RESEARCH ARTICLE

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Developing a sustainability reporting assessment tool for higher education institutions: The University of California

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Abstract

Businesses have integrated sustainability reporting into their corporate responsibility efforts. However, universities, as the hubs of sustainability awareness, have been struggling with reporting their sustainability practices. The purpose of this study is to examine sustainability assessment tools in higher education institutions and develop a sustainability reporting assessment tool suitable for evaluating sustainability reporting in these institutions. The study attempts to fill the research lacuna in sustainability reporting in these institutions. In doing so, this study proposes a tool for assessing sustainability reporting in higher education institutions and applies the framework to the University of California. The result of the study shows that University of California is performing stronger in environmental and educational dimensions while social and governance/economic dimensions are lagging behind. Finally, it is concluded that assessment tools have failed to recognize reporting as an integral part of sustainability in universities and sustainability reporting among these institutions is still embryonic.

1 | INTRODUCTION

I shall never be content until the beneficent influence of the University reaches every home in the state. President Charles Van Hise, University of Wisconsin, 1904

The above statement inspired Sir Eric Ashby, British educator, to recognize the greatest American contribution to higher education as "dismantling the walls around the campus" and to let society benefit from it (Bok, 1982). The mission of higher education institutions is closely related to sustainability and it is widely accepted that universities should play an active role in sustainability (Lukman & Glavič, 2007; Stephens, Hernandez, Román, Graham, & Scholz, 2008; Vladimirova & Le Blanc, 2016). They contribute to economic development, social inclusion and environmental sustainability in society by educating the future workforce that would constitute the backbone of all businesses and organizations while, as organizations in their own rights, they develop sustainability-oriented curricula, outreach programs, and research, design sustainable operations, and exercise sustainability assessment and reporting practices. Moreover, higher education institutions are the fulcrum of raising sustainability awareness. They play a crucial role in informing and transforming societies (Barth & Rieckmann, 2012), helping them and businesses to become more sustainable and responsible by contributing to social debates and informing economic and environmental policies (Godemann, Bebbington, Herzig, & Moon, 2014). Nonetheless, higher education institutions should be the subject of change and not merely agents of change (Lukman & Glavič, 2007).

It serves our argument to split higher education institutions into two main categories of public and private, as their approach to sustainability differ. Public universities are typically larger and more complex than private universities and receive funds from the federal government and other public sources. By way of illustration, the University of Wisconsin, mentioned earlier, was one of the land-grant universities that was formed thanks to the Morrill Act. In 1862, US President Abraham Lincoln signed the Morrill Act which together with the accompanying Morrill Act of 1890 (for Confederate states) allowed states to sell blocks of land to fund and establish public universities with the pragmatic purpose of educating and training young people. Universities are, in fact, social institutions (Turner, 1997) that stand to serve society. By contrast, private universities are business-like organizations, which in addition to their mission of education and pursuit of science, follow a profit maximization dictum. Therefore, as organizations with quasi-corporate characteristics, private higher education institutions should strive to confirm their commitment to sustainability, realize their economic, social and environmental impacts, and readjust their behavior to act more sustainably and responsibly.

There are six important factors that influence the adoption of sustainability in education institutions: purpose and mission, city–business ecosystem, national/state legislature and policy, research–education–science nexus, local-campus culture, and international norms among higher education institutions. These factors are specifically influential for higher education institutions. Generic factors such as size, limited finance and competing stakeholder demands are not included in the list.

Regarding sustainability, purpose and mission are probably the factors that distinguish public and private higher education institutions. Certainly, there are exceptions to this statement but in general it is the way most public and private higher education institutions approach sustainability. The formation of sustainability offices in universities is the way most universities integrate sustainability into their operations. For instance, the University of Utah's sustainability office mission statement stipulates: "Our mission is to integrate sustainability as a core principle throughout all operations, research, disciplines, and curriculum at the University of Utah and to support sustainability initiatives and actions within the campus and community." City–business ecosystem or cooperation is another factor that contributes to the promotion and implementation of sustainability in higher education institutions (Shelest, Ionov, & Tikhomirov, 2017). This driver for sustainability has been gaining traction particularly in the past three decades. These cooperations often form between a network of businesses across the city and the university. Some of these initiatives even entail a network of cities. Formed to contribute to promoting sustainable cities by networking universities mainly in Asia, fostering collaboration with cities, international organizations, development agencies and nongovermental organizations (NGOs), the International Academic Consortium for Sustainable Cities (IACSC) is a prime example of such initiatives at the Yokohama City University. Another instance is the cooperation between the University of Lausanne and a nearby farm. In this arrangement the university disposes of food waste by sending it to the farm where it would be used to produce organic fertilizers and also biogas fuel, generating heat and electricity for the farm and nearby community.

National/state legislature and policy are probably the most persuasive elements in pushing sustainability agenda in universities. To put this into perspective take Denmark's commitment to renewable energy. Denmark has committed to a fossil-fuel-free, 100% renewable energy future by 2050. To achieve this goal, legislation and policy-making processes are attuned toward renewable and clean energies. As a part of Danish society, Danish universities also aspire to contribute. For example, the "Green Lighthouse" building at the University of Copenhagen generates its own energy from solar cells and panels, storing excess energy underground. The research–education–science nexus is an important tripartite element in the development of sustainability in universities. Universities in the Netherlands and the UK are particularly good examples. Local-campus culture plays a crucial role in the promotion of sustainability in universities usually via student-led initiatives. For example, students at India's College of Engineering, Attingal, turned 5 acres of barren campus land into a thriving plot, yielding organic vegetables for both students and the local community. The final factor is the rise of international norms among higher education institutions. For instance, the Sustainability Tracking, Assessment and Rating System (STARS) reporting framework has gained tremendous traction among higher education institutions as a standard practice and is becoming a norm. The dynamics of these factors explain why some universities move toward sustainability while others do not.

