Please cite the Published Version

Sustainable Development Goals and Sustainability Teaching at Universities: Falling Behind or Getting Ahead of the Pack?

Walter Leal Filho a, Chris Shiel b, Arminda Paço c, Mark Mifsud d, Lucas Veiga Ávila e, Luciana Londero Brandli f, Petra Molthan-Hill g, Paul Pace d, Ulisses M Azeiteiro h , Valeria Ruiz Vargas i, Sandra Caeiro j

a) School of Science and the Environment, Manchester Metropolitan University, Chester Street, M1 5GD Manchester, UK & European School of Sustainability Science and Research, Hamburg University of Applied Sciences, Faculty of Life Sciences, Ulmenliet 20, D-21033 Hamburg, Germany w.leal@mmu.ac.uk & walter.leal2@haw-hamburg.de
b) Department of Life & Environmental Science, Faculty of Science & Technology, Bournemouth University, Poole, Dorset, BH15 5BB, UK   cshiel@bournemouth.ac.uk
c) Department of Business and Economics, NECE, University of Beira Interior, Estrada do Sineiro, 6200-209 Covilhã, Portugal apaco@ubi.pt
d) Centre for Environmental and Education Research, University of Malta, Msida, Malta mark.c.mifsud@um.edu.mt
e) Federal University of Santa Maria, Administration Department, Graduate Program in Administration, Av. Roraima nº 1000, Cidade Universitária, Camobi District, Santa Maria - RS, Brazil admlucasveiga@gmail.com
f) Graduate Program in Civil and Environmental Engineering, University of Passo Fundo, CAMPUS I–Km 171–BR 285, CEP 99001-970, Passo Fundo/RS, Brazil   brandli@upf.br
g) NTU's Green Academy, Nottingham Trent University, 50 Shakespeare Street, NG1 4FQ Nottingham, UK petra.molthan-hill@ntu.ac.uk
h) Department of Biology & CESAM Centre for Environmental and Marine Studies, University of Aveiro, 3810-193 Aveiro, Portugal   ulisses@ua.pt
i) School of Science and the Environment, Manchester Metropolitan University, Chester Street, M1 5GD Manchester, UK   v.vargas@mmu.ac.uk
j) Center for Environmental and Sustainability Research, Universidade NOVA de Lisboa and Departamento of Science and Technology, Universidade Aberta, Rua Escola Politecnica, n. 147, 1269-001 Lisboa, Portugal scaeiro@uab.pt

Abstract

The fact that the world community is engaged in pursuing the Sustainable Development Goals (SDGs) means that an unrivalled opportunity is provided to universities, both in respect of teaching and in research, on individual SDGs, as well as in pursuing their "third mission" linking up with external stakeholders and society. However, not many universities have realised that and many are falling behind. This paper explores the many advantages of the introduction of the SDGs into teaching and suggests that it can catalyse the engagement of students in Higher Education Institutions (HEI) with the concepts of sustainability. The paper fills in a research gap by surveying the current state of the art regarding the theme, presenting current data outlining the extent to which HEI are using SDGs to support their sustainability work. The reasons why some institutions are currently not engaging is also shown. The paper, which consists of a worldwide survey deployed to collect data on the SDGs and sustainability teaching at universities, concludes by providing some recommendations aimed at encouraging further engagement of HEI in incorporatingSDGs as part of their teaching programs. This research is unique in the sense that it provides for the first time offers an overview of the level of emphasis selected universities currently place on the SDGs. Finally, it provides a contribution to current state of knowledge by

outlining some actions universities may take, to move forward with their implementation.

