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Review

Sustainability in higher education: a systematic review with focus on management education

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ABSTRACT

Sustainability has received increasing attention in management education over the past ten years. This article reviews a decade's worth of research in a systematic analysis of 63 articles published in international higher education and management education journals between 2003 and 2013. The purpose of this article is to map and review the publications based on the analysis according to the following four categories: (1) Types of papers, (2) Challenges, (3) Teaching techniques, and (4) Curriculum orientation. The scientific value of this article focuses on three main contributions to management education. First, while most articles are descriptive, focusing on specific, unique experiences in a given institution or with a particular teaching method or tool, few situate themselves within the broader philosophy and design of management education. The second contribution is an evaluation of the status of sustainability in management education as a field of study. This systematic review highlights the lack of consistency in the concepts used: no stable categories emerge from these articles and very few studies integrate the three levels of educational philosophy – teaching, program design, and learning. Third, this review highlights future directions for sustainability in management education institution-wide. While all articles highlight the need for curriculum change, very few specify how this change could and would be achieved by course design or explicit educational paradigms.

1. Introduction

Sustainability[2] has attracted increasing attention in higher education over the last two decades due to several factors. The Brundtland report (1987) and the presentations of the Rio-1992 Conference criticized the existing educational systems on how sustainability issues are taught, and put forth the idea that programs should incorporate education that would contribute to a sustainable society. Since then, the terms "education for sustainability" and "education for sustainable development" have gained international usage (Shrivastava, 2010). It is in this context that new educational programs, research institutions and scientific publications, all with an emphasis on sustainability in higher education, have emerged (Wang et al., 2013; Scott, 2012; Sterling and Scott, 2008).

The Talloires Declaration (1990) was the first official statement by university administrators that reflected a commitment to teaching and research in sustainability in their institutions. To encourage compliance and advance the initiative, the Association of University Leaders for a Sustainable Future (ULSF, 1990) was created. Since 1990, over 20 international binding agreements and declarations of higher education institutions to introduce sustainability in their research and teaching agenda have followed (Grindsted and Holm, 2012). In the US specifically, the Association for the Advancement of Sustainability in Higher Education (AASHE) was established in the early 2000s with the mission of empowering higher education to lead the sustainability transformation. AASHE

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[2] Note: Various definitions of sustainability and sustainable development can be found in the literature. These two terms are open to a variety of interpretations and also subject to internal contradictions, and they are frequently interchangeable in the literature. For instance, according to Carley and Christie (2000), embarking on a sustainable development path is considered to be a political, not just a technical, process, and it can be seen as a continuing process of mediation and trade-offs between different goals and aspirations. In this perspective, sustainability is a "destination that we aspire to reach with the selection of the sustainable pathways that we choose as we proceed along the journey" (Curran, 2009, p. 6). Thus the authors of this paper view sustainability as a result of sustainable development. For this reason, the term "sustainability" has been selected in this article.

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seeks to achieve this by providing resources, professional development, and a network of support to enable institutions of higher education to model and advance sustainability in everything they do, from governance and operations to education and research. On the international level, UNESCO initiated the UN Decade of Education for Sustainable Development (2005–2014), with the aim of promoting and integrating the values of sustainable development into all aspects of learning in order to encourage behavioral change (UNESCO, 2005).

More specifically in management academia, the Organizations and the Natural Environment (ONE) division of the Academy of Management (AOM) was created in 1991 with the following mission: "ONE is dedicated to the advancement of research, teaching, and service in the area of relationships between organizations and the natural environment" (ONE, 2014). The theme of the 2009 Annual Meeting of the Academy of Management, for example, was the greening of management. Illustrative of the increasing number of initiatives are the 'Principles for Responsible Management Education' (PRME), a global initiative that seeks to establish a process of continuous improvement among management education institutions in order to develop a new generation of business leaders capable of managing the complex challenges faced by business and society in the 21st century. Another relevant initiative is the Beyond Grey Pinstripes. Since 1998, it is a "research survey and alternative ranking of business schools that spotlights innovative full-time MBA programs leading the way in the integration of issues concerning social and environmental stewardship into the curriculum" (Beyond Grey Pinstripes, 2014).

These initiatives illustrate the movement towards sustainability in management education (see Lozano et al. (2013) for an analysis of declarations, chapters, and partnerships developed for institutions of higher education; see Disterheft et al. (2013) for a critical reflection about sustainability science and sustainable development education in universities).

As for management education institutions, over the last decade, educators in post-secondary institutions have launched numerous courses, programs and initiatives in sustainability in management (for a review of these, see Caeiro et al., 2013; for a historical perspective in US management education institutions, see Rands and Starik, 2009). Thus, an increasing number of management educators have contributed to transforming the method of training future business leaders and managers, based on the assumption that companies need to recognize their pivotal roles and responsibilities in achieving sustainable societies. Waddock (2007) points out that this shift towards sustainability challenges educators in existing firm- or organization-centered management programs to take both the environment and society into account in their teaching.

Academic research on sustainability in management education has co-evolved alongside the increasing presence of sustainability in management studies curricula (Stead and Stead, 2010). Issues related to the insertion and integration of sustainability into management education are therefore gaining importance (Audebrand, 2010). This importance has translated into increased academic interest and a multiplication of publications (Stephens and Graham, 2010). For example, a search in the EBSCO academic database (2003–2013) using keywords "sustainability" and "higher education" resulted in 265 papers, while the combination of "sustainable development" with "higher education" resulted in 143 papers.

This paper focuses its attention in management education, including undergraduate, graduate programs, and executive education. A distinction is proposed between two forms of introducing sustainability into management education. While 'integration' refers to the full adoption of sustainability into management curricula, implemented in programs in a holistic way, 'insertion' will be used to distinguish a more superficial or tacked-on approach from a holistic integration of sustainability into management curricula.