To better assess the drivers of sustainability in higher education institutions, one can, arguably, compare public higher education institutions to NGOs and private higher education institutions to private corporations. Hence, public higher education institutions may follow a normative or moral approach toward sustainability whereas private

higher education institutions pursue an enlightened self-interest approach toward sustainability. With this analogy, one can investigate the technical aspects of sustainability in higher education institutions.

Sustainability reporting is a powerful apparatus for assessing, reporting and managing the economic, social and environmental impacts of an organization. Businesses and other reporting entities have already embraced sustainability reporting as a part of their organizational sustainability and responsibility efforts. Notwithstanding significant improvements, sustainability integration in higher education institutions still faces many challenges (Ramos et al., 2015). Few universities are adequately accountable to their stakeholders and report on their sustainability performance (Ceulemans, Molderez, & Van Liedekerke, 2015) and the rest have been grappling with incorporating sustainability reporting into their sustainability agenda. Sustainability reporting can help universities to assess their performance and communicate their sustainability efforts to their respective stakeholders (Lukman, Krajnc, & Glavič, 2010).

A surfeit of sustainability tools have been developed for higher education institutions, but few evaluate sustainability reporting of universities. Furthermore, many important aspects of sustainability in higher education institutions such as education, research and outreach have not been covered in these tools, therefore creating a research gap (Yarime & Tanaka, 2012). Unsurprisingly, the business sector has been more successful in developing assessment tools for planning, implementation, management, assessment and reporting of sustainability practices. This study attempts to combine the two strands of research, that is, the sustainability assessment tools of higher education institutions and business sector to develop a more comprehensive framework. It also endeavors to contribute to the current research gap in the integration of sustainability (reporting) in higher education institutions (Velazquez, Munguia, & Sanchez, 2005). To serve this end, the Environmental, Social, Educational, and Governance (ESEG) University Sustainability Reporting Assessment Tool is introduced. As an example, the tool will be applied to the University of California (UC), a leading higher education institution with a relatively long track record in sustainability reporting.

The rest of the study is organized as follows. In the next section, the theoretical background of the study is presented. The third section details the method, the proposed tool for assessing university sustainability reporting and the example of UC. The results and discussion of the study are presented in the fourth section. The final section concludes the study and presents the research limitations and future directions.

2 | THEORETICAL BACKGROUND

2.1 | Education for sustainable development (ESD) in higher education institutions

The proliferation of global economic, social and environmental challenges in tandem with political instability have created an atmosphere of unsustainable changes over the past few decades. The concepts of sustainability and sustainable development have emerged as practical solutions in the political discourse (Martens, 2006). The term sustainable development was initially introduced in the Conference on the

Human Environment in Stockholm, Sweden, in June 1972, which also led to the creation of the United Nations Environment Programme (UNEP) in December of that year, and was mainstreamed by the Brundtland Report of the World Commission on Environment and Development in 1987. Sustainable development is seen as means to transform one organization (Schaltegger, Etxeberria, & Ortas, 2017). Later, the Rio Earth Summit was a landmark event in establishing sustainable development at the highest decision-making level in 1992 which also led to the Kyoto Protocol in 1993. In 2000, the UN Millennium Summit adopted eight development goals, to be achieved by the end of 2015, known as the Millennium Development Goals. The Rio +20 conference in 2012 paved the way for the development of the post-2015 development agenda to continue the path of the Millennium Development Goals (Pintér et al., 2014). Sustainable Development Goals were set to promote focused and coherent action on sustainable development at the UN Sustainable Development Summit in September 2015. Sustainable Development Goals include 17 main goals, 169 proposed targets and 304 proposed indicators to examine compliance, and one of the Sustainable Development Goals is dedicated to education (Sustainable Development Goal 4[1]).

The incorporation of ESD and environmental education in systems of higher education institutions was formally commenced in the UN's conference on the Human Environment in 1972 (Calder & Clugston, 2003; Verbitskaya, Nosova, & Rodina, 2002). The term ESD initially appeared at the Rio Earth Summit in 1992. It is defined more broadly than environmental education and also includes social, economic, cultural and governance aspects of sustainability. ESD intends to enable everyone to acquire the values, competencies, skills and knowledge necessary to contribute to building a more sustainable society, which requires revisions to teaching methods and contents and familiarizing students with concepts and skills such as systems and design thinking, complexity, multilateral decision-making and community engagement. Subsequently, the United Nations General Assembly passed a resolution in 2002 to declare the decade 2005–14 as the Decade of Education for Sustainable Development (DESD) to further foster ESD (UNESCO, 2005). Before DESD, the implication of environmental issues in higher education institutions received little or no attention (Lukman et al., 2010). DESD became a catapult for transcending ESD in all sectors of education across the developed and developing world (Cebrián & Junyent, 2015). For instance, the US Partnership for Education for Sustainable Development (USP) with the vision to integrate sustainability into the United States' education and learning was formed as a response to UN DESD (Rowe, Gentile, & Clevey, 2015). As a result of the DESD and countless sustainability initiatives, higher education institutions have realized the value and the urgency of integrating sustainability into their educational system as an interdisciplinary concept (Gaziulusoy & Boyle, 2013).

In the age of sustainable development (Sachs, 2015), every organization should commit to act sustainably, behave in a responsible manner and report its sustainability efforts to the relevant stakeholders. Higher education institutions are no exception. They approach sustainability differently and implement sustainability measures at various levels: institutional framework, campus operations, education, research, outreach and collaboration, sustainable development through on-campus experiences, assessment and reporting (Lozano et al., 2015).