Keywords: Sustainability – Higher Education – Sustainable Development Goals- Teaching- Engagement

Highlights:

1. The implementation of the Sustainable Development Goals (SDGs) at universities is still on its infancy

2. The SDGs may assist universities to better relate with external stakeholders and society

3. A greater involvement of students may be achieved by the integration of the SDGs in teaching

4. More systematic efforts are needed to increase the presence of the SDGs in higher education institutions

1. Introduction

The well-known Sustainable Development Goals (SDGs) are a new, universal set of goals targets and indicators, that were adopted on September 25th, 2015 to "end poverty in all its forms" by 2030 "and balance the three dimensions of sustainable development: the economic, social and environmental." (UN Assembly 2015, p.2). As a part of the New Sustainable Agenda, SDGs follow and expand on the eight millennium development goals (MDGs), which were launched in 2001 and expired in 2015 (Sachs, 2012). Every country is requested to incorporate the ambitious 17 goals into their agendas and political policies and to work towards achieving SDGs. MDGs considered targets for poor countries to achieve, with financial support from wealthy states. While the MDGs focused primarily on poverty and health, the 17 goals, comprise 169 targets, include new areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice.

Unlike the Millennium Development Goals (MDGs) which were arranged by a working group in the basement of the UN Headquarters in New York City, the UN conducted the largest consultation programme in their history in order to assess what the SDGs should cover. To this purpose, an open working group with representatives from 70 countries was established in March 2013. At the same time, the UN conducted a series of "global conversations", which included 11 thematic and 83 national consultations and door-to-door surveys; as well as an online survey where people were asked to highlight topics they would like to see approached in the goals. The results of the consultations were taken into account in the working group's discussions.

Data gathered from the MDGs showed that consideration of the indicators to be used should be given as early as possible (Hák et al., 2016). All SDG indicators were expected to be considered as an integrated package as many SDGs are

interdependent and must be pursued together for one simple reason: progress in one field often depends on progress in the others. Measuring the full spectrum of SDGs and their targets through a compact indicator framework and associated monitoring systems is a key prerequisite to achieve the goals within the period 15 years – and quite a big challenge. "Indicators will be the backbone of monitoring progress towards SDGs at local, national, regional, and global levels" (SDSN, 2015, p.2). For the worldwide success of SDGs the targets must be operationalised into a management tool that helps countries to develop implementation strategies, allocate their resources, measure their progress and guarantee the accountability of all persons involved. The mechanics of SDG monitoring are still being worked out, but an emerging consensus based on two years of intensive global discussions, involving thousands of experts from UN organizations, academia, civil society, business and a large number of national statistical offices, suggests that the focus of SDG monitoring will be at national level. Complementary monitoring will be set up at regional and global levels (SDSN, 2015).

Regarding SDG funding, the UN has stated that USD 3.9 trillion in annual investment will be needed to achieve the global goals. At the point of launching the SDGs, the level of public and private investments in the relevant areas was just around USD 1.4 trillion (UNCTAD, 2016). A strategy for filling the gap needs to be discussed. The United Nations Conference on Trade and Development (UNCTAD)'s Investment Policy Framework for Sustainable Development (IPFSD) makes a key contribution to reform efforts in this area. The best and the most consistent solution at this point seems to be the concept of a multi-stakeholder platform to finance SDGs, that was first introduced at the Third International Conference on Financing for Development (FfD) in Addis Ababa, Ethiopia, in 2015 (IISD, 2016). One year later, in October 2016, UN Secretary-General Ban Ki-moon announced the launch of a new platform to strengthen innovative financial solutions. Meanwhile, the World Bank Group released a 2030 vision document, in which they present their contribution, including open trade promotion and sustainable concessional financing for supporting SDGs (IISD, 2016).

Within the multi-stakeholder platform and with participation from all institutions, the implementation of the SDGs suggests new opportunitites for higher education institutions and a good opportunity to evaluate their work so far, in respect of capacity building (Shiel et al. 2015). According to SDSN (2017) the role of universities in regard to SDG implementation is related to their extensive learning and teaching activities, including undergraduate and graduate teaching, professional training, executive and adult education, online learning, co-curricular activities, and student clubs and societies.

