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Understanding the limits of assessing sustainability at Universidad San Francisco de Quito USFQ, Ecuador, while reporting for a North American system

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Abstract

Purpose – Universidad San Francisco de Quito, USFQ, completed an assessment study to understand its performance in sustainability in 2012. This study aims to recognize the limitations of applying a North American rating system considering relevant criteria to a South American university and to emphasize the importance and lack of benchmarks available in the region.

Design/methodology/approach – Methodology used for this study is based on the Sustainability Tracking Assessment Rating System (STARS) by AASHE. In December 2013, USFQ joined the Pilot Program that included publicly documenting efforts, sharing feedback and making suggestions for system improvements.

Findings – Data collected by USFQ in 2012 and 2013 illustrate how the status of USFQ as a non-residential, teaching university in Ecuador in a developing country had several challenges while using an evaluation system established for universities within a North American system. The limits of assessing sustainability in South America are associated to its geographical location, the number of students and staff that commute to University and the lack of environmental services and certifications available in Ecuador. There are applicability issues with the use of STARS without performance reports from regional peers that can guide the development of relevant benchmarks for future comparability.

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Originality/value – Little research has been conducted in the assessment and tracking of sustainability within universities in South America. This paper is one of the first to address the applicability of a North American self-reporting tool to a South American university.

Keywords Sustainability, Benchmark, Campus sustainability, STARS, Latin American higher education institutions, South American university

Paper type Case study

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Introduction

The concept and implementation of sustainable development (SD) are now being included in universities' agendas, policies and activities (van Weenen, 2000; Cortese, 2003). Higher education institutions (HEIs) have recognized the importance of including sustainability in their students' education and community's future, particularly due to their unique position to stir change (Stephens *et al.*, 2008; Tilbury, 2011; Cortese, 2003). However, implementing sustainability practices on campuses could be more challenging than in a corporate atmosphere owing to additional pressures such as universities structures, tradition and fear of diffusing priorities from education, research and service, among others (Wu *et al.*, 2010; Krizek *et al.*, 2012).

Motivation to start a sustainable campus comes from ethical duty (Orr, 1991), potential to influence society and the environment (Cortese, 2003) and the necessity and value of various business propositions such as cost reduction, prevention of financial loss owing to new legislation or long-term risk management through proper investment of endowments (Ho *et al.*, 2010). All institutions, private or public, rely on their financial results; thus, management has to balance the stakeholders' interests in any sustainable initiative being considered for implementation (Hoffman and Woody, 2008; Málovics *et al.*, 2008). Institutions may also regard a sustainable campus as an opportunity to attract new students. According to Robert Franek, The Princeton Review's Senior VP–Publisher, 61 per cent of 10,000 teenagers in the USA who participated in a survey indicated that a school's commitment to the environment would influence their decision to apply to or attend the school (ThePrincetonReview, 2016). Sustainable campuses promote leadership and brand recognition, as well as association of good standing in the community. Each university may have a different perspective as to why sustainability initiatives are important. This may be related to their own impact on the environment depending on a range of factors such as academic majors (e.g. Chemistry major with chemical purchases and discarding compared to a business school), geographic location (tropical versus equatorial climates and energy availability) and number of enrolled students (ecological footprint).

In general, there are many examples of the implementation of SD in HEIs; however, these efforts tend to be mainly compartmentalized and not holistically integrated in the education system (Lozano *et al.*, 2015). University sustainability initiatives range from leader's commitments, sustainability policies, internal agreements and to more than a dozen global declarations and networks (Lozano *et al.*, 2013) such as the International Sustainability Campus Network (ISCN), the Global University Network for Innovation (GUNI), the Global University Partnership for the Environment and Sustainability (GUPES), among others. There are also major agreements such as the American College & University Presidents' Climate Commitment with over 695 signatories and 533 climate actions for American universities (ecoAmerica). In Latin American universities, there was the Declaration of the Regional Conference for Higher Education for Latin America and the Caribbean (CRES) that took place in Colombia in June 2008. The Conference was organized by the UNESCO

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International Institute for Higher Education for Latin America and the Caribbean (IESALC-UNESCO) (IESALC, 2008). A substantial effort was created through ARIUSA, the alliance of university networks for sustainability and the environment, which has been meeting since 2007 (ARIUSA, 2014). They represent 22 networks of 360 universities in 15 Latin American countries to promote the coordination of actions in the field of environmental education and the collaboration for research in the environment.

Despite these efforts, information about the progress made by universities on their own campuses is limited in South America. Campus sustainability is a fairly new concept for South American HEIs and therefore there is little published research, frameworks or benchmarks in place at this time (Matamoros, 2008; Gomez *et al.*, 2014). The use of peer sustainability reports and environmental certifications would be an important stepping stone to better increase the exchange of ideas for sustainability initiatives and create strategies tailored to the South American region (Gomez *et al.*, 2014; Sayed *et al.*, 2013).