Higher education institutions have adopted a considerable number of declarations and charters since the 1970s. The first international declaration on environmental education, known as the Tbilisi Declaration, was signed at the Intergovernmental Conference on Environmental Education in Tbilisi in 1977 (Calder & Clugston, 2003). The Talloires Declaration, which was adopted in Talloires, France, in 1990, recognizes that universities play a major role in the education, research, policy formation and information exchange, and sets forth ten actions: (1) increase awareness of environmentally sustainable development, (2) create an institutional culture of sustainability, (3) educate for environmentally responsible citizenship, (4) foster environmental literacy for all, (5) practise institutional ecology, (6) involve all stakeholders, (7) collaborate for interdisciplinary approaches, (8) enhance the capacity of primary and secondary schools, (9) broaden service and outreach nationally and internationally, and (10) maintain the movement. Other prominent higher sustainability declarations of education institutions include the Swansea Declaration, Kyoto Declaration¸ Lüneburg Declaration on higher Education for Sustainable Development, Global Higher Education for Sustainability Partnership, and Rio+20 higher Education Sustainability Initiative to name just a few.

However, sustainability reporting or disclosure of nonfinancial information is not a core element in this declaration or of most other declarations, charters or initiatives. In the Talloires Declaration, Actions (2) and (6), in particular, provide the foundation for sustainability reporting in universities through "engaging in. .. information exchange on population, environment, and development to move toward global sustainability" and collaboration with stakeholders. In general, these declarations, charters and initiatives have failed to recognize reporting as an integral element of the integration of sustainability in higher education institutions. In addition, Ralph and Stubbs (2013) identified enabling factors for higher education institutions to integrate sustainability into their strategy including a strong policy environment, resourcing of strategies, and encouragement of leaders and environmental sustainability advocates. One factor that is usually overlooked in these analyses is sustainability communication and reporting.

2.2 | Sustainability reporting in higher education institutions

In the past decade, a growing number of higher education institutions have integrated sustainability into their organizational systems, namely within curricula, research, operations, outreach, and assessment and reporting (Cortese, 2003). Sustainability reporting provides a powerful tool for universities to evaluate their performance and communicate their sustainability efforts to the respective stakeholders and society at large (Ceulemans et al., 2015).

Sustainability reporting was developed as a legacy of integrated social reports of the 1960s, environmental reports (Ceurstemont, Bolton, & Capps, 2001) and nonfinancial reporting of the 1980s (Isenmann, 2011). The amalgamation of social and environmental disclosures resulted in the first ever quasi-sustainability reports in the 1990s (Hahn & Kühnen, 2013). However, the first concerted efforts for standardization of sustainability reporting came with the establishment of the Global Reporting Initiative (GRI, 2013). GRI released the first version of its reporting framework in 2000 and was later revised

in 2002, 2006 and 2011. GRI G4 and GRI Standards, the latest iterations of the sustainability reporting framework, were released in 2013 and 2016, respectively. GRI is the most prominent framework for voluntary reporting of nonfinancial information in the world (Brown, de Jong, & Levy, 2009). The purpose of GRI is to induce a process of standardization for disclosures by developing a universally accepted framework for sustainability reporting (Vormedal & Ruud, 2009). To date, nearly 10,000 organizations have released approximately 25,000 reports using GRI guidelines. Following the proliferation of GRI sustainability reporting, some higher education institutions have started to report their sustainability practices (Ceulemans et al., 2015). Figure 1 shows the adoption of sustainability reporting by higher education institution for the period 1999–2015. The results were obtained from frequency counts conducted using the GRI database on May 29, 2016.

The results show that sustainability reporting in higher education institutions has experienced an overall upward trend in the past decade, although the trend is not consistent in all years. The adoption of sustainability reporting by higher education institutions took off in 2010 and continued with a relatively increasing trend but a decline in 2013. This trend shows that more and more higher education institutions are moving toward sustainability reporting under GRI, the same trend also being seen in the overall trends of sustainability reporting in higher education institutions. CorporateRegister, for instance, records 112, 134, 143, 127 and 127 sustainability reports for the period between 2011 and 2015, although these numbers seem feeble in comparison with those from the business sector. Lozano (2011) also found that sustainability reporting in higher education institutions is still in its early stages in terms of both the number of reporting institutions and the level of reporting in comparison with private corporations. This stems from the fact that higher education institutions have not yet seriously taken up the challenge of reporting their sustainability efforts. In fact, 92 of 250 reports do not follow GRI guidelines, which may also partly boils down to the fact that the GRI guideline was not designed for higher

education institutions (Lozano, 2011). Furthermore, many universities, following their traditional reporting style, publish environmental reports or integrate nonfinancial information in their annual reports and have failed, so far, to integrate international frameworks such as GRI and Global Compact. Figure 2 shows the regional distribution of GRI framework adoption in higher education institutions for the period 1999–2015.

Unsurprisingly, European universities have the lead in sustainability reporting followed by North America (mostly United States), and Latin America and the Caribbean, while Asia and Africa lag behind Australia.

## 2.3 | Sustainability assessment tools

A considerable number of assessment tools have been developed since the proliferation of sustainability declarations in higher education institutions in the 1990s. Sustainability assessment tools, as an integral part of the performance management process, play a key role in planning, implementation, management, assessment and reporting of sustainability practices of higher education institutions. A list of the sustainability assessment tools that were developed and whether they address sustainability reporting is presented in Table 1. Note that the following list is not exhaustive and only includes selected prominent tools.

These tools typically entail common sustainability attributes such as energy, equality, diversity, water, waste, emissions, as well as attributes related to sustainability in higher education institutions such as research, curriculum, teaching, courses, sustainability education and operations. Shriberg (2002) studied 11 major cross-institutional sustainability assessment tools and found that, while varying significantly in purpose, scope, function and the state of development, they have the following common features. The Association for the Advancement of Sustainability in Higher Education's (AASHE's) STARS, for instance, is a transparent, self-reporting framework that assesses and evaluates the relative progress of universities toward sustainability. STARS is made up of credits that cover the whole range of higher education sustainability and include performance indicators and criteria organized into four categories: Academics, Engagement, Operations, and Planning & Administration (AASHE, 2016). Participating universities and colleges either receive a STARS Bronze, Silver, Gold or Platinum rating or earn recognition as a STARS Reporter. As of January 15, 2017, 802 universities use the STARS Reporting Tool and 657 ratings have been awarded cumulatively. Figure 3 demonstrates the diffusion of the STARS system during the period September 2009 to June 2016.