In this context, sustainability in higher education has emerged as a research field, and within this field increasing interest is shown in management education, in particular in combination with concerns about leadership for a sustainable future. Several issues of journals (Adomßent et al., 2014; Starik et al., 2010; Springett and Kearins, 2005) and volumes (Muff et al., 2013; Caeiro et al., 2013; Wankel and Stoner, 2009) have been published. However, this area has not yet been reviewed in a systematic way. Given the increasing interest and the large body of academic literature on the subject, there is a clear need for a systematic review of the literature, which is the aim of this paper. It is accomplished here through the systematic analysis of a decade's worth of published articles pertaining to sustainability in management education. Thereby, the purpose of this paper is to characterize the publications based on the analysis according to the following four categories: (1) Types of papers, (2) Challenges, (3) Teaching techniques, and (4) Curriculum orientation.

Taking into account that the focus of this paper is how sustainability is being introduced into management curricula instead of why it is happening, the review of curricula and teaching techniques presented here was structured around two guiding questions: (1) How are higher management education institutions guiding the introduction of sustainability into their curricula? (2) What pedagogical techniques are being applied? In so doing, this article complements Karatzoglou's (2013) literature review of the relevant academic papers on universities' roles in and contributions to regional sustainability initiatives.

The remainder of this article is organized into three sections. The second section explains the research methods of this literature review, including the systematic process conducted in this analysis. The third section reveals our findings and maps the status of sustainability in higher management education. The fourth section presents the discussions. Finally, the last section brings the conclusions, including the limitations of the field and suggests avenues for future research.

2. Research method

This paper is based on a systematic review utilizing a structured approach to reviewing published academic research. Organized and replicable methods were employed to identify, select, and critically analyze the literature. It includes both a quantitative, bibliographical, and a more qualitative thematic analysis (Tranfield et al., 2003). This systematic review was conducted in three steps, namely, (1) journal identification, (2) keyword identification and search, and (3) article content analysis. Each step is described in further detail below.

2.1. Paper selection and delimitation

First, the journals to be included in the sample were identified. Journals recognized by Management Education and Development (MED), the division of the Academy of Management dedicated to research and practice in management education, were selected. These journals are the Journal of Management Education, Management Learning, International Journal of Management Education, Journal of Education for Business, Journal of Executive Education, *Journal of Leadership Education, Organization Management Journal*, and *Journal of Management Development*. The journal *Academy of Management Learning Education* was also included, as it is ranked

among the top five most influential and frequently cited management and education research journals.

Six journals indicated by MED were excluded, as they had published no papers either about sustainability in higher education or sustainability in management education. These include *Transformative Dialogues, Journal of Management Inquiry, Educational Media International, Journal of Marketing Education, The Accounting Educators' Journal* and *Journal of Industrial Organization Education*.

The Journal of Cleaner Production and *Business Strategy and the Environment* were added. Both are journals with strong business sustainability research traditions with high impact factors (3.398 and 3.236 respectively) and have published articles on sustainability in management education. Finally, the *International Journal of Sustainability in Higher Education* (IJSHE), a specialized publication, was added. In total, a sample of 12 journals was built.

Next, three keywords were identified: sustainability, sustainable, and green. The authors used both "sustainability" and "sustainable development" because in most of the articles they appear as synonymous. These key words were searched for in the article titles from these journals over the period from 2003 to 2013, which almost perfectly corresponds to the UNESCO decade for sustainable development in higher education and covers the first years of the Management-specific PRME (initiated in 2007). This choice resulted in a sample composed of papers that discuss the relationship between sustainability and higher education in a general way and sustainability and management education in a specific way (as detailed in the Section 2.2).

Selected articles from the *International Journal of Sustainability in Higher Education* (IJSHE) were found using the same keywords; however, case studies and papers about 'green campus' initiatives, which most often had a mainly operational focus, were excluded. As a result, 17 papers from IJSHE were included in the sample (Table 1). This last journal (IJSHE) was added by virtue of its being a publishing venue for management educators, even though it is not a management education journal *stricto sensu*.

It was decided to include 31 papers on sustainability in higher education generally, as their discussions and results are relevant and applicable to different areas such as management education. These "boundary papers" are concerned with the relations among sustainability, higher education, curricula and teaching, which makes them relevant to management education as well. It was therefore decided to include these papers in the sample. The relevance of these general papers for management education specifically was defined based on the relevance in at least one of the three following criteria: (1) challenges related to integration of sustainability in management education, namely: to what extent are the challenges identified in the article relevant specifically for management education?; (2) teaching techniques, namely: to what extent are the teaching techniques analyzed in higher education relevant for management education? and (3) curriculum orientation, namely: to what extent is the discussion on curriculum orientation in the article relevant for management education per se? The application of these three criteria led 31 out of the 34 papers were included in the final sample. All 34 abstracts were analyzed based on these three criteria to ensure that their discussions were applicable and directly to management education.

The process resulted in the final sample of 78 papers in all, as summarized in Table 1. A third step — content analysis — is described in the following section.

Table 1
Journals and number of papers.

Journal	Papers
Management Education and Development – MED	22
Academy of Management Learning and Education	6
Journal of Cleaner Production	28
Business Strategy and the Environment	5
International Journal of Sustainability in Higher Education	17
Total	78

2.2. Content analysis

This third step was comprised of 4 stages: (1) classification of the focus of the papers, (2) construction of the initial analytical framework and preliminary analysis of a sample of 10 articles, (3) refinement of the previous analytical framework resulting in the final analytical framework, and (4) analysis of all articles.

In stage 1, three different focuses were identified in these 78 papers:

(1) Introduction of sustainability into higher education. These papers are more general, and the results and discussions can usually be related or applied to any area of higher education, including management education.
(2) Introduction of sustainability into specific higher education areas such as business, engineering, design, and architecture.
(3) Green campus and sustainable campus. These papers discuss structural and institutional transformations and sustainability initiatives related to the way campuses are operated (e.g. energy efficiency).

After deriving this classification scheme the authors decided to conduct the analysis with a focus on (i) a general introduction of sustainability into higher education and (ii) an introduction of sustainability into management education. These 78 articles went through desk review (Table 2); 63 of these were then subjected to critical appraisal and evaluation by the authors. The 15 discarded papers (10 about specific higher education areas — engineering, design, and architecture — and 5 about green campus) did not center on our primary topic at this time, namely sustainability in management education. For example, "Cross-cultural education for sustainability: development of an introduction to sustainability course" (Vann et al., 2006) was eliminated in spite of the term 'sustainability' in the title, as the paper actually focuses on an experience conducted in the Design Institute.