Universidad San Francisco de Quito USFQ is located in Ecuador, a country that has yet to become fully developed and has the potential to skip traditional industrialization in favor of a sustainable-based economy for future generations given the production matrix shifts from extractive activities. The University was founded in 1988 as a private liberal arts university, and at the time of the study, it boasted 5,953 students in 2012 with the majority being undergraduates. The Ecuadorian Government's Higher Education Grading System (CEAACES for its Spanish acronym), ranks USFQ as one of only three HEIs in Ecuador that provides high-quality education, offering over 40 different majors including medicine, engineering and veterinary science (USFQ, 2016). Its main campus sits in a valley named Cumbayá near Quito, the capital city of Ecuador. At 2,350 m of altitude, USFQ experiences a unique spring-like weather year round, with an average temperature at noon of 72.7°F and about 12 sunlight hours for each day (Cazorla and Tamayo, 2014).

Given this background and the yearning to implement and evaluate an appropriate sustainability program, USFQ enrolled in the pilot project from the Association for Advancement of Sustainability in Higher Education (AASHE) and used the Sustainability Tracking, Assessment and Rating System (STARS), as it has been labeled as the most comprehensive reporting tool available for assessing and tracking sustainability in HEIs (Sayed *et al.*, 2013). During the process of evaluating and comparing USFQ's performance in sustainability, there were no other reports for comparison in the region.

The following research provides USFQ's sustainability performance for 2013; describes the challenges and opportunities of using an evaluation tool mainly catering to North American institutions at a South American University, such as USFQ; and demonstrates the need to establish relevant benchmarks that may enable other universities in similar contexts to assess their performance in sustainability.

Methodology

The self-reporting tool STARS from AASHE was used to generate the first sustainability report for USFQ. AASHE provides a guideline of possible categories that universities can pursue to achieve a sustainability rating. However, at the moment, AASHE and its tools are mainly focused on North American universities. Owing to the growing interest at the international level, they implemented an international pilot program for HEIs worldwide, and USFQ joined the program in December of 2012. The STARS tool at the time, Manual 1.2, includes seven different criteria for HEIs which are eloquently summarized by Beringer *et al.* (2008): curriculum, research and scholarship, operations, faculty and staff development and rewards, outreach and service, student opportunities, institutional mission, structure and planning to provide a holistic view of the sustainability of a university.

The baseline year for USFQ's first sustainability report was 2012, although the time frame in which data were collected was from January 2012 through November 2013. The main campus located in Cumbayá was the geographic boundary for the study for all scopes except for business travel. The University also has scientific research stations in other regions of Ecuador: Tiputini Biodiversity Station (TBS) located in the Amazon, the Galápagos Institute for the Arts and Sciences (GAIAS) and the Galapagos Science Center (GSC) in San Cristóbal, Galápagos, and Paluguillo Páramo Station located in Papallacta, as well as several other research operations functioning throughout Ecuador.

The STARS evaluation is divided into three main categories: Education & Research, Operations and Planning, Administration & Engagement. Each category is worth 100 points and is divided into further subcategories. Credits are awarded based on impact. Tier-I credits are worth 1 or more points, while Tier-2 credits are worth 0.25 points, as those strategies tend to have a smaller impact than Tier-I credits or are already accounted for in the method. To calculate the final score, the average of the three categories is calculated for a grade over 100 points.

Results

USFQ's first sustainability report chose specific achievable sections from the three categories specified in STARS Manual 1.2. Table I shows the credits that USFQ was able to pursue during its first assessment for STARS. Even though there are 100 points available for universities to achieve in each section, USFQ identified those as unable to attain based on context in Table II. Being USFQ's first attempt, there were restrictions on pursuing credits that required showing the progress or reductions such as greenhouse gases (GHGs) or water consumption. The following analysis disentangles the possible sections to be pursued and the challenges with each.

Table I.
All credits pursued and obtained by USFQ in 2012 using STARS Manual 1.2 based on 3 categories: Education & Research, Operations and Planning, Administration & Engagement

Education & Research	
Co-curricular education	0.75
Curriculum	4
Research	0
Subtotal	4.75
Operations	
Buildings	0
Climate	2
Dining services	8.7
Energy	0
Grounds	0
Purchasing	0
Transportation	4.2
Waste	1.56
Water	0
Subtotal	16.46
Planning, Administration & Engagement	
Coordination and planning	0
Diversity, access and affordability	9
Human resources	8
Investment	0
Public engagement	13.7
Subtotal	30.7
Total	51.91
Average	17.30