Shi and Lai (2013) developed a university ranking framework to integrate sustainability criteria into university ranking systems. The criteria of the framework were extracted from three prominent university rating frameworks that is, STARS, the American College and University Presidents' Climate Commitment or ACUPCC, and the College Sustainability Report Card (the Green Report Card). According to Shi and Lai (2013) more and more university sustainability ranking systems have been developed in the past decades to incorporate sustainability into their systems and demonstrate their commitment toward a sustainable society. Having evaluated the state of sustainability assessment tools in higher education institutions, the next section will introduce the method and the tool developed for assessing sustainability reporting in higher education institutions.
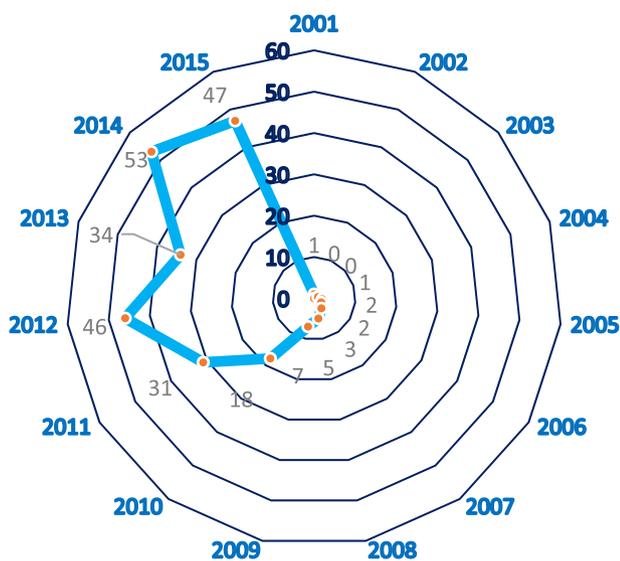
FIGURE 1 Chronological view of sustainability reporting in higher education institutions based on the GRI reporting framework and other frameworks for the period 1999–2015 including 250 reports (as of may 29, 2016) [Colour figure can be viewed at wileyonlinelibrary.com]
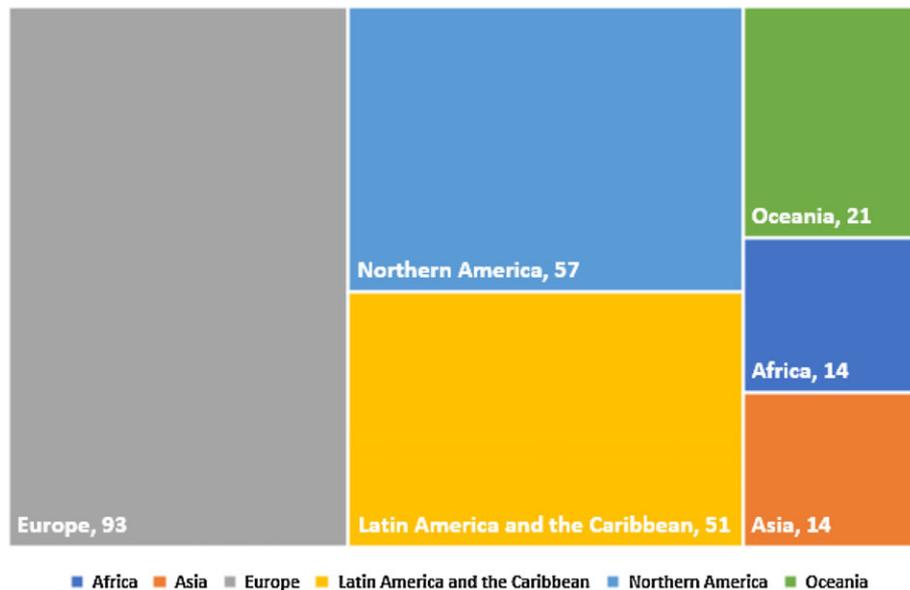
FIGURE 2 Geographic distribution of sustainability reporting in higher education institutions for the period 1999–2015 including 250 reports (region, number of reports in the database as of may 29, 2016) [Colour figure can be viewed at wileyonlinelibrary.com]

3 | METHOD

Most of the contributions to the research on sustainability in higher education institutions adopt two prevailing methodological approaches that is, theoretical and case study. The case study approach is the dominant method used in sustainability research in higher education institutions (Lozano et al., 2015). Yin (1994, p. 13) defines a case study as a research study in which the number of variables of interest far outweigh the number of data points. Providing a detailed account of the research process demonstrates methodological rigor (Yin, 1994). Therefore, a rigorous framework has been used to ensure the validity and reliability of the results. Following Gibbert, Ruigrok, and Wicki (2008), four elements of methodological rigor that is, internal validity, construct validity, external validity and reliability, were reviewed. Internal validity demands (causal) relationships between variables and results. Reliability requires replicability of the results, while construct validity concentrates on the extent to which research investigates what it claims to study. Finally, external validity focuses on the generalization of the results.

Assessment tools help with better understanding of where a higher education institution stands, in terms of sustainability, and which initiatives and activities could improve sustainability. They also affect the incentives of higher education institutions in engaging in sustainability (Yarime & Tanaka, 2012). The development of corporate sustainability assessment tools provides a good example for higher education institutions. Designing a specialized sustainability reporting framework, similar to GRI, and rating systems for evaluating sustainability performance/reporting of higher education institutions, similar to Dow Jones Sustainability Index (DJSI), Oekom, GMI, Bloomberg ESG Data, and so on, can present useful takeaways from the developments of corporate sustainability assessment tools. Shi and Lai (2013) and the STARS framework are good examples of emulating best practices of corporate sustainability in higher education institutions.