The SDGs offer an opportunity to extend Education for Sustainable Development (Shiel et al. 2019) where Education for Sustainable Development (ESD) is defined as a learning process (or approach to teaching) based on ideals and principles that prepare people of all walks of life to plan for, cope with, and find solutions for issues that threaten the sustainability of our planet (UNESCO, 2005). Although, it should be noted that many definitions of ESD have been suggested, however Wals (2009) considers that the diferences are important in ensuring that ESD develops in ways that are locally relevant and culturally appropriate. This means it is not necessary to seek consensus over the meaning of ESD but, rather, seek consensus around a range of key principles covering the scope, purpose and practice of ESD.

However, there is a consensus that the holistic nature of ESD allowed it to be a possible tool for achieving the MDGs and Education for all (EFA) (Wals, 2009). Regarding the SDGs, since the launch of 2030 Agenda, Education has become central to their realization: there are a stand- alone goal (SDG4), education is mentioned in targets of five goals , and more important, is linked to almost all of other SDG in one way or another (UNESCO, 2017a). The crucial role of Education in supporting SDGs implementantion is attributed to (SDSN, 2017):

- Quality education leads to improved development outcomes for individuals, communities and countries, meaning better access to gainful employment, better nutrition and health, reduction of gender disparities, greater resilience in disasters, more engaged citizens, and so on.

Implementing the SDGs require addressing a wide range of social, economic and environmental challenges, involving complex interlinkages, uncertainty and conflicts of values. Providing learners with skills to think through complexity, learn through dialogue and communication, engage in deep reflection, develop worldview and values sensitivity, and assess when activities support or detract from achieving the SDGs – as well as other important skills, knowledge and vocational expertise – will help accelerate the implementation of all the SDGs.
While there is substantial literature in relation to ESD, literature that evaluates how universitites are engaging with the SDGs is in its infancy.

Thus, the question of how universities could be agents of change by putting SDG and sustainability teaching into practice, is crucial and deserves the attention of both practitioners and academics. There is a research gap as far as how the inclusion of the SDGs in the context of universities´ activities are concerned. This research addresses this gap, and explores the many advantages that the introduction of SDGs in teaching can create, serving as a catalyst to inspire the engagement of students in Higher Education Institutions (HEI) with the concepts of sustainability. It presents the extent to which HEI are using SDGs to support their sustainability work by utilising a worldwide survey instrument to collect information about the degree of priority given to SDGs teaching, curriculum integration, development of SDGs theme in classes and the extent to which SDGs issues are being taught.

2. Universities and SDGs

SDGs represent an ambitious and positive commitment to sustainability across the globe and will contribute to securing a legacy for future generations. If SDGs are to be achieved, then various actors, around the world, need to be engaged in taking actions as part of a long-term process to bring about change (UN, 2015).

The global aims have the potential to result in a paradigm shift for teaching, learning and understanding sustainability, as core to the functioning model (PRME, 2015). This may enhance education in ways that benefit students and institutions. In addition, the academics engagement in sustainability teaching enforces their role as educators (Lazzarini et al., 2018). Embedding the goals within and across the curriculum will contribute not only to extending and enhancing human capital, but will also yield an increase in the numbers taking action and aiming to live sustainably – this could have

significant impact on securing achievement of the goals and a better future (Leal Filho et al., 2018).

Universities, as significant influencers and agents of change, must play a significant and more prominent role in the change process catalysed by SDGs. In order to do so, 42 international and national networks such as Association for the Advancement of Sustainability in Higher Education (AASHE), AIM2Flourish, China Green University Network, Conférence des Grandes Écoles, Copernicus Alliance, The Environmental Association for Universities and Colleges (EAUC), Globally Responsible Leadership Initiative and the International Association of Universities (IAU), have joined forces to launch the SDG Accord (2017). HEIs are encouraged to sign up and report annually on how they have embedded SDGs in their institution. The reports will be collated and presented to the UN High Level Political Forum. Others have created networks to focus on particular areas such as research to promote SDGs (e.g. HAW Hamburg in Germany has created the "World Sustainable Development Research and Transfer Centre" and the "European School of Sustainability Science and Research").