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Education & Research	
Co-curricular education	
Tier 2-3: Model Room in Residence Hall	0.25
Tier 2-4: Themed Housing	0.25
Subtotal	0.5
Operations	
Energy	
OP-8: Clean and Renewable Energy	7
Tier 2-1: Timers for Temperature Control	0.25
Tier 2-4: Vending Machine Sensors	0.25
Grounds	
Tier 2-3: Tree Campus USA	0.25
Tier 2-4: Snow and Ice Removal	0.25
Purchasing	
OP-10: Computer Purchasing	2
OP-11: Cleaning Products Purchasing	2
Transportation	
Tier 2-10: Local Housing	0.25
Waste	
Tier 2-5: Move-In Waste Reduction	0.25
Tier 2-6: Move-Out Waste Reduction	0.25
Subtotal	12.75
Planning, Administration & Engagement	
Diversity, Access and Affordability	
Tier 2-1: Gender Neutral Housing	0.25
Investment	
PAE-16: Committee on Investor Responsibility	2
PAE-17: Shareholder Advocacy	5
PAE-18: Positive Sustainability Investments	9
Tier 2 Credits	
Tier 2-1: Student-Managed SRI Fund	0.25
Tier2-2: Socially Responsible Investment Policy	0.25
Tier2-3: Investment Disclosure	0.25
Public Engagement	
PAE-25: Trademark Licensing	4
Subtotal	21
Total unattainable credits (out of 300)	34.25
Total unattainable credits (out of 100 of total score)	11.42

Table II. Total unattainable credits by USFQ in 2012 divided by STARS Manual 1.2 categories and subcategories

Category 1: Education & Research (100 points)

This category is further divided into three subcategories: co-curricular education (18 points), curriculum (55 points) and research (27 points). USFQ, as many new, small, private universities, began as a teaching university. In co-curricular education, the only credits not available are related to housing, while all curriculum credits are available. In terms of research, despite being the University with the highest citations in the region (TimesHigherEducation, 2017), at the time of the first USFQ sustainability report, no system to identify all of the research being done in sustainability was in place. Research credits were not pursued; however, a list of active projects was presented in the sustainability

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report. The platform aligning the SD goals with all research projects should present an advantage for USFQ today.

Category 2: Operations (100 points)

This category is analyzed based on each subcategory.

Buildings (13 points): 11 of these points are available based on the highest LEED certification. Only a third of these points are available by having clear policies without the LEED certification. The Green Building Council was just established in Ecuador in 2012, previously making it prohibitive to access such a certification.

Climate (16.5 points): Being the first year of USFQ's reporting, it was ineligible for the 14 points available for GHG reduction. Therefore only two points were pursued with the initial GHG Emissions Inventory (GHGI). The latter 0.50 points are associated with air travel and an offset program not yet established at USFQ.

Dining services (8.5 points): These credits were pursued successfully as the University's main dining services provider is directly affiliated with the University, including the purchases at a 250-mile radius (6 points) and most Tier-2 credits (2.5 points) with vegan options and post- consumer organic waste composting. In this regard, a USDA organic certification immediately grants the initial 6 points; this certification is not available in Ecuador.

Energy (16.5 credits): The initial 8 points were not possible to pursue, as it required a baseline to prove the reduction in energy consumption. The largest challenge consisted of the 7 points from renewable energy purchasing. The University is completely dependent on the Ecuadorian energy grid, and there are currently no governmental energy consumption or reduction incentives in place. By law, the Ecuadorian Government is the sole provider of energy and the only option available in the market. It only provides permits to private industry when not able to provide energy through its public companies (CONELEC, 2013). Nonetheless, the energy portfolio is changing toward more renewable sources, with an increase of 5,227 MW that will be available by 2022 based on current investments (CONELEC, 2013). This increase is based on 80 per cent hydropower, 16 per cent thermoelectric and only 4 per cent other renewables such as photovoltaics and sustainable biomass (CONELEC, 2013). Still, based on the current emission factor with less than 50 per cent of hydropower, energy was the second largest source of emissions in USFQ's GHGI with 18.7 per cent attribution (Table III).

The Tier-2 options were not all available as temperature sensors (0.25) are not necessary, as only areas with absolute need for climate control have air conditioning or heating; vending machine sensors (0.25) were not pursued, as those are not available on campus. LED lighting (0.25) was not pursued at the time but is certainly available, and the installation of an energy management system (0.25) and energy metering (0.25) is now being implemented. However, the bulk of available credits correspond to variables currently outside the control of the University.

Grounds (3.25 credits): The first two points available for an integrated management system were easily pursued, as well as the Tier-2 wildlife habitat (0.25), native plants (0.25) and compost (0.25) credits. However, the remainder 0.50 points from Tree USA (0.25) and Snow and Ice Removal (0.25) were not available owing to lack of certification availability in the first place, and climate conditions in the second.