Shriberg (2002) emphasized the importance of developing a "universal assessment tool." This study uses two comprehensive sustainability frameworks that were developed for business and education sectors to design a comprehensive sustainability reporting assessment tool. Rahdari and Anvary Rostamy (2015) developed a general set of sustainability indicators using a four-pronged approach including rating systems/indices, reporting guidelines, normative frameworks and management systems. They structured the most common indicators of sustainability into a three-dimensional Environmental, Social and Governance framework that can be used as a general tool for evaluating the performance of different organizations or to assess their sustainability reporting. However, to assess sustainability reporting of universities, an educational dimension should accompany the most common indicators of sustainability. Educational indicators reflect social and cultural norms (Lukman et al., 2010). For this, Lozano (2006) developed the Graphical Assessment for Sustainability in Universities (GASU) tool which simplifies the comparison of sustainability performance/reporting in universities. GASU was based on the GRI 2002 guidelines and had an educational dimension and a five-point measurement scale. The Educational dimension contains three categories: (1) curriculum, (2) Research and (3) Services. The two frameworks provide a robust construct for assessing sustainability reporting in universities and higher education institutions. Both frameworks are indicator-based, which provides high levels of transparency, consistency and usefulness for decision-making (Lozano, 2006). By combining these two frameworks, in contrast to most previous studies that merged the indicators, the validity of the frameworks will be preserved. Lozano, Llobet, and Tideswell (2013) found that in preparing a sustainability report for a university, or any institution, it is vital to adopt a holistic perspective, that is addressing different interrelations between indicators, categories and dimensions, and the system. Dimensions, main criteria, subcriteria and indicators were extracted from these two frameworks and a quantitative four-dimensional tool was developed (Figure 4).

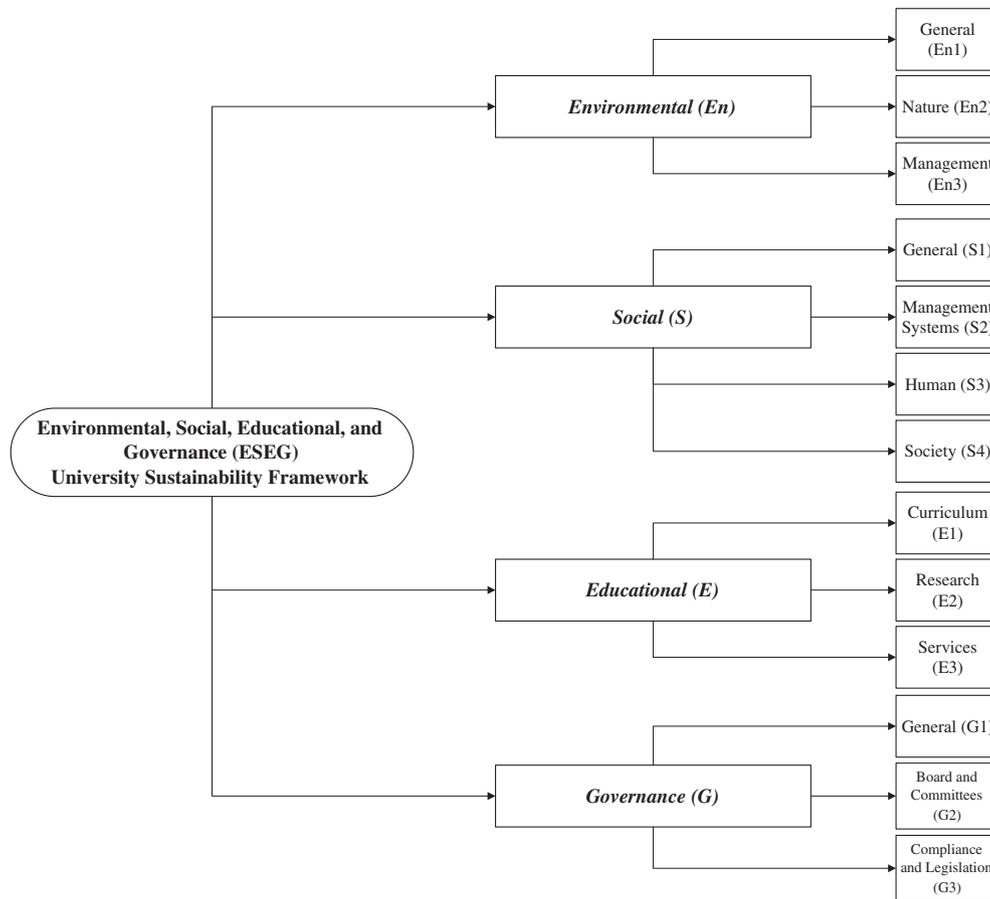**TABLE 1** A list of sustainability assessment tools