Kopnina (2017, p.2) in her research observed several courses related with sustainability in three universities. The main objective of teaching these courses was to raise students' understanding regarding the importance of the outcomes of SDGs, and at the same time, qualifying students "to reflect upon their own ethical positioning on sustainable development and SDGs". The author concluded regarding the relevance of teaching SDGs in the educational process that unfortunately, to date only a few HEI's have identified the potential benefits of strategically aligning the curriculum with SDGs acknowledging the benefits and impact that their educative role will have on societal engagement with the goals. Overall, universities need to pay further attention to SDGs and to carefully consider how much support they may be able to offer towards their achievement.

The SDGs agenda covers an extensive set of social, economic, and environmental challenges that are closely related and, according to SDSN Australia/Pacific (2017), the expertise of universities is crucial for the achievement of all these goals. Moreover, SDGs will not be attained without these institutions. The problem is that sometimes the functions of learning and teaching, research and administration/governance are approached separately, when in reality they are interconnected. The opportunity for creating, establishing and communicating connections between these areas can be potentiated by SDGs (SDSN Australia/Pacific, 2017).

As is already recognised, education is one of the bases of SDGs, since quality education contributes to noteworthy sustainable development benefits for all individuals and societies in general, contributing to accelerating capacity to implement SDGs (UNESCO, 2016s such, HEI, by means of their experience of learning and teaching, which includes several levels of education (undergraduate and graduate, professional and executive training) perform a very relevant role in SDG implementation (SDSN Australia/Pacific, 2017

In the scope of the SDGs framework, education plays a relevant role indicated specifically by one goal (Goal 4 - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all) and its 10 targets (Dlouhá and Pospísilová, 2018). Some of the targets within this goal clearly call for action by universities, and many others have direct significance to learning and teaching activities within HEI. Thus, education seems to be an important driving force align

society with the spirit of SDGs. By this, citizens should be educated in a proper way, developing their engagement in society. According to Annan-Diab and Molinari (2017), the promotion of a quality education is crucial for enhancing citizens' lives and advancing sustainable development.

In turn, Mader and Rammel (2015), suggest that research based knowledge created by universities is crucial for all of the 17 goals, but in their opinion, the most relative SDGs are Goals 4, 9, 12, 16 and 17. However, while this only highlights five specific goals, it is important to reinforce that all students need to understand the implications of the entirety; all students need to develop the knowledge and skills required to live sustainably, within environmental limits. An education that does not prepare learners for the global context and a future that is uncertain might be considered inadequate; an education that addresses SDGs brings benefits to the learner (Mader and Rammel, 2015).

In the ideal scenario, the university education process (curricular, extra-curricular and co-curricular) should address the global aims (and all the goals) directly; all programmes need to enable learners to consider the issues raised by sustainability, not only in the context of their disciplines but also at a more general level, as citizens who will be impacted and have impact. Particular disciplines may make a stronger contribution to particular goals (e.g. 'water and sanitation', Goal 6, might align more with environmental science; similarly, 'healthy lives' and 'well-being', Goal 3, suggests greater traction in Health Sciences), but all goals need some consideration by all staff and students if there is to be progress. This approach has been taken by Nottingham Trent University, UK, in its *Curriculum Refresh* framework, which encourages every programme leader to integrate one or more SDGs into their teaching and assessment, so that students work towards one or more of SDGs (Willats et al., 2017). Other universities such as the Victoria University of Wellington, New Zealand, have mapped their current curriculum against SDGs with the aim to track their own contributions towards the global goals and improve their offerings (Wilks and Van den Belt 2017).

In general, the potential impact and influence that HEI might have on society in addressing sustainable development is strong (Sedlacek, 2013). They should be seen as essential drivers of education for sustainable development by exploring, testing, developing and communicating conditions for transformative change (Mader and Rammel, 2015). The UN Sustainable Development Goals, as well as the UN Global Action Programme on Education for Sustainable Development (Aichi-Nagoya Declaration, 2014) should then be an important driver to encourage the engagement of HEIs.