Purchasing (7.5 points): Computer purchasing (2 points) requires Electronic Product Environmental Assessment Tool (EPEAT) certification, which is currently not readily available in Ecuador. We have included a new policy to prefer those products but that is not always the case. Cleaning product purchasing (2 points) requires Green Seal™ or

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Table III. CO_2 Tonnage allocation on each scope GHG emissions for USFQ in 2012 and PUCC in 2013

Scope	Sources GHG emissions	USFQ Tons of CO_2	USFQ Weighted Percentage (%)	PUCC* Tons of CO_2	PUCC* Weighted percentage (%)
Scope 1	Diesel	106.1	2.2	55.7	0.1
	LPG	102.5	2.2	139.3	0.3
	Fuel	26.5	0.6	111.4	0.3
	Natural gas	N/A	N/A	1086.2	2.5
	Methane emitted from waste	14.2	0.3	N/A	N/A
Total scope 1		249.3	5.2	1392.59	3.1
Total scope 2	*Purchased electricity*	886.5	18.7	9378.9	21.2
Scope 3	Waste stream CO_2	36.2	0.8	5028.0	11.4
	Student commute	2651.4	55.8	27486.2	62.1
	Faculty and staff commute	325.2	6.8		
	Business travel to Tiputini/Galapagos	338.9	7.1	N/A	N/A
	Air travel for business	246.8	5.2	1005.6	2.3
	Water usage CO_2	16.4	0.3	N/A	N/A
Total scope 3		3614.9	76.1	33519.76	75.7
	Total	4750.7	100.0	44291.3	100.0

Note: *Taken from Reporte de Huella de Carbono 2013 from PUCC's Sustainability Office

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EcoLogo™ products, also not available in Ecuador. Office paper purchasing with a preference for recycled paper (2 credits) could not be pursued, as it must be negotiated with the external provider. A vendor code of conduct (1 credit) has not yet been established but could. Tier-2 credits were not pursued.

Transportation (12 points): Tier-1 credits including student (4 points) and employee (3 credits) commuting splits were measured; however, based on the 100 per cent of commuting students with only 9.6 per cent travel by biking or walk, 40.9 per cent take public transportation and 49.5 per cent take their private vehicles, of which only 20 per cent carpool (Velasco *et al.*, 2014). USFQ was at a particular disadvantage to universities that have housing on campus and that have better accessibility through cycling and walking. This is a challenge for a peri-urban campus in a mountainous region without proper cycling infrastructure. The GHGI determined that most emissions for the University come from the commuting of students, faculty and staff, which accounted for 62.8 per cent of the total emissions (Table III). The main campus, located in the Cumbayá Valley has a 500-m altitude difference from Quito and has limited connectivity with the rest of the city. Owing to the massive congestion and occupancy of the narrow highways that connect Quito and Cumbayá, the travel time to or from Quito varies from 20 to 60 min. Furthermore, only a few bus companies serve Cumbayá, and these are not enough to adequately supply the users' demand (Salazar and Ochoa-Herrera, 2016). Campus fleet (2 points) was not measured. In the Tier-2 credits, only local housing cannot be pursued.

Waste (12.5 credits): All credits but the Move-In (0.25) and Move-Out (0.25) reduction credits could be pursued owing to the lack of dormitories on campus and having a majority of locals as students. However, waste diversion (3 credits) is at a particular disadvantage owing to the lack of municipal services to recycle or compost material formally. The waste stream of USFQ accounted for 36.1 tons of CO_2 in 2013 in the GHGI. USFQ widely advertises the recycling of plastic bottles through the help of the student government, GOBE (Velasco *et al.*, 2014). This is a very successful program, as polyethylene has a high value in the market, making it a desirable recycling material at $800 per ton in Ecuador (CEPAL, 2013). However, other recyclable materials are often discarded rather than recycled. Recycling services and infrastructure in Ecuador are scarce and therefore USFQ has been unable to offer a full recycling program beyond what is offered by the city and corresponds to voluntary collection by "mineros" who sort through trash (Hernández *et al.*, 1999).

Water (10.25 credits): All credits are possible to pursue. However, the consumption of water also affected the GHGI. Quito currently has a pilot wastewater treatment plant (WWTP) in operation and it is only treating <3 per cent of domestic effluents (EPMAPS, 2017). Although installations are in the midst of building, the current practice is to discharge wastewater into rivers without previous treatment (Voloshenko-Rossin *et al.*, 2015). USFQ calculated the theoretical CO_2 emissions (16.4 tons) assuming the biological treatment of wastewater in nature.

Category 3: Planning, Administration & Engagement (100 points)

Within this category, the subcategory of Coordination and Planning (18 credits) can be fully pursued with the proper institutional organization. In the Diversity, Access and Affordability (13.75 credits), USFQ was able to pursue almost all credits. The lack of housing prevented the pursuit of Gender-Neutral Housing credits (0.25). For the Human Resources subcategory (19.75 credits), only Sustainable Compensation (8 credits) was evaluated; yet, there is no regional restriction to obtain all available points. Investment (16.75 credits) was inaccessible to USFQ and would be for most Latin American universities, as endowments are generally not established; therefore, there are no external investments

with the University funds. Lastly, USFQ was able to pursue most Public Engagement credits (31.75) but for the Trademark Licensing (4 points) only available to members of the Fair Labor Association or Worker Rights Consortium.