No.	Year	Type	Sustainability assessment tool	Sustainability reporting
1	2014	Academic	Gómez et al.—Sustainability in HEI	+
2	2014	Practical	Sustainability tracking, assessment and rating system (STARS) (version 0.4 was developed in 2007)	+
3	2013	Practical	Green league (people and planet green league guide)	+
4	2013	Academic	Shi and Lai—University ranking framework	+
5	2013	Practical	Greening universities toolkit v.2	
6	2012	Academic	Yarime and Tanaka—Sustainability assessment tools in HEIs	+
7	2012	Practical	Greening universities toolkit	
8	2012	Practical	GreenMetric world university ranking	
9	2011	Practical	Campus sustainability selected indicators snapshot and guide (CSSISG). First version published in 2006	
10	2010	Practical	The green plan—National Framework—France	
11	2009	Practical	Campus sustainability assessment framework Core (CSAF core)	
12	2009	Practical	The unit-based sustainability assessment tool	+
13	2007	Practical	College sustainability report card	+
14	2007	Practical	Sustainability tool for assessing universities curricula holistically (STAUNCH)	
15	2006	Academic	Lozano—Graphical assessment for sustainability in universities (GASU)	+
16	2004	Practical	Good Company's sustainable pathways toolkit	
17	2003	Practical	Campus sustainability assessment framework (CSAF)	+
18	2003	Practical	Higher education Partnership for Sustainability (HEPS)	+
19	2003	Practical	Eco-management and audit scheme (E-MAS)	
20	2002	Practical	ESD toolkit	
21	2002	Practical	Campus sustainability assessment review project (CSARP)	+
22	2002	Academic	Shriberg—Institutional assessment tools for sustainability	
23	2001	Practical	National Wildlife Federation's state of the campus environment	
24	2001	Practical	Auditing instrument for sustainability in higher education (AISHE)	
25	2001	Practical	National Wildlife Federation's state of the campus environment	
26	2001	Practical	Campus sustainability selected indicators snapshot	
27	2000	Practical	Higher education Partnership for Sustainability Reporting Tool (HEPS RT)	+
28	2000	Practical	Environmental management system self-assessment checklist	+
29	1999	Practical	Sustainability assessment questionnaire (SAQ)	
30	1998	Practical	Grey pinstripes with green ties—MBA programs	+
31	1998	Practical	Higher education funding council—England's environmental workbook	+
32	1996	Practical	Environmental management system self-assessment checklist	+
33	1993	Practical	Campus ecology	
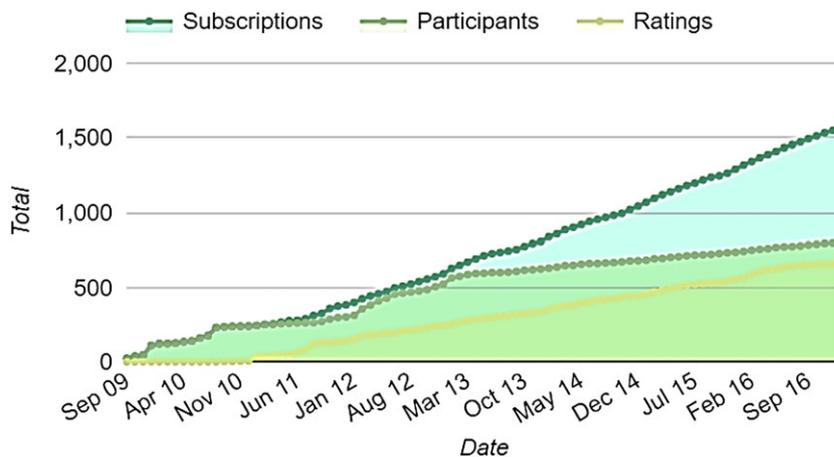
FIGURE 3 Diffusion of STARS system from September 2009 to September 2016 (source: Stars.aashe.org) [Colour figure can be viewed at wileyonlinelibrary.com]

In the quantitative, indicator-based four-dimensional framework, equal weighting has been applied to hinder subjectivity from affecting the results. Use of equal weighting across all criteria in the framework presents a challenge. Nevertheless, it is worth mentioning that while the employment of equal weighting across all measures in the ESEG framework is unrealistic, reaching an accurate weighting vector to

FIGURE 4   The proposed ESEG university sustainability reporting assessment tool

modify the scores on each dimension, main and subcriteria is beyond the scope of this study. The linguistic scale, presented in Table 2, is used for assessing sustainability reporting.

Many tools have also been developed for planning, implementation, management, assessment and reporting of sustainable practices of higher education institutions. Yarime and Tanaka (2012) conducted a 20-year study to examine the basic trends and characteristics in the scope and methodology of the sustainability assessment tools in higher education institutions. They recategorized indicators and questions of the sustainability assessment tools into the five categories governance, operations, education, research and outreach. Yarime and Tanaka (2012) found that the education, research and outreach aspects of sustainability activities of higher education institutions are not well addressed in sustainability assessment tools (i.e., a research gap) and identified the need for the development of comprehensive sustainability assessment tools for higher education institutions. The ESEG University Sustainability Reporting Assessment Tool, by combining two comprehensive sustainability frameworks from the business and education sectors, accounts for these shortcomings. Collaboration is a key element in mainstreaming sustainability among higher education institutions, so outreach is an underlying factor in all four dimensions. The four dimensions of the framework are elucidated upon below.

Environmental Dimension—the environmental dimension is much highlighted in most of the higher education institutions' sustainability assessment frameworks and has been a key focus in universities' sustainability programs. The environmental dimension entails environmental management (environmental management systems, water–energy efficiency, services and supply chain), natural preservation (climate change mitigation efforts, biodiversity, waste and emission reduction) and general categories (risk assessment, environmental education within the higher education institutions, transparency of environmental performance, and outreach through participating in natural conservation efforts).

TABLE 2   Scale used for scoring in ESEG framework

Code	Score	Scale	Scoring
0	0%	Null (N)	The indicator is not covered.
1	25%	Low (L)	The indicator is covered under a more general topic.
2	50%	Medium (M)	The indicator is directly covered but not adequately measured.
3	75%	High (H)	The indicator is quantitively or qualitatively measured and reported. No program is associated with the indicator.
4	100%	Very high (VH)	The indicator is quantitively or qualitatively measured and reported. A goal is tied to the indicator and its performance is associated with a program and measured with time.

Social Dimension—the social criteria are often neglected in higher education institutions although they are particularly prominent for the stakeholders. This particular category highlights the significance of social indicators and that they are as important in higher education institutions as in the business and social sectors, if not more so. The social dimension includes a wide variety of issues such as stakeholder management, socially responsible investing, social inclusion and equality, labor and human rights, outreach through community development and philanthropy, and transparency of social performance.