According to SDSN *Australia/Pacific* (2017), in order to contribute to education and teaching for SDGs, universities can:

- Include SDGs into all undergraduate and graduate courses, as well as graduate research training;

- Deliver training on SDGs to all curriculum developers, course coordinators and professors;

- Offer executive education and capacity building courses for external stakeholders based on SDGs;

- Defend the implementation of national and public education policies that support education for SDGs;

- Involve students in the co-creation of learning environments that sustain learning on SDGs;

- Develop courses directed to real-world collaborative projects for change.

In summary, the benefits of universities engaging with SDGs are, in large measure, related to the impact that this will have on global society. universities have a moral duty to contribute to the society in which they thrive; a healthy society reciprocates with benefits to the institution, staff and students. If universities play a leading educative role in this agenda, then SDGs are more likely to be achieved, particularly as higher education underpins the development targets (Association of Commonwealth Universities (ACU, 2015). The opportunity that SDGs present to transform the curriculum, albeit that such transformation may challenge existing ways of thinking and organising, may yield further benefits where learning quality and student experience are enhanced. This in turn, contributes to a virtuous circle, where initial efforts to tackle the challenges are rewarded by better ways of working and learning; where a more attractive educative offering appeals to future students but also to employers where graduate outcomes are more appropriate to a sustainable global context (UNESCO, 2017b).

It is clear that universities need to align with the development agenda and explore ways to serve as a mechanism for achieving SDGs (ACU, 2015), however, how many are actually doing so? Further, what form does that engagement take and are they addressing all SDGs or just a few? Such questions form the basis of the research undertaken for this paper and support the overarching aim of exploring how universities are embracing SDGs so that practice can be shared.

3. Methods

The sections above set the context for the method required and approach that would enable data gathering across a wide distribution. The methodological details are described in this section.

3.1. Survey design and procedures

A questionnaire was developed to collect data on the SDGs and Sustainability Teaching at universities. The first sets of questions were carefully reviewed by the authors to minimise redundancies and ensure all relevant questions were considered. The questionnaire survey was pre-tested by a panel of academics within the field of sustainability at different universities. The feedback provided was used to improve the instrument.

The survey instrument was converted into an on-line tool, for wide distribution and to cater for an international level of responses. An online survey was carried out from 22th July to 31st August 2017 using Google Forms. The survey aimed at characterising the current status of Sustainable Development Goals (SDGs) and its integration with Sustainability Teaching at universities. The survey instrument consisted of 9 questions (seven closed questions and two open questions) and was structured in a way that it could gather information on the degree of priority given to SDGs in the learning process, which SDGs the respondents have developed in their teaching (e.g., embedding SDGs into class assignments/discussions and explore possible solutions
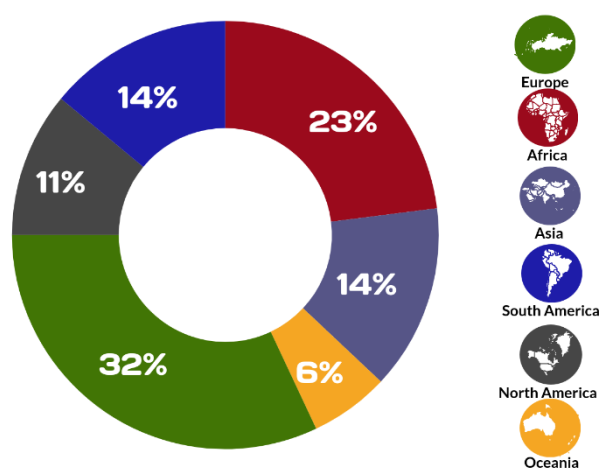
through extension projects), the resources made available to it, its strategic positioning at the university and the extent to which SDGs issues are being taught (or not) and how respondents assess the future emphasis given to SDGs in the curriculum at their universities (see in Appendix in questionnaire).