In this step specific questions emerged: Is sustainability being inserted or integrated into the curricula, and if so, how? What are the challenges faced by institutions of higher education in this process? Which pedagogical tools are being used to teach sustainability?

The second stage involved a preliminary analysis of 10 articles and the identification of initial categories that were later adjusted in the review process (stage 3). This systematization resulted in four categories shown in Table 3. Finally, this systematic analysis (stage 4) followed the procedure developed by Karatzoglou (2013) in which four types of papers were identified: case studies, literature reviews, conceptual (theoretical) papers, and mixed papers. The research of this paper confirmed the mentioned classification. From the 63 selected publications, four specific topics were identified to organize the analytical framework: types of papers, challenges, teaching techniques, and curriculum orientation. Table 3 summarizes this analytical framework.

The first category, types of papers, is concerned with the paper's main objective and style. The second category, challenges, covers the barriers and difficulties faced by institutions of higher education during the planning and implementation stages. Teaching techniques represent the third category: how are professors teaching sustainability and which techniques are being discussed and suggested for teaching sustainability in the higher and

Table 2
Focus and number of papers.

Focus of paper	Number of papers
Introduction of sustainability in higher education	31
Introduction of sustainability in management education	32
Introduction of sustainability in other specific areas (engineering, design, architecture)	10
Green or sustainable campus	5
Total	78

Table 3
Analytical framework.

Categories – management education		
1. Type of papers (type of research presented on sustainability in ME)	Prescriptive	Provides a framework and instructions for the integration of sustainability in higher management education.
	Descriptive	Usually based on case studies related to specific processes of integrating sustainability.
	Prescriptive and Descriptive	Involves both of the above.
2. Challenges (related to the promotion or enhancement of sustainability in ME)	Organizational	Related to structure, commitment and time, support, planning, resistance to change, and training.
	Terminological	Conceptualization of the meaning of sustainable development and sustainability.
	Capabilities	Capacity of academic staff to properly integrate the subject.
	Pedagogical	Teaching models and tools used inside the classroom.
3. Teaching techniques (how to teach sustainability in ME)	Case method	Teacher facilitates the students' search for solutions to real-world problems and challenges.
	Action/Experiential learning	Active participation in the problematization process; research and problem solving promotes students' critical reflection.
	Service learning	Students actively learn through by providing community services (usually social services).
	Problem-based learning	Students are given a problem that they are expected to solve by research and through exchanging ideas with their peers.
	Other	Seminar and group discussion, games, lectures, videos, brainstorming, workshop sessions.
4. Curriculum orientation (how and where sustainability is located in a curriculum)	Stand-alone course or module	Disciplinary approach. Sustainability is taught with no ties to other courses.
	Cross-disciplinary	Represents an isolated instance of examining the topic through insights from another field, usually using some sustainability- related task during the class.
	Interdisciplinary	Involves the integration of two or more disciplines to solve a specific problem requiring the expertise of more than one method; it may be either a temporary project or a permanent course in the curriculum.
	Multidisciplinary	Different fields of knowledge are brought together to teach sustainability. In this case, each discipline retains its own method and may be responsible for a different topic linked to the theme.
	Transdisciplinary	This approach seeks to overcome the concept of the academic discipline, moving beyond it to include stakeholders such as organizations, customers, and citizens.
	New course or program	Sustainability is integrated through development of a new course or program.

Source: Adapted by the authors from Karatzoglou (2013).

management education context? The last category is curriculum orientation. This refers to the position of sustainability within a curriculum and discussions about the orientation best suited to the teaching of sustainability. Each subcategory will be explained before the general findings are discussed.

3. Literature overview findings

This section summarizes the findings of this literature review of sustainability in management education.

3.1. Sustainability in management education

The 63 papers analyzed identify the need to include the triple bottom line as the central basis for sustainability in management education. Erskine and Johnson (2012, p.199) summarize this central motive as follows: “if businesses are embracing a Triple Bottom Line (TBL), business schools need to prepare students for triple-bottom-line thinking”.

As for the chronological evolution of publications, peaks in publication are related to special issues (e.g. Journal of Cleaner Production in 2006 and Academy of Management Learning & Education in 2010). In 2013, the number of publication was high (11 papers of the sample), even without a special issue. Altogether, the papers can be classified into three categories based on their approach: prescriptive, descriptive or both (Fig. 1).

3.1.1. Types of papers

This classification of the papers aims to respond the following guiding question: How are higher management education institutions guiding the introduction of sustainability into their curricula? The range of topics discussed in these papers is diverse and includes issues summarized in Table 4. While each article may

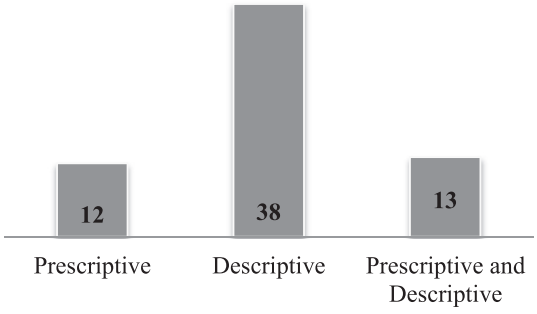

Fig. 1. Types of papers.

Table 4
The main topics of papers.

Main topic	Meaning	Categories	Authors
Organizational change	Identification of barriers to the integration of sustainability and the need to develop solutions to overcome them	Type of papers Challenges	Exter, 2013; Arbuthnott, 2009; Sibbel, 2009; Stephens et al., 2008; Lidgren et al., 2006; Velazquez et al., 2005; Benn and Dunphy, 2009; Rands, 2009; Thomas, 2005; Pesonen, 2003.
Teaching techniques and the learning process	Discussions of and new proposals for the best way to teach sustainability.	Type of papers Teaching techniques	Diamond and Irwin, 2013; Coleman, 2013; Dobson and Tomkinson, 2012; Audebrand, 2010; Brundiers et al., 2010; Kevany, 2007; Barth et al., 2007; Onwueme and Borsari, 2007; Steiner and Posch, 2006; Warburton, 2003; Kurucz et al., 2013; Viswanathan, 2012; Brumagin and Cann, 2012; Erskine and Johnson, 2012; Shrivastava, 2010; Peoples, 2009; Porter and Córdoba, 2009; Boxer, 2008; Collins and Kearins, 2007; Rusinko, 2005; Springett, 2005; Kearins and Springett, 2003
Curriculum changes	Kinds of curriculum design adopted for the integration of sustainability	Type of papers Curriculum orientation	Lozano and Young, 2013; Ceulemans and De Prins, 2010; Lozano, 2010; Rusinko, 2010a,b; Juárez-Nágera et al., 2006; Lambrechts et al., 2013; Palthe, 2013; Persons, 2012; Stead and Stead, 2010; Wheeler and Zohar; Hart, 2005; Pesonen, 2003.
Creation of a new course or program	Description of the design process, implementation, and evolution	Curriculum orientation	Dickson et al., 2013; Wieland and Fitzgibbons, 2013; Kurland et al., 2010; Bremer and López-Franco, 2006; Welsh and Murray, 2003.