Educational Dimension—the educational dimension is adopted from Lozano (2006). It encompasses sustainability curriculum development, sustainability research and services (awareness raising, outreach through interuniversity research collaboration, etc.). The educational dimension is what makes higher education institutions unique in comparison with other organizations. Turan, Cetinkaya, and Ustun (2016) found teaching to be the most important aspect of a sustainable university to stakeholders.

Governance Dimension—this dimension revolves around administrative structures and policy directions of higher education institutions and how they integrate sustainability within their conventional governance structure. It includes issues such as board composition, the structure and functioning of the committees, oversight, compliance, ethics and corruption, financial policy, transparency, and outreach through networking with business, government and other higher education institutions.

One of the strengths of the ESEG tool for assessing sustainability reporting in higher education institutions is the strong consideration of the governance and social dimensions, which often have been found to be less represented in the higher education institutions' sustainability tools (Yarime & Tanaka, 2012). The approach used in this study is a nested one (Rahdari, 2016) focusing on one practical example that is, the UC.

4 | PRACTICAL EXAMPLE: UNIVERSITY OF CALIFORNIA

The UC is a public university with ten campuses (Berkeley, Davis, Irvine, UCLA, Merced, Riverside, San Diego, San Francisco, Santa Barbara and Santa Cruz) and five medical centers. The UC's institutional commitment to campus sustainability began in June 2003 by the adoption of green building and clean energy policy principles and 2004's Policy on Green Building Design and Clean Energy Standards. The latter was updated and extended to cover all areas of climate protection practices, building renovations, sustainable operations and maintenance, waste reduction, environmentally preferable purchasing, sustainable transportation, sustainable food service and sustainable water systems. To manage sustainability on all ten campuses a Sustainability Steering Committee was convened with eight Policy Working Groups on Green Building, Climate Change and Clean Energy, Sustainable Transportation, Sustainable Operations, Waste Reduction and Recycling, Sustainable Purchasing, Sustainable Food Service, and Sustainable Water Systems. All campuses are represented on each of the working groups.

The UC is an archetype in sustainability among universities and fits as a practical example for four reasons. Firstly, the UC is one of the leading universities in terms of green and sustainability practices (University of California, 2015b). For instance, UC San Diego is the top Institution in the United States and fourth worldwide for Environmental and Earth Sciences as appointed by the journal *Nature* and the UC,Berkeley was selected by Sierra Club as among the top three Cool Schools for sustainable food. Moreover, UC San Francisco's Medical Center was recognized by Practice Greenhealth's Top 25 Environmental Excellence Award and Princeton Review put nine UC campuses among the most environmentally friendly colleges in the United States. Secondly, the sustainability movement in the UC was student-led and motivated since its beginning in the early 2000s as well as many student-led social and environmental projects implemented since the 1960s (University of California, 2013). Thirdly, UC and its campuses has a noticeable track record in sustainability reporting. UC has made significant progress in sustainability reporting, going from meeting minutes to developing fully fledged sustainability reports that lately have been prepared in accordance with GRI guidelines. Finally, its sustainability ambitions are strategic, scalable and oriented to the long term. UC's sustainability program covers all of its ten campuses, five medical centers, three national laboratories, and agricultural and natural resources centers.

UC is committed to cut greenhouse gas emissions (a 50% reduction based on 1990 levels), outperform the energy provisions of the California Building Code by at least 20%, reduce potable as well as per-capita water use by 20%, divert 100% of campus solid waste from landfills and procure 20% of its food from sustainable sources by 2020. Furthermore, it should reach zero net greenhouse gases from buildings and its vehicle fleet by 2025 and achieve carbon neutrality for scope 1 and 2 emissions by 2025 and scope 3 by 2050.

UC is a beneficiary of the Morrill Land-Grant Acts. It is also located in the state of California which is one of the most progressive states in the United States and usually pursues environmentally friendly policies. Given these qualifications, the râisons d'être behind the selection of UC as the case study is two-fold. First, UC is a progressive school that considering the evergrowing sustainability movement can serve as an apotheosis of sustainability for other universities. Secondly, it is a massive organization that allows this study to explore different dimensions of the proposed assessment tool which would not be feasible with a less-known and smaller private university.
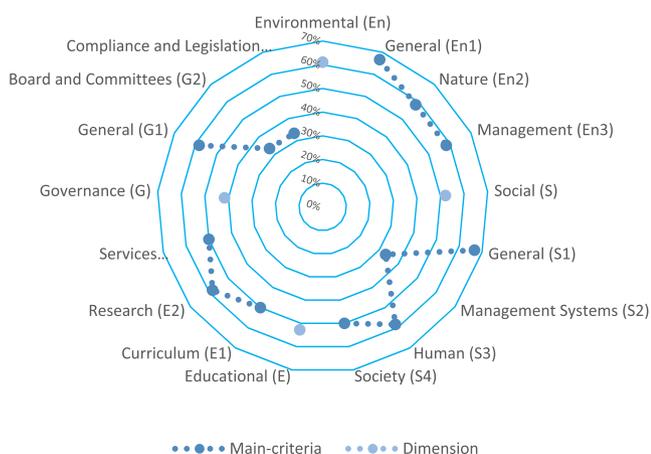
5 | FINDINGS AND DISCUSSION

Sustainability reporting is not merely a compliance or a reporting process but also a stakeholder engagement (Brown et al., 2009), awareness raising and performance measurement tool. One of the ways by which sustainability can trickle down across higher education institutions is by engaging the most important stakeholders in universities that is, students and the staff. Sustainability reporting would foster a culture of sustainability in higher education institutions and raise awareness with regard to sustainability within the organizations as well as in relation to their stakeholders (Heilmayr, 2005). UC provides a good example of such an engagement. UC's commitment to sustainability declarations have been influential in setting its sustainability goals. For instance, as a signatory to the American College and University Presidents Climate Commitment, UC has committed to cut its greenhouse gas emissions to 1990 levels, a 50% reduction. To foster

collaboration and engagement in sustainability programs, the Carbon Neutrality Initiative Student Fellowship Program funds student-generated projects that support the UC system's goal to produce zero-net greenhouse gas emissions by 2025.