Carbon footprint

Given the lack of reports to compare USFQ's results in the first sustainability report with universities in the same context, the available proxy was the carbon footprint with a counterpart in Latin America. The accounting method used for calculating CO_2 emissions was the GHG emissions developed by US EPA (EPA). The University focused on direct responsibility: Scopes 1 and 2 GHG emissions, and most relevant criteria from Scope 3 GHG emissions such as transportation, commuting, trash and water (EPA). In this study, a functional unit of tons of CO_2 per student per year was used to establish a baseline for both operational and financial indicators during 2012. A comparison to Pontificia Universidad Católica de Chile (PUCC), which developed its carbon footprint in 2013 (PUCC, 2013), showed the similarities in the weighted percentages of emissions. As shown in Table III, the majority of emissions for both universities come from student and faculty commuting, accounting for over 60 per cent in both cases. Interestingly, the major differences rest in waste stream emissions, which are much higher for PUCC at 11.4 per cent (PUCC, 2013) than for USFQ at 0.8 per cent (Velasco *et al.*, 2014). However, the percentages of Scope 3 are similar owing to a high percentage of Air travel for USFQ, both to the other campuses and elsewhere, accounting for 12.3 per cent, compared to only 2.3 per cent for PUCC. Overall, the carbon footprint for PUCC was 1.35 ton CO_2 per student (PUCC, 2013) compared to 0.8 ton CO_2 per student at USFQ (Velasco *et al.*, 2014).

Discussion

Sustainability at Universidad San Francisco de Quito

USFQ defines sustainability as:

> [...] an approach where business and society are balanced with a finite amount of resources in order to achieve quality of life. Because the University is located in a developing country the definition of sustainability also includes topics such as healthcare, potable water and electricity (Velasco *et al.*, 2014).

USFQ views sustainability as a more holistic concept and not only sustainability of the environment. This means that beyond curbing carbon emissions, diversity, finances, volunteering and academic sustainability are all important within USFQ's legacy. For example, inclusivity is a key component of USFQ's sustainability prerogative. Considering the post-colonial climate of Ecuador, there are still several underrepresented groups in higher education in the country. For this reason, USFQ offers an inclusive program called "Diversidad Etnica" or Ethnic Diversity for students from indigenous and Afro-Ecuadorian backgrounds. This program includes access to a learning center, one-on-one tutors, personal counseling, as well as scholarships and financial aid (Velasco *et al.*, 2014). Accounting for the University's efforts in sustainability through inclusion and affirmative action as a method to end poverty and universal access to education – as defined by the SD goals (UN, 2015) – is particularly important, as South America has one of the highest levels of racial and income inequality in the world (Walsh, 2014; Htun, 2004).

In terms of overall scoring, USFQ was only able to achieve 17.30 credits out of 100 total credits available for STARS recognition. Even though it was unable to reach a rating, it is difficult to assess whether this is an appropriate score for a first-time reporting South American institution without being able to compare to other universities in the same

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context. Obtaining sustainability data and information about an HEI is often difficult. As Lozano has indicated, many universities have sustainability efforts, but less than 48 per cent report them by signing declarations, charters or initiatives that would make these visible (Lozano *et al.*, 2015). Once the information is found, the next challenge is to understand how the author or researchers conceive sustainability and commonly a definition of sustainability is often lacking. Dade and Hassenzahl (2013), in a study evaluating the concept of sustainability, found out that only 52 out of 83 HEI websites searched included a definition of sustainability and about half of these focused entirely on environmental sustainability. Therefore, it is challenging to make comparisons among HEIs when these definitions vary so widely. USFQ includes its definition of sustainability on its sustainability webpage (http://ois.usfq.edu.ec). Additionally, USFQ offers easy access to the sustainability report for interested individuals and parties through the same website, under resources (Velasco *et al.*, 2014).

USFQ used a North American rating system within the scope of a South American university without the aid of prior publications or the ability to make comparisons to a relevant gold- or platinum-level university in the region, making it the only available baseline for the comparison of future reports. According to several studies, it is difficult to determine if the right direction for the sustainability of the university is being aimed without a method of comparison among a group of higher education universities (Shriberg, 2002; Fischer *et al.*, 2015).