discuss more than one topic, this summary reflects the most central one for each article. The literature is dominated by empirical and descriptive studies of individual initiatives (29 papers) and specific approaches (16 papers). It was found that the literature lacks a cohesive research agenda and it is not supported by strong theoretical foundations in either education or management studies. These general findings corroborate Stephens and Graham's (2010) analysis.

This general characterization of the papers leads to the following categories discussed below.

3.1.2. Challenges to introducing sustainability into management education

The classification linked to challenges is related to the following guiding question: How are higher management education institutions introducing the sustainability into their curricula? Four main challenges related to the insertion or integration of sustainability into management education were identified in the literature. These were classified as organizational, terminological, capability-based, and pedagogical challenges. Fig. 2 shows each category and its frequency in the literature sample.

3.1.2.1. Organizational challenges. Organizational challenges are the most frequently mentioned challenges in the articles analyzed. Authors point out that integrating sustainability into higher education depends on several organizational changes that require support, involvement, and commitment from the management of the academic institution. Authors highlight that the capacity to change is often limited by three main organizational factors.

Firstly, several authors highlight that the changes necessary for integrating sustainability into management education require institutional support and resources in order to “make it happen” (Barth, 2013, 2012; Lozano, 2010; Rusinko, 2010a,b).[3] Secondly, they highlight the need for continuous involvement on the part of faculty and ongoing organizational development at multiple levels (Benn and Dunphy, 2009), including adequate planning, resources, active participation, commitment, training, communication and information, performance indicators, and policies to promote sustainability on campus (Kurland et al., 2010; Rusinko, 2010a,b; Viswanathan, 2012).

The third element highlighted in the literature is that the complex structure of educational institutions involves groups with diverse interests, which can hinder the process (Kurland et al., 2010; Sibbel, 2009; Wright and Wilton, 2012). Authors emphasize that this *status quo*, in which future business leaders need to learn to think systemically rather than in silos, leads to a fragmented education; this fragmentation needs to be overcome to successfully integrate sustainability into higher management education (Coleman, 2013; Kurucz et al., 2013). Rusinko (2010b) advocates an effective integration of sustainability into management education through a combination of bottom-up and top-down efforts. In other words, dialogue between internal stakeholders at different levels, as well as between internal and external stakeholders (lecturers, tutors, course directors, and industry leaders), should be involved in the process of organizational change when developing curricula around sustainability (Benn and Dunphy, 2009).

In addition, authors identify the lack of understanding of sustainability's importance, a resistance to change, a lack of necessary skills and leadership, and the time and effort required to promote curriculum changes as significant organizational barriers to the effective integration of sustainability into higher education (Ceulemans and De Prins, 2010; Exter et al., 2013; Naeem and Neal, 2012). Exter et al. (2013) advocate the need for more opportunities for faculty to meet to share ideas and experiences and to foster collective learning and discussion.

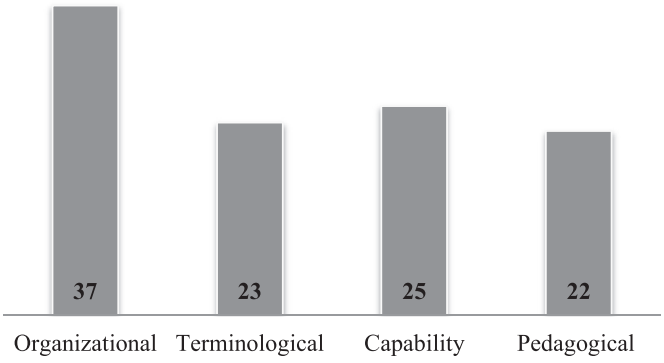

Fig. 2. Main challenges.

[3] Note: For reasons of clarity, only three current references are mentioned per in-text citation in the findings. Table 4 connects themes with all sources.

3.1.2.2. Terminological challenges. The articles analyzed exhibit two main terminological challenges. The first is related to sustainability itself and the second is related to the sustainability–business nexus. The first challenge concerns the meaning of sustainability in itself; both "sustainable development" and "sustainability" are contested umbrella concepts; they mean many different things to different people. This semantic lack of clarity adds to the confusion. Authors identify three main terminological challenges. The first concerns the tension between holistic definitions of "sustainability" and more narrow or instrumental significations. Some authors point to the lack of a consistent definition and shared understanding of the concept of sustainability as a great challenge for its introduction into management education (Brumagim and Cann, 2012; Shrivastava, 2010). While some authors highlight the need to include the interrelationships and interdependencies between environmental carrying capacity, socio-cultural conditions, and economic growth in this concept (Kurland et al., 2010; Wu et al., 2010), others reduce sustainability to a mere tactic to "add value" to products and production processes (Boff, 2012). Yet another group of authors highlights that sustainability may also be used as part of the quest for a competitive advantage by academic institutions in order to attract funding and/or high-caliber students.

This more limited understanding may restrict sustainability to technical issues related to environmental protection while ignoring the more complex issues with global, social, cultural and ethical dimensions (Benn and Dunphy, 2009; Richter and Schumacher, 2011). The more holistic view highlights that sustainability explores the connection of humans with nature and requires the combination of analytical, physical, and spiritual concepts and practices into a holistic learning experience (Shrivastava, 2010). Thus, the transdisciplinary essence of sustainability in itself challenges the education system, since different disciplines understand the subject very differently (Dobson and Tomkinson, 2012). The transdisciplinary approach asserts that sustainability cannot be taught in an isolated or disciplinary way.