3.2. Sample

The survey was disseminated via email (two calls 30 days apart) to the following groups according to a non-probability judgmental sampling (Saunders et al., 2007): rectors and office managers of a wide range of universities, including those which participated in the Green Sustainability Metrics 2016; authors of publications on the subject "sustainability at universities" in the Web of Science between 2007–2016; participants in the World Symposium on Sustainable Development at Universities, held in September 2016 at the Massachusetts Institute Technology in the United States of America; Rectors of Brazilian federal public universities; Rectors of Portuguese public universities; Representative of universities (rector, sustainability office manager, researcher / teacher) participating in the Inter-University Sustainable Development Research Programme (IUSDRP); Representatives of the universities participating in the Copernicus Alliance; Rectors and Managers of the Sustainability Office of the universities participating in the Association for the Advancement of Sustainability in Higher Education (AASHE), Members of the Environmental Association for Universities and Colleges (EAUC) and Sustainability in Higher Education Developers (SHED) Group in the UK. These covered over 17 countries spread over the five continents (Figure 1). A total of 167 responses were received and analysed.

The sample served the purpose of offering a profile of current trends of the population to which it was sent (i.e. worldwide top authors and science/research administrators in HEIs in the topic of sustainability at universities).

The country and continental distribution (17 countries) of the respondents is showed in Figure 1 and 2. In relation to the gender of the respondents, 57% were male and 43% female.

Figure 1 – Distribution of the respondents by Continent.

Figure 2 – Distribution of the respondents by Country.

3.3. Framework for the data analysis

Statistical analyses were performed on the data collected (percentages and frequencies, for closed questions). For the open-ended questions, a content analysis was conducted according to Bardin (1977): data from open questions were analysed by content analysis (categories were ascertained) and subsequently quantified as percentages.

3.4. Methodological limitations

The limitations associated with this survey include restricted validity, reliability and generalizability of the results. There are also issues associated with participant and observer error and bias (Saunders et al., 2007). These limitations were addressed in a number of ways:

- Content validity was increased by forwarding the questionnaire to a number of experts in the field prior to actual dissemination and amending the questions accordingly.
- Internal validity was increased by subjects and by rephrasing questions and letter of entry through iterations with above mentioned experts to reduce evaluation apprehension.
- Data can be considered reliable if the same results (or similar) can be gained by different researchers asking the same questions to the same (or similar) people. In this research, reliability of the data was increased through preliminary pilot work with a small sample of experts with similar characteristics to the target group both in the quantitative data collection.

Although the scales were indigenously constructed and validated, a longer array of questions could provide more breadth at the expense of time. The study could have been complemented with in-depth interviews with experts (see Aleixo et al, 2017, 2018) in order to have a deeper understanding of the barriers, potential and actions when implementing SDGs teaching, research and action at universities. In this paper the focus was on the on-line data gathered to capture a general overview of the current situation. Future studies may focus on interviews, hence complementing this one.

Despite its limitations, this study reveals important attributes concerning the relevance of the data gathered. Due to their still early stage of development, disciplines such as education for sustainable development, sustainability in higher education, among others, are fertile ground for the application of similar methodologies to the one here employed.

4. Results

This section presents the main findings from the study, clustering them along two main topics. Firstly, it presented the findings in relation to the general approaches taken by HEIs how they embed SDGs into the curriculum. Secondly, the answers to each of the open questions were carefully analyzed, trying to understand how the respondents have integrated SDGs into their learning processes, highlighting the frequency of teaching and methods used, among others.