The Global Climate Leadership Council of the UC has pledged a 5-year US$1 billion commitment to climate solutions through entrepreneurship and innovation to achieve carbon neutrality by 2025 (University of California, 2015a). Furthermore, UC have taken the lead in several initiatives. By way of illustration, UC is the first university in the world to sign the Montreal Carbon Pledge, a UN Principles for Responsible Investing initiative which considers the long-term investment risks associated with climate change and carbon regulation. UC has also developed a Framework for Sustainable Investing that has eight dynamic topics including climate change, food and water security, inequality, an aging population, diversity, human rights, circular economy, ethics and governance (University of California, 2015a). In terms of food, as the world population grows to an expected 8 billion people by 2050, the UC's Global Food Initiative ensures that it can sustainably and nutritiously feed itself.

The data used for the analyses was from UC's 2015 sustainability report and the analyses conducted are based on UC's overall performance rather than a particular campus. The main analysis included the subcriteria level evaluations. The assessment included 42 indicators, 12 for the educational dimension and 30 for governance, social and environmental dimensions. To examine Nature (En2, main criteria) from the environmental (En) dimension, three subcriteria measures including Climate Change (En21), Biodiversity (En22), Emission, and Pollution and Waste (En23) were assessed based on Rahdari and Anvary Rostamy's (2015) sustainability indicators and the educational dimension (E) was evaluated based on Lozano (2006). Figure 5 summarizes the results of UC's performance assessment based on the ESEG University Sustainability Reporting Assessment Tool.

Using scoring, the results demonstrate the level of reporting on each dimension as well as its main criteria. For instance, ethe ducational dimension (E) had a score of over 52.8% with the main criteria of research (E2) scoring the highest in this dimension, at 58.3%. The results of the ESEG framework analysis show that UC is performing more strongly in the environmental and educational dimensions while the social and governance dimensions are lagging behind. This framework can be used to evaluate the performance level of sustainability reporting among higher education institutions.

The state of sustainability reporting in universities is bittersweet (Leal Filho, Manolas, & Pace, 2015). On the one hand, higher education has not been relatively successful in integrating sustainability into its curricula, operations, outreach, assessment, reporting and raising awareness. On the other, the potential of higher education institutions in transcending sustainability and sustainable development agenda is underused. A good example is online sustainability reporting. Isenmann, Bey, and Welter (2007) identified several trends that would reveal and augment the footholes of online sustainability reporting in the future. Some of these trends, such as stakeholder engagement and computer-based media, have already become an integral part of sustainability reporting while others, such as two-way communication, have not been widely practised. By contrast, inventive practices such as online real-time reporting of economic, social and environmental indicators are in the pipeline in the business sector and even some of the higher education institutions like Harvard University are moving toward it. The realization of technologies such as real-time reporting of sustainability information can help with timely decision-making with regard to sensitive information for example, emission or waste management data.

6 | CONCLUDING REMARKS, LIMITATIONS AND FUTURE RESEARCH

Sustainability reporting is gaining momentum among higher education institutions, with greater numbers realizing the value and the exigency of integrating sustainability reporting into their educational system. However, sustainability reporting in higher education institutions remains in an inchoate state in terms of both the number of reporting institutions and the level of reporting in comparison with the business sector (Lundberg, Balfors, & Folkeson, 2009). Furthermore, few universities provide externally audited sustainability reports. Nonetheless, it is becoming de rigueur for higher education institutions to share their sustainability efforts with their stakeholders through sustainability reporting. More higher education institutions are moving toward a business-oriented management, and therefore developing sustainable business models for the entire university can provide the financial incentives for policy-makers and universities to move toward sustainability reporting and ESD. There are several trailblazing universities moving toward this approach. UC's impact investing strategy summarized under its Framework for Sustainable Investing is an appropriate example of incorporating business sustainability strategies.

This study added value to the field of sustainability in higher education institutions by proposing a tool for the assessment of sustainability reporting in higher education institutions, applying the framework using a real-world example. The main contributions of the study were three-fold. First, it reviewed the development of ESD and sustainability in universities. Secondly, it examined the development of sustainability assessment tools in higher education institutions. Finally, it developed a tool for quantitative assessment of sustainability reporting in higher education institutions and provided a practical example of UC to showcase the application of the ESEG framework. The study is not, however,

FIGURE 5 University of California's performance evaluation based on the ESEG university sustainability reporting assessment tool [Colour figure can be viewed at wileyonlinelibrary.com]

without its limitations. First, the study focuses on one example (a nested approach) to introduce a new framework (i.e., ESEG) for the assessment of sustainability reporting in higher education institutions. This limitation was partly addressed by refraining from drawing general conclusions from the UC example and not extending the results to all higher education institutions. Secondly, sustainability reporting is not as well established in higher education institutions as it is in the business community, limiting the scope of the study. This stems partially from the fact that most of the sustainability reporting frameworks were designed, predominantly, for business organizations and the indicators within the framework are suitable for business organizations rather than educational organizations.

Future studies can use a cross-case analysis approach in assessing sustainability reporting in higher education institutions through comparative analysis and focus on examining the relationship between sustainability reporting in higher education institutions and key concepts such as university (general) rankings, third-party assurance, sustainability performance, economic performance, the university's image, public perception of sustainability performance and sustainability declarations/charters/initiatives.

ENDNOTES

[1] Sustainable Development Goal 4: "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". Subgoal 4.7 of SDG 4 focuses on ESD; by 2030 "ensure all learners acquire knowledge and skills needed to promote sustainable development, including among others through ESD and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture's contribution to sustainable development."

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