The second terminological challenge identified concerns the sustainability-business nexus. In management studies, a focus on sustainability requires that a firm's environmental and social responsibilities be given the same weight as its economic concerns (Wheeler et al., 2005; Wu et al., 2010). The difficulty is that sustainability issues are not often conceptualized as being part of the core money-making process of the business (Boxer, 2008); this tension represents a fundamental challenge for business schools and their traditional curricula (Wheeler et al., 2005). The third aspect discussed by the authors is that the complexity, vagueness, and confusion associated with the concept of sustainable development calls for new approaches to education and to institutional and curricular design (Lozano, 2010; Miller et al., 2011; Steiner and Posch, 2006).

The literature indicates the need for standard definitions of concepts. For example, 'cleaner production', 'pollution prevention', and 'eco-efficiency' are terms that are often used interchangeably (Velazquez et al., 2005). Sustainable development and topics related to sustainability are considered to be difficult to understand and to build on (Wright and Wilton, 2012); Miller et al. (2011, p.181) posit that "sustainability is not a smooth, cumulative, or linear process or a single desired end state." However, these challenges need not deter the conceptual and educational transitions required (Porter and Córdoba, 2009).

3.1.2.3. Challenges of capability and pedagogy. The third challenge concerns the "education of the educators" and the capacity of management educators to promote sustainability through pedagogy. If integrating sustainability means promoting self-reflexivity, critique, and social action or engagement, authors question the ability of management educators to model and teach these skills in the classroom (Rusinko, 2005). The limited training of management educators in sustainability constitutes a frequently-cited challenge (Brumagim and Cann, 2012; Persons, 2012; Wu et al., 2010).

Faculty engaged in introducing sustainability into management curricula often face two challenges at once, namely learning sustainability themselves as well as questioning the learning paradigm they are in. Several authors highlight that teaching sustainability requires shifting from a teacher-centered to a student-centered approach (Erskine and Johnson, 2012; Rands, 2009; Richter and Schumacher, 2011). According to Velazquez et al. (2005, p.386) "professors are learning and teaching about sustainability at the same time. In fact, few educators are being taught how to teach about sustainability; most of them are learning in the area, but in the process mistakes are made".

Authors contend that education in sustainability not only requires innovation in teaching and learning, but also challenges the capabilities of academic staff to generate, bring about, and adopt innovative practices necessary to teach sustainability (Barth and Rieckmann, 2012). Lozano (2010) highlights the lack of knowledge on the part of administrators, a lack of appreciation amongst lecturers of the relevance of the topic to management education, and the failure of teachers to support the promotion of sustainability as important obstacles to be overcome. Thus, this "knowing how" to become involved in sustainability education (Kevany, 2007) is a significant challenge to academic institutions.

3.1.3. Teaching techniques: searching for innovative ways to teach sustainability

The teaching techniques' classification was built based on the guiding question: What pedagogical techniques are being applied? Most authors view the introduction of sustainability as a need to radically rethink management education. They assert that traditional methods of management education, focusing on a single and isolated discipline and often based on unidirectional education processes, fail to provide the training for graduates to work towards developing solutions around sustainability issues in a new and complex world (Sibbel, 2009). They detail the changes needed related to teaching techniques. In teaching sustainability, Stubbs and Cocklin (2008) highlight the need to develop students' ability to think in new ways and from different worldviews. As Kurland et al. (2010, p. 459) put it, "if the world demanded that decisions be made in fundamentally different ways, then [it follows that] we should educate students in quite different ways as well". Students should thus be stimulated to be active learners instead of mere knowledge consumers (Juárez-Nájera et al., 2006). Authors highlight that this requires an essentially new learning culture, incorporating an open-minded and participative process (Barth et al., 2007). A dynamic mutual learning process is required, in order to learn from experiencing the process instead of purely memorizing its characteristics (Steiner and Posch, 2006).

The selected articles analyze isolated experiences in teaching sustainability, most often the experience of the authors. This focus on a single experience hinders a discussion of a variety of experiences as well as the evaluation of the initiatives described. Therefore, the classification scheme presented in this paper was developed by taking into account how these techniques were explored in the literature. A few authors highlight that the case method, service learning, and problem-based learning represent various applications of action learning strategies. However, in most of the literature, the specific strategies are not detailed and are referred to simply as "action learning". The authors have therefore opted to separate this group into distinct categories. The frequency of each technique in the literature sample is shown in Fig. 3.

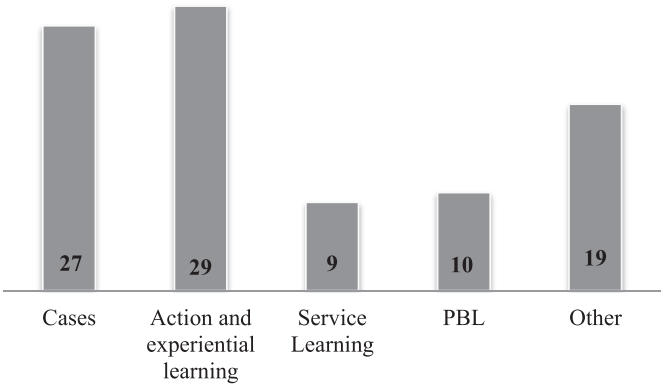

Fig. 3. Teaching techniques.

The literature reviewed suggests that a more dynamic learning process could be achieved in several ways. First, when students problematize on an issue, they become active knowledge producers instead of passive recipients (Welsh and Murray, 2003). Second, authors assert the importance of including more realistic problems and problem-solving methods when teaching sustainability in the classroom (Lozano, 2010). The common denominator of the teaching techniques employed is that they promote, to varying degrees, the shift from a content-centered to a more student-centered curriculum, intended to foster responsible citizens and promote the development of skills, such as problem solving and critical thinking (Anderberg et al., 2009). The techniques presented in Fig. 3 are used in 'transformative learning', an educational strategy that incorporates interactive methods of teaching and learning, transforming the learning process from passive to active (Kevany, 2007).