4.1 Approaches to embed the Sustainable Development Goals at universities

The results on the awareness the SDG for the respondents show that most are fully aware (78%). However, when asked about the application of SDGs in teaching, the numbers decrease: only 32% fully apply SDGs in the university activities, 40% partly apply them, 11 % a little bit and 18% do not apply (Figure 3).
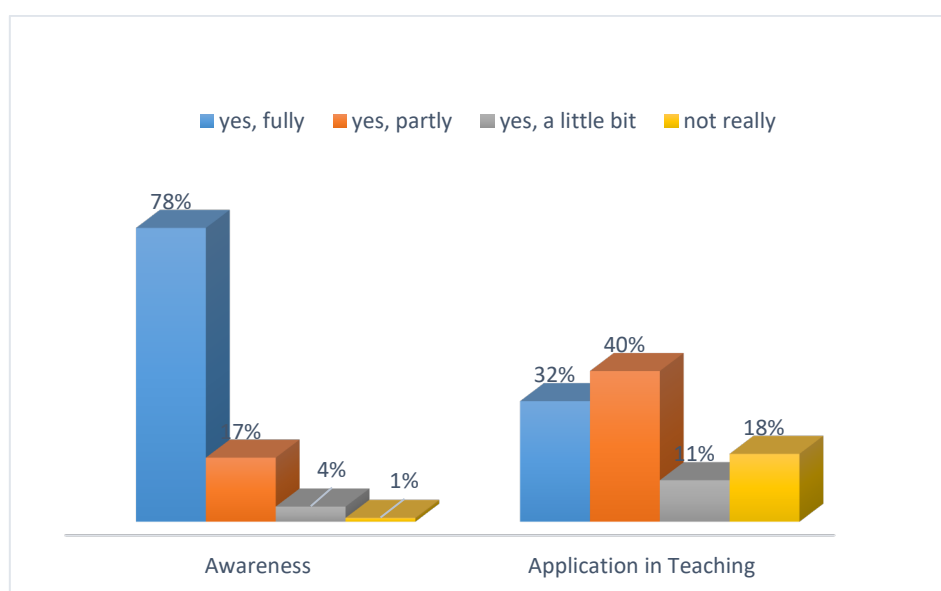

Figure 3 –SDGs Awareness and Application in Teaching in the surveyed population.

When the respondents were asked about the integration of the SDGs at their Higher Education Institutions, 96% agreed that each student should know about the SDGs;

92% agreed that the SDGs should be part of the core curriculum; 77% agreed that it is up to the individual to choose one or more of the SDGs and work towards them; 97% agreed that it should be an institutional commitment to work towards one or more of SDGs. This result is in stark contrast to the current uptake of the SDGs in the universities: Only 43% indicated that their university has made the strategic decision to embed the SDGs in their curriculum.

However, individual goals have been embedded in the teaching. Table 1 shows which SDGs are being addressed in teaching by continent. In this question, the respondents could indicate more than one SDG.

In North America, with a total of 19 respondents, SDG 3, had 79% indications, followed by SDGs 11, 12 and 13 with 63%. In South America 23 respondents indicated more attention to SDG 4, Quality Education, followed by SDG11, 12 and 13.

In North America, with a total of 19 respondents, SDG 3, had 79% indications, followed by SDGs 11, 12 and 13 with 63%. In South America 23 respondents indicated to giving more attention in their classes in SDG 4, Quality Education (74%), followed by SDG11, 12 and 13.

The Africa continent had 38 respondents whose teaching address SDG4, 6 and 11. Asia, with 23 respondents, indicated more attention related to SDGs 3 and 4. In Oceania, with 10 respondents, more emphasis shown in teaching SDG2 and 6 both with 70%. In Europe, with 54 respondents, 54% of the actions have been around SDG13, climate action.

Table 1 - Addressing SDGs in Teaching by Continent, in the surveyed population.

	North America	South America	África	Asia	Oceania	Europe
Goal 1 - No Poverty	53%	39%	39%	52%	50%	28%
Goal 2 - Zero Hunger	58%	30%	37%	35%	70%	28%
Goal 3 - Good Health and Well-being	79%	30%	37%	65%	50%	41%
Goal 4 - Quality Education	47%	74%	53%	65%	50%	46%
Goal 5 - Gender Equality	63%	30%	26%	57%	50%	37%
Goal 6 - Clean Water and Sanitation	63%	53%	47%	52%	70%	35%
Goal 7 - Affordable and Clean Energy	63%	57%	37%	52%	60%	37%
Goal 8 - Decent Work and Economic Growth	47%	43%	29%	39%	60%	20%
Goal 9 - Industry, Innovation and Infrastructure	47%	53%	32%	43%	50%	37%
Goal 10 - Reduced Inequality	53%	39%	26%	48%	60%	31%
Goal 11 - Sustainable Cities and Communities	68%	57%	45%	57%	50%	56%
Goal 12 - Responsible Consumption and Production	68%	53%	34%	39%	50%	52%
Goal 13 - Climate Action	68%	53%	39%	61%	60%	59%
Goal 14 - Life Below Water	53%	17%	19%	35%	60%	33%
Goal 15 - Life on Land	53%	22%	21%	35%	60%	33%
Goal 16 - Peace and Justice Strong Institutions	53%	26%	26%	52%	60%	26%
Goal 17 - Partnerships to achieve the Goal	37%	35%	34%	52%	60%	37%