Although a few questionnaires to assess universities' sustainability do exist besides STARS, they also present some limitations. As evaluated by Gomez *et al.*, the Green Metric World University Rankings include participants from all over the world; yet, it has a focus on eco-efficiency that neglects the social portion of sustainability (Gomez *et al.*, 2014), so important for USFQ. The Global Reporting Initiative (GRI) also has an evaluation for universities, but it fails to capture its human rights and social concerns (Bice and Coates, 2016). Other efforts in Latin America include the platform for Information, Awareness and Evaluation of Sustainability in universities developed by Universidad de Sao Paulo and Universidad Autónoma de Madrid (USP-UAM). This provides insightful evaluation about sustainability performance, but it is insufficient to provide guidelines for benchmarking as it does not offer comparable results or clear indicators.

In North America there is a network of universities to aid each other with publications on the successes, constraints and opportunities (Yarime *et al.*, 2012). Although networks such as ARIUSA exist, they do not yet offer an equivalent system of sustainability evaluation. De Araujo Góes and Magrini proposed a sustainability assessment tool and the creation of a program for HEIs' monitoring, publication of results and benchmarking in Brazil (de Araújo Góes and Magrini, 2016). Nonetheless, the authors found that one of the limitations of the study was the difficulty to obtain information on sustainability-related activities developed in Brazilian universities.

There is also a collaborative effort from the University of Mexico and the University of Cartagena to develop a more contextual sustainability tool based on STARS to assess Latin American universities (Güereca *et al.*, 2015). However, they do not report on the final emissions per student that would make comparability easier, as reported in STARS. The tool developed, ESCALA, is also not publicized or available for other universities to be able to assess and compare their sustainability initiatives.

The Latin American meeting of sustainable universities (ELAUS), happening every two years since 2010, committed to create a network of Latin American or Iberoamerican universities, an electronic magazine focused on SD in universities and to share experiences and opportunities (Brandli *et al.*, 2010). Nonetheless, the reporting of these experiences has

yet to come to fruition. ARIUSA has a major effort coming along for evaluation of sustainability in South American HEIs and has yearly forums to discuss environmental and sustainability efforts (ARIUSA, 2014) that offer a major opportunity for USFQ and other universities to evaluate sustainability systematically in the Latin American context.

Gomez *et al.* developed an adaptable model for assessing sustainability (AMAS) in higher education for different contexts (Gomez *et al.*, 2014). They used the best practices of major sustainability evaluation tools where indicators can be chosen. Although a useful tool, it may lead to choosing indicators that may not be comparable regionally. The drawback that Gomez *et al.* identified in STARS is its design for societies with more sustainability initiatives and implementations available (Gomez *et al.*, 2014). Therefore, the identification of adequate equivalency for a university in Ecuador or in the USA that measures the sustainability efforts of the university itself rather than the level of development of the country where the university is located is what any tool, including STARS or AMAS, should be measuring.

Identifying challenges and opportunities of applying a North American rating system in South America higher education institutions

There were challenges and opportunities associated with assessing the sustainability of USFQ through a third-party certification mainly catering to North American institutions. The first and most prominent challenge was based on it being the first sustainability report created for the University, which has enlightened the path moving forward for initiatives; however, obtaining the data and setting the standards for monitoring internally are part of an important exercise in sustainability reporting, regardless of reporting system.

According to the evaluation, 11.42 per cent of all credits are unattainable based on USFQ's context (Table II). Only 0.17 per cent or 0.5 credits are related to the first category of Education & Research pertaining to the lack of housing. However, in this first report, the lack of research programs and incentives for sustainability, a whole subsection in the Education & Research portion, represented a missed opportunity that could be addressed by others in the region prior to reporting. As described in the results, USFQ began as a teaching university and is now directing more resources toward research, but this is recent compared to major North American universities.

The next 4.25 per cent or 12.75 credits unavailable are related to the category of Operations and mostly focused on the unavailability of environmental services and certifications in Ecuador. The political and economic situation of any given country results in differences among the environmental incentives that are prioritized governmentally and help advance different industries in the country, some of which may hinder areas of particular importance for the livelihoods of the most vulnerable (Eakin and Wehbe, 2009). This also limits the environmental services available for the University to acquire and consequently perform better in worldwide standards. As mentioned above, both wastewater treatment facilities and recycling programs are insufficient in Ecuador. More relevant to the carbon footprint of USFQ is the lack of available, safe and reliable public transportation. Many students at the University rely on their own vehicles to arrive to USFQ. Therefore, working on the carpooling systems is one of the major initiatives for the University to become more sustainable.

Moreover, in Ecuador there are not many incentives for renewable energy beyond what is supplied by the government. As indicated by van Weenen (2000) in his article on sustainable universities, one of the greatest challenges of this century is to achieve ecological sustainability while creating societies that can have reasonable standard of living. This means that in regions where equitable distribution of resources and opportunities has

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not been achieved, the challenge of sustainability takes an extra burden that requires basic services to be offered, perhaps innovated, so that more superior sustainable goals can be considered.