Overall, the literature presents several teaching strategies (see Table 3) that can be adopted to teach sustainability issues better: (1) the case method; (2) action and experiential learning; (3) service learning (SL); (4) problem-based learning (PBL); and (5) "other" strategies, which refer to a diverse range of tools including games, debates, seminars, discussion groups, guest speakers, videos, field trips, brainstorming, and workshop sessions (Kurucz et al., 2013; Viswanathan, 2012; Wieland and Fitzgibbons, 2013).[4]

The first teaching technique is the case method, which "is a discussion-based teaching tool that requires the active participation of students who discuss concrete management situation(s) and who try to provide solutions or recommendations for the management issues at stake" (Mesny, 2013, p.57). On the one hand, some authors see the case study technique as a good option for introducing sustainability in management education, considering the issues, discussions and critical reflections that can emerge (Kurucz et al., 2013; Palthe, 2013; Persons, 2012). On the other hand, the limitations of this method include it not being true to managerial reality, not requiring truly active learning and not being experiential enough (see Mesny, 2013). Furthermore, the case method tends to revolve around a decision-maker and a specific business decision rather than more systemic situations; this narrow framing is problematic because it does not promote a systemic understanding of the complexities of sustainability challenges.

In using the case method, students have to elaborate solutions to real-world problems and challenges. The educator acts as a moderator and must pay attention to the implications of the questions they ask and to the answers they are looking for (Audebrand, 2010). Shephard (2008) explores the transdisciplinary case study as a learning framework that is becoming widely used in sustainability education and research. It is based on both functional socio-cultural constructivism and project-based learning, through which students are enabled to tackle complex real-world examples of sustainability issues. The main difference between it and the classical case method is its transdisciplinary approach in which both problem and solutions are discussed from different perspectives, linking science and practice in a participative process between students, professors, the community, and other stakeholders (Brundiers et al., 2010). This transdisciplinary approach can overcome what Stead and Stead (2010) point out as a key problem in sustainability education: "academic frameworks alone are not sufficient for truly integrating concern for nature and society into the minds and hearts of most students. Most students want the frameworks they learn supplemented with real business examples and hands-on experiences that allow them to 'reach out and touch' sustainability in the business world" (Stead and Stead, 2010, p.494).

The second method, action and experiential learning, involves activities in which students learn by doing (Collins and Kearins, 2007; Shrivastava, 2010; Springett, 2005). The action learning approach is emerging as a very promising method for teaching sustainability. It involves the students' participation in problematization, research, problem solving and critical reflection, using tools such as teamwork, case studies, projects, discussions, and games. The objective is to generate cognitive engagement, which can increase students' motivation and develop their critical thinking skills (Macvaugh and Norton, 2012). There is a consensus in the literature on the clear need to revise classic teaching methods; however, what is lacking is a thorough discussion and critical assessment of the advantages, limitations, and shortcomings of each alternative teaching technique. "Because sustainability is, by its nature, a concept and topic that calls for action, the active learning approaches preferred by students may be more valuable [in relation to classical teaching with a passive learning process] in this emerging focus of business inquiry" (Erskine and Johnson, 2012, p.204).

The third method, service learning (SL), is a form of action learning mentioned in 8 papers (see for example Kurucz et al., 2013; Rands, 2009; Rusinko, 2010b). Rusinko (2010b) points out how engaging in active service learning projects can promote an effective learning of sustainability. These initiatives in service learning allow students to interact with different stakeholders and to expand their perception of the relevance of sustainability to organizations and to society as a whole; this is a shift in perspective from learning "for the community" to learning "with the community" (Brundiers et al., 2010).

The fourth technique – problem-based learning (PBL) – is another kind of action learning that aims to turn students into independent thinkers capable of solving complex problems. According to Hung et al. (2008, p. 486), it is "an instructional method that initiates students' learning by creating a need to solve an authentic problem. During the problem-solving process, students construct content knowledge and develop problem-solving skills as well as self-directed learning skills while working toward a solution to the problem". In other words, students are given a problem they are expected to solve by exchanging ideas with their peers and acquiring the necessary knowledge that they may initially lack (Raufflet et al., 2009). Students engage in dialogue as they learn to ask, research and reflect upon subject matter relevant to sustainability. This approach emphasizes learning through problem-solving skills, with content based on challenges that incorporate multi-stakeholder scenarios and conflicts of interest, and span

[4] Note: distance learning was mentioned in 4 papers (Bremer and López-Franco, 2006; Juárez-Nájera et al., 2006; Anderberg et al., 2009; Diamond and Irwin, 2013) but was not discussed in depth in these papers.

disciplinary boundaries (Dobson and Tomkinson, 2012; Anderberg et al., 2009).

Finally, the last category of techniques – "others" – refers to other techniques that an educator can use to teach sustainability through interaction and critical reflection simultaneously. These other methods include games, discussions, seminars, discussion groups, guest speakers, videos, field trips, brainstorming and workshop sessions (Erskine and Johnson, 2012; Kurucz et al., 2013; Persons, 2012).

Overall, the pedagogical bases for and critical analyses of these four major teaching techniques are not explored in the literature analyzed. As discussed above, the literature on the whole emphasizes the need for a shift from a classical teaching model towards a more interactive one in which students participate in the co-construction of knowledge and understanding. The literature is thus very diverse. However, it tends to remain focused on application, presenting tools and techniques with a limited discussion of their fundamentals. On one hand, the selected papers share many experiences and possibilities; on the other hand, they provide limited reflection on and evaluation of the type of learning achieved in these processes.

3.1.4. *Curriculum orientation: where sustainability is located in the curriculum*

From the literature it was possible to draw a continuum of perspectives on integrating sustainability into management curricula. The perspectives in Table 5 summarize different ways to integrate sustainability into higher and management education.

