or sustainable development, on the other hand the universe of organization learning and institutional change. In this exploratory journey, addressing complexity was a task that led to the identification of innumerable elements that constitute each universe. Nevertheless, here I have identified the most significant components of each universe. Their linkages were also assessed with the aim of analysing how they interact in practice. Therefore, the results of this dissertation are just a selective sample of ways in which these two universes relate with higher education institutions.

Along the dissertation, concerns have been raised about the role of higher education institutions in the global arena. In addition, the presentation includes a conceptual framework suitable to assess sustainability in higher education institutions. The application of such an assessment tool has led to the identification of many practices and strategies that can be considered by any higher education institution.

Answering the research question, this discussion shows successful strategies and practices about ways in which *management systems are being modified to incorporate sustainability into higher education institution*. The most relevant aspects of this transformation are best identified following the reflexive approach incorporated in the assessment tool. For instance, *building a foundation* higher education institutions are: 1) defining sustainability as a multidimensional concept; 2) incorporating this sustainability definition in their policy, setting clear and distinctive objectives for each one of the activity areas of the institution paying particular attention to education and research: and, 3) assessing institutional communication attending to the complexity of the sustainability message. S*trengthening* this transformative process, higher education institutions are working in developing networks of resource sharing based on inclusiveness and participation of the variety of stakeholder related to the institution. For example, higher education institutions are supporting these networks with institutional recognition of the work done by its participants. Finally, for *reassessment of planning*, higher education institutions are working mainly in solving the problems and obstacles of institutional change. Assessing institutional change as a complex issue, higher education institutions are developing consistent systems of reporting that allow them to take informed decisions. In addition, attention is also directed to the commitment of the institutions' leadership in achieving sustainability.

The implications of the present dissertation are plain for the University of Granada. Indeed, this

work has a special concern to the main institution under study. The results of this research have shown that besides the barriers of institutional change, there are still new objectives to be set, and additional goals to be achieved regarding multidimensional sustainability. As it was mentioned before, there are a few critical steps to follow. For instance: 1) setting an appropriate long-term budget to encourage both, operations improvements, and sustainability oriented research and education; 2) networks of resource sharing should be encouraged to provide inclusiveness and participation, support to these networks and the work done by its participants should be achieved by institutional recognition in the form of prizes, credits, and developing new institutional ways of acknowledgement.; and, 3) an extensive and well organised system of reporting should be put in place to grant a sense of institutional achievement, and to be able to get enriched with the scrutiny of the international public. Finally, by looking at the experiences from other institutions the University of Granada can better recognise that these changes are possible and highly advisable.

In general terms the results of this research show that sustainability in higher education institutions is a growing field developing in complex ways due to its variety of contexts of application. This research provides an up to date art of the question regarding successful sustainability strategies and practices in higher education institutions. As it was mentioned, a sustainability assessment tool when applied to a case study such as the one on the University of Granada, shows the potential of such instruments to aid institutions to improve their practices and performance. The strategies and practices pointed out in this dissertation have the potential to aid higher education institutions to better reflect, incorporate and institutionalise multidimensional sustainability related concepts.

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