There were also challenges with the applicability of issues directly related to certifications only achievable by North American Institutions. Examples of such certifications include USDA Organic, EPEAT, Fair Labor Association and Worker Rights Consortium, LEED, Tree Campus USA, among others mentioned in the results section. Even if USFQ was pursuing similar goals to these certifications, this equivalence was not significant without the certification on STARS, despite the lack of such certification services in-country.

An analysis of 108 available voluntary certifications in the USA shows the high demand for these services to provide external review and approval of specific activities in various sectors since their first introduction in the 1990s (Raynolds *et al.*, 2014). In many developing countries where external certifications have been introduced from developed countries, mirroring local certifications have been developed, such as the case with many forest certifications worldwide (Cashore *et al.*, 2010). In his evaluation of the implementation of international certification in developing countries, Fikru (2014) describes the initial demand from multinationals to promote these certifications; however, he points to new internal pressures from unions and governments from the developing countries to have external certifications that help in achieving their goals. This represents an opportunity for the contextualization of many certifications that could become available in the South American region. It would be relevant for the overall internationalization of STARS and other ratings systems to have a dynamic system that acknowledges and accepts new equivalent certifications that hold external review.

In this section, the most substantial advantage was the geographical location within the GHGI, without drastic weather changes in Cumbayá, Ecuador. This resulted in no major electricity expenditures related to heating or cooling that could contribute to high CO_2 emissions. This circumstance playing to USFQ's advantage is the only representative of the geographical location and would differ even within Ecuador, particularly in coastal universities where the use of air conditioning is more common. Energy and water consumption patterns could be a metric to be further correlated to weather variables to improve sustainability indicators in different regions, an alternative that USFQ is currently exploring. This may be the most measurable method to create benchmarks for the region in terms of operations.

The last 7 per cent or 21 unattainable credits are in the category of Planning, Administration and Engagement. The biggest market challenge in this category is the creation of endowments. USFQ does not have an endowment and although it is now planning to start one, the culture of donating to large private institutions, despite their status as not-for-profit, does not have precedence. Endowments offer the financial stability for the educational commitments of any institution to be realized in the future, therefore falling within a key component of sustainability financing (Ho *et al.*, 2010). This financial obstacle is also hard to overcome considering the current political system in which there are no grants or funds available from the Ecuadorian government to support research or any endeavor at private universities.

Nonetheless, USFQ had the highest score in this latter category, obtaining 13.7 credits out of 31.75 just in the engagement section. USFQ's focus on social sustainability of the community and the region was beneficial. All of USFQ students participate in volunteering programs to advance USFQ's commitment and service to the community. Through the seminar PASEC (Programa de Aprendizaje y Servicio), students dedicate 80 h over the

course of a semester through partnerships with over 55 non-profits, day care and public schools (Velasco *et al.*, 2014). The purpose of PASEC is to provide a hand in well-established, long-term programs that are aiming to enhance the quality of life for the Ecuadorian population, thereby aiding in the country's sustainability itself.

The embrace of Latin American institutions of the third mission of "extension" (Stephens *et al.*, 2008) may offer an opportunity for Latin American Universities to excel in this section. Extension is understood differently by several trends of thought. Some understand it as the research and education of the community (Halac *et al.*, 2005). Others instead conceptualize it as the role of universities as long-standing institutions to partake in the governance and service in many countries were democratic processes and political stability is lacking (Göransson *et al.*, 2009). Governance is a key component of sustainability, and the advocacy for proper democratic processes and participation that USFQ has promoted inside and outside the university walls has put the University at an advantage. Nonetheless, this variable is only measured in STARS as Sustainability Policy Advocacy (4 credits). This is also disregarded in other worldwide ratings for universities where generally Latin American universities do not reach high rankings (Bernasconi, 2013).

Major opportunities to be pursued at USFQ

Transportation

Student commuting is a large emissions problem faced by universities all over the world and the major carbon emitter for USFQ both in 2012 and 2015, when carbon footprints have been measured (Velasco *et al.*, 2014; Salazar and Ochoa-Herrera, 2016). Studies have shown that personal car transportation emits 4 times as much CO_2 per passenger per kilometer as buses, 11 times as much NO_x and 12 times as many hydrocarbons (Tolley, 1996). The large amount of free parking available at USFQ is a way of subsidizing and encouraging car users. The lack of reliable public transportation from Quito to USFQ can account for some car commuters. However, if free parking can be significantly reduced, more students would be forced to take public transportation, therefore reducing CO_2 emissions (Balsas, 2003). A proposal for USFQ and the city of Quito to collaborate on would be the implementation of USFQ specific buses. These buses would provide students and staff with their own public transportation from high-density places in Quito to USFQ. However, this may pose a challenge considering the large geographical extension of Quito and the extremely variable schedules by students, faculty and staff. Another option, that is currently being implemented, is a carpooling system called "Autocompartido" (Autocompartido, 2012) to encourage sharing rides. This Web platform enables students, faculty and administrators to car-share based on their home location and time of departure.