This research confirms the conclusion of Ceulemans and De Prins's (2010) article in which they identified two generic approaches to introducing sustainability in curricula: horizontal or vertical. In horizontal introduction, sustainability is interwoven through different courses on the curriculum; the approach is interdisciplinary and is predicated on the need for a systemic and holistic approach. Vertical introduction can be understood as the organization of separate courses related to a specific topic such as sustainability. A 'socio-environmental management' course could be an example of vertical introduction of sustainability into management education. This segmented or disciplinary approach common in business schools needs to be overcome, particularly in teaching sustainability (Kurucz et al., 2013; Shrivastava, 2010) since the concept of sustainability, with roots and applications in several compartmentalized academic fields, needs to be taught with a holistic and integrated view (Kurland et al., 2010). The curriculum will be more effective in teaching sustainability issues if sustainability is integrated into core courses than if it is presented in a marginal way to deliberately give visibility to sustainability in the curriculum (Stubbs and Cocklin, 2008; Thomas, 2005). In other words, if sustainability is inserted into specific subjects such as strategic management or corporate finance, its presence, while apparent, may be only superficial (Benn and Dunphy, 2009). The incidence of the six curriculum orientation perspectives in the literature is shown in Fig. 4.

A specific course (stand-alone course or module) can be either disciplinary or interdisciplinary. Some authors describe and discuss this kind of vertical introduction of sustainability using an interdisciplinary approach (Dobson and Tomkinson, 2012; Rusinko, 2010a; Shrivastava, 2010). The rationale for an interdisciplinary approach is that studies in a single discipline are incomplete and cannot provide enough learning opportunities to effectively overcome the barriers to achieving desirable sustainability-related educational goals (Sibbel, 2009; Welsh and Murray, 2003). However, calls for an interdisciplinary approach may be largely rhetorical if new strategies to transcend conventional disciplinary structures are not found (Warburton, 2003). Both interdisciplinary and transdisciplinary approaches result from the need for university classes to better reflect real-world experiences (Brundiers et al., 2010; Diamond and Irwin, 2013; Lozano, 2010). However, a stand-alone course or module has usually a disciplinary approach and it is more common in the traditional higher education system. This way to bring sustainability to education is very far from transdisciplinary approach which is seen as an "ideal" manner to

Table 5
Curriculum orientation and authors.

Perspective	Meaning	Trend	Authors
Stand-alone course or module	Usually a disciplinary approach. Sustainability taught with no ties to other courses.	Vertical integration	Erskine and Johnson, 2012; Rusinko, 2010; Stead and Stead, 2010; Walck, 2009; Bremer and López-Franco, 2006; Roome, 2005; Pesonen, 2003.
Cross-disciplinary	Isolated integration across the curriculum through a specific task.	Horizontal integration	Palthe, 2013; Persons, 2012; Brumagim and Cann, 2012; Rusinko, 2010a,b; Benn and Dunphy, 2009; Rusinko, 2005; Kearins and Springett, 2003.
Interdisciplinary	Amalgamation of different disciplines for solving specific issues related to a specific topic such as sustainability. Involves method-sharing.	Horizontal or vertical integration	Kurucz et al., 2013; Diamond and Irwin, 2013; Viswanathan, 2012; Miller et al., 2011; Mochizuki and Fadeeva, 2010; Peoples, 2009; Sibbel, 2009; Stephens et al., 2008; Kevany, 2007; Onwueme and Borsari, 2007; Lidgren et al., 2006; Martinez et al., 2006; Juárez-Nájera et al., 2006; Wheeler et al., 2005; Warburton, 2003.
Multidisciplinary	Different fields of knowledge come together to teach sustainability. Each discipline retains its own method and may be responsible for a different topic linked to the sustainability	Horizontal integration (ideal)	Lozano et al., 2013; Viswanathan, 2012; Anderberg et al., 2009; Bremer and López-Franco, 2006; Juárez-Nájera et al., 2006.
Transdisciplinary	Seeks to overcome the concept of disciplines, moving beyond academic disciplines to include stakeholders such as organizations, customers, and citizens.	Horizontal integration (ideal)	Kurucz et al., 2013; Lozano et al., 2013; Brundiers et al., 2010; Stephens et al., 2008; Kevany, 2007; Steiner and Posch, 2006; Martinez et al., 2006; Warburton, 2003.
Creation of a new sustainability-centered course or program	Integration of sustainability through the development of a new course or program.	Vertical integration	Erskine and Johnson, 2012; Viswanathan, 2012; Stead and Stead, 2010; Rusinko, 2010a,b; Walck, 2009; Coopey, 2003; Pesonen, 2003.

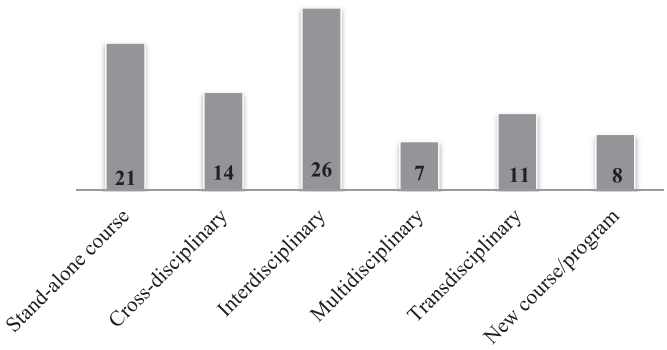

Fig. 4. Curriculum orientation.

overcome the concept of disciplines, including other areas of management, and stakeholders such as organizations, customers, and citizens during the process of education.

To summarize the results, this literature review suggests that the introduction of sustainability into curricula involves multidisciplinary collaboration, interdisciplinary orientation, and the favoring of horizontal contacts between professors from different departments and divisions to diversify the university's offerings (Juárez-Nájera et al., 2006). This approach requires a process of engagement among academics associated with a proper academic recognition of the importance of adopting new teaching and learning approaches and community outreach. It will help professors, students, and citizens to co-operate in integrating sustainability issues in real societal decision-making processes (Benn and Dunphy, 2009; Lozano et al., 2013).

4. Discussion: sustainability in management education as a field of practice

This systematic review was structured according to the following four guiding categories: (1) Types of papers, (2) Challenges, (3) Teaching techniques, and (4) Curriculum orientation. Research methods and findings of this review were presented in the section above. This final section identifies the contributions and the scientific value added for this article, and discusses the findings. The conclusion section brings the implications for education practices and avenues for future research for integrating sustainability into management education.