Additionally, USFQ encourages cycling for students in the Cumbayá area and provides more parking for bicycles, an option that should substantially reduce emissions (Tolley, 1996). Nonetheless, the topography of the University's surrounding area is a major setback to motivate students to cycle. Moreover, the lack of cycling paths adjacent to USFQ is a major challenge to overcome and one that is being addressed together with the Municipality of Quito, Ecuador.

Environmental awareness

Environmental awareness is a problem faced by the country, government and citizens of Ecuador, as well as by USFQ. However, USFQ is working on this through the education of its students and the presentation of services available on campus. The student government (GOBE) held an awareness campaign for recycling plastic bottles in 2012; 6000 plastic bottles were collected and strategically placed in highly occupied areas around campus to

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create a visual impact and push students to realize the importance of recycling and being environmentally conscious (Velasco *et al.*, 2014). The same is the case with the annual electronic waste campaign held by the Office of Innovation and Sustainability at USFQ (Dalgo *et al.*, 2015). During this engaging campaign, there is not only information presented about the environmental degradation due to improper disposal of e-waste but also transparency as to how it will be treated, recycled and upcycled. The campaign has been held during three consecutive years, 2014, 2015 and 2016, yielding 2, 3.2 and 8.9 tons of e-waste, respectively, and it will continue to be held annually. Increasing environmental awareness may also lead to more student co-curricular involvement that can offer more credits in the category of Education & Research section.

These concrete initiatives and actions that go beyond the classroom can help people with little to no environmental knowledge grasp the concept of environmental sustainability that can at times seem broad, theoretical, or abstract (Filho, 2000). Sustainability should be conceived with a holistic approach within the entire education system accounting for operations, educational efforts, research, community outreach, on campus experiences and reporting, as delineated by Lozano in his SD commitment index for HEIs (Lozano *et al.*, 2015).

Conclusions

The unique role of universities to advance science must be matched by their efforts to walk the talk and work coherently. Too often it is visible that institutions are trying to develop the next innovative idea for resource recovery when there is still no proper sourcing of recyclable waste in their own institution. The gap between university operations and the academic research in universities must be filled by engaging all stakeholders (Müller-Christ *et al.*, 2014). However, in many cases, stakeholders are unable to pinpoint the role of HEIs to advance sustainability in their communities (Lozano *et al.*, 2015). In the case of Ecuador, a major stakeholder continues to be the government with investment and regulations. Therefore, USFQ, as many other South American universities, must be at the forefront for developing relevant technologies and policies and pushing for existing ones in the local context to be implemented. Finding a manner to take this collaboration with different stakeholders into account when evaluating sustainability at universities is extremely relevant.

The recognition of sustainability in both the public and private sectors has led HEIs to embrace the importance of leading innovation and acting as living laboratories for sustainability initiatives, e.g. TU Eindhoven (Markopoulos and Rauterberg, 2000), its initial promoter, Harvard Living Lab (Harvard, 2016) and University of Leeds Living Lab (Leeds, 2016), among many others. Therefore, it is important for other universities in South America to generate their own sustainability reports and to publish in reporting systems that can enable the exchange of ideas leading to the betterment of sustainability initiatives in all aspects, including Education & Research, Operations and Planning, Engagement & Administration.

Because USFQ is located in a developing country, the University faces challenges that are similar to many other developing countries and sometimes unique to Ecuador. Some of these limitations are the lack of adequate environmental infrastructure such as regulations, wastewater treatment systems, recycling programs, access to sufficient public transportation, a demand of a teaching rather than a research focus and limited access to information and financing for endowments to determine investment. The comparison of the carbon footprint to Pontificia Universidad Católica de Chile (PUCC) also showed that Scope 3 is a challenge for South American Universities. In Ecuador, this is particularly important

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owing to the large number of students and faculty commuting to campus and the lack of sufficient public transportation.

Despite these challenges, the assessment of the STARS tool shows that 11.42 per cent of all credits are unattainable based on context, leading to a potential maximum score of 88.58 which is higher than the minimum 85 required for the highest rating available in STARS – Platinum. This however would imply that USFQ and other universities in similar circumstances would not begin in equal conditions to North American Institutions. For STARS to be a useful sustainability tool in universities beyond the USA, it would require significant editions to account for the climatic, political, infrastructural and social differences across different contexts. Moreover, it would require revisions for the recognitions and development of various local certifications. Indeed, AASHE and STARS are taking in feedback from participants worldwide to improve their metrics and adequately assess universities worldwide, including USFQ's case, a much-needed effort for internationalization.

Lastly, understanding and acting upon the limitations found during this research has the possibility to influence both Ecuadorian infrastructure and sustainability. Furthermore, the aid of more reports becoming available from universities in similar contexts may enable the development of benchmarks to improve the collective sustainability efforts in HEIs in South America.

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