Three main factors are responsible for this diversity and the practical nature of writings on the subject. The first one is related to the research area in itself. Sustainability, as mentioned above, is an umbrella concept with several definitions; the limited clarity around its introduction into management education reflects broader debates on the topic. The second pertains to the main authors in the field. As compared to other areas of sustainability recently analyzed in this journal, such as SMEs and sustainability (Klewitz and Hansen, 2014), the role of universities and regional sustainability (Karatzoglou, 2013), lean management, or supply chain management and sustainability (Martínez-Jurado and Moyano-Fuentes, 2013), sustainability in management education is an area whose authors, as professors and lecturers, are both practitioners in the field and authors of the articles simultaneously. While management scholars build and consolidate knowledge on "external" objects such as SMEs or regional developments located "out there", authors in this field are often "agents of change" in their own organizations as well. The progress, shape, and scope of sustainability in its introduction into the curriculum are thus contingent on processes of organizational change in academic institutions. This fact explains the reflexive role of these articles, in the authors' analyses of their achievements and the challenges in their respective academic contexts.

The third factor concerns the often normative stance of these articles: several authors believe in sustainability and view its introduction as desirable and something that should be done for moral reasons. Authors tend to organize their research contributions in a "problem/experience/implications for other institutions" format. They focus on the organizational and institutional challenges of integrating sustainability; the solutions they find to address these shortcomings and challenges are most often micro- or individual-level solutions. Ironically, while all articles highlight the general "need" for curriculum change, very few specify how this change could and should be undertaken, from the perspectives of both course design and an explicit educational paradigm.

4.1. Mapping a field "in progress"

The first scientific contribution of this paper is a comprehensive review and analysis of peer-reviewed articles on sustainability in management education. The authors have systematically reviewed the articles based on an analytical framework with four categories, namely (1) the type of article (descriptive, prescriptive or both), (2) the challenges of promoting sustainability studies in management education, (3) teaching techniques, and (4) location in and/or across curricula. This literature review aimed to connect these dimensions – contextual, terminological and pedagogical – to each other. In doing so, this paper complements other recent systematic reviews including Karatzoglou's (2013) more general review of the roles and contributions of universities to sustainable development education, as well as Stephens and Graham's review (2010), which focuses on an empirical research agenda for sustainability in higher education.

Overall, the body of knowledge on integrating sustainability into management education is characterized as follows. First, most of the 63 articles analyzed are descriptive, tending to present a specific experience in a given institution or program and to center on a particular teaching method or tool. Second, while authors agree that integrating sustainability requires more participatory teaching techniques, they fail to agree on which ones in specific it requires. The range of techniques promoted varies widely from case methods to action-centered learning, service learning, and problem-based learning. Third, authors come to diverse conclusions on where to fit sustainability in management curricula; their suggestions range from a specific course dedicated to the topic to inter-, cross-, or multi-disciplinary possibilities.

Very few articles situate these descriptions or experiences within the context of the broader philosophy and design of management education or connect it with a specific definition of sustainability. Fourth, there is a strong focus in the articles on the range of challenges in promoting sustainability in management education including organizational, terminological, capability-related, pedagogical and individual ones. Often the authors of the papers share their experiences, including accomplishments and disappointments. Altogether, the diversity of approaches mapped in this review, as well as the practical focus of discussions of the obstacles to change, offers a broad repertoire of experiences as well as some practical guidance for management scholars interested in promoting sustainability initiatives in their respective academic contexts.

4.2. From insertion to integration

In all, this breadth and diversity reflect the widespread insertion of sustainability into management education. At the same time, this very diversity as well as the lack of reference to research-based (National Research Council, 2000; Schommer, 1994) theories of

learning (Diamond, 1998) reflect a less successful integration, defined here as the full and systemic adoption of sustainability into management curricula with an eye to its wide-ranging implications on learning paradigms and course design. This is to say that while sustainability has been added to management curricula, it has yet to be fully and meaningfully incorporated into course and program design. This lack of pedagogical integration has epistemological effects. It reflects another scientific value added for this paper.

As a field of knowledge, sustainability in management education remains fragmented in terms of the diversity of issues, methodologies, theoretical frameworks or approaches, research issues promoted, and in the sheer diversity of the implications proposed. This review shows that articles reflect individual experiences and concerns rather than the search for common ground. While several articles draw from actual practical experience in teaching and management education, other papers, on the prescriptive side, put forth broad principles for achieving the "integration of sustainability in management education". These findings confirm Stephens and Graham's (2010) conclusions, which asserted that this debate lacks a cohesive research agenda and the support of a strong theoretical base. This issue represents an exciting and important research area, yet at present it is far from being a research field in itself. On the whole, knowledge on the topic does not accumulate but remains scattered, and a "field" per se has not yet emerged. As such, this "research area" is rather a social and cognitive space in which management faculty reflect on and share their individual and specific *praxis* relating to the enhancement of sustainability in management education; at present, it is not a research field in which a dominant or cohesive understanding of sustainability in management education could emerge.

5. Conclusions and future directions: the road ahead

The diversity of the articles reviewed in this paper is a sign of success for the advancement of sustainability in management education. It shows that sustainability has made progress and that researchers have responded to institutional and international pressures, as well as initiatives such as the PRME and the UNESCO Decade of Education for Sustainable Development.

In terms of the applicability of the findings, three avenues for the integration of sustainability into management education are proposed. The first is the application of research-based theories of learning. Theories of learning — of how people learn — constitute a long and established tradition, among other cognitive (Brace, 2001; Dweck, 2002; Matlin, 1989), neurological (National Research Council, 2000), epistemological (Schommer, 1994), and educative assessment (Wiggins, 1998) traditions. The recourse to these established and research-based learning theories could provide the epistemological grounding for this fragmented field of knowledge as well as provide proposals for change. The second avenue is practical and concerns course design, which leads faculty to begin with the clear identification of the learning outcomes for students (Wiggins, 1998). As discussed above, most of the articles analyzed in this review focus on specific activities but fail to connect them with the design of a course or a program. Backward design, which relies on the principle of focusing first on the desired teaching outcomes and leaving for a later stage specific teaching activities, could help address this limitation.

The third avenue concerns assessment of both advancement of sustainability in management education as well as the assessment of learning. No article reviewed in this paper aimed to contribute to assessing these outcomes. Understanding how to map sustainability in management education as well as sustainability-specific management learning outcomes could be a promising endeavor for future research in this growing area.

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