From a global perspective (Table 2), the approach of the different SDGs by universities are balanced, although Climate Action (66%), Sustainable Cities and Communities (64%) and Quality Education (62%) are SDGs that stand out from the others.

Table 2 - Approach of the 17 SDGs by the sampled universities.

GOALS	Number of universities	%
Goal 1 - No Poverty	66	47%
Goal 2 - Zero Hunger	61	44%
Goal 3 - Good Health and Well-being	79	56%
Goal 4 - Quality Education	87	62%
Goal 5 - Gender Equality	66	47%
Goal 6 - Clean Water and Sanitation	79	56%
Goal 7 - Affordable and Clean Energy	77	55%
Goal 8 - Decent Work and Economic Growth	56	40%
Goal 9 - Industry, Innovation and Infrastructure	67	48%
Goal 10 - Reduced Inequality	61	44%
Goal 11 - Sustainable Cities and Communities	90	64%
Goal 12 - Responsible Consumption and Production	79	56%
Goal 13 - Climate Action	92	66%
Goal 14 - Life Below Water	53	38%
Goal 15 - Life on Land	53	38%
Goal 16 - Peace and Justice Strong Institutions	58	41%
Goal 17 - Partnerships to achieve the Goal	65	46%
Total of participants in this question	**140**	**100%**

Even respondents who generally want to include SDGs in their teaching practices have pointed out reasons why sometimes they do not do so. The reasons cited are lack of training (16%), lack of opportunity (15%), lack of materials (11%), lack of time (8%) and others (47%).

Among the other reasons, the respondents seem not be so sure about the appropriate place where SDGs could be integrated in their courses. Several respondents claimed that the SDG were not applicable, that there was a lack of emphasis to this theme, and that most of the SDGs were not relevant to a particular course. Another reason given, which also justifies the previous one, is that the curriculum is defined within disciplinary committees; there are curriculum limitations and lack of power to change. One respondent commented that SDGs have not been considered in their college, maybe because they are still new (less than a year at the time of the survey).

Other reasons identified were lack of financial incentives, lack of governmental commitment, and lack of institutional support.

Many respondents recognised the need to give them more consideration, as this comment indicates: "*The chair I teach is rather new at the faculty. I never thought including the SDG, but I will include them next year*".

Concerning the different routes the University have taken in embedding SDGs, the respondents chose the possibilities given in nearly equal measure, without giving one of them a preference (see Table 3). Nevertheless "developing partnerships to advance the goals" had a higher percentage of full agreement (22 %), compared to "ensure everyone on campus knows what the goals are and why they are important" which had the higher percentage of not agreement (39 %).

Table 3. Possible ways to incorporate the SDGs at the university, according to the surveyed population.

Ways to incorporate the SDG at the University	Yes, fully	Yes, partly	Yes, a little bit	Not really
Ensure everyone on campus knows what the goals are and why they are important	13%	27%	21%	39%
Embedding SDGs into the curriculum	10%	32%	27%	30%
Embedding SDGs into class assignments/discussions/Lectures	16%	24%	36%	24%
Students explore possible solutions through extension projects	18%	28%	34%	20%
Work on the goals within your own institution	19%	33%	30%	18%
Use SDGs to guide research priorities and impact	19%	23%	33%	25%
Developing partnerships to advance the goals	22%	20%	31%	27%
Report on your efforts and impact in relation to SDGs	14%	21%	28%	37%

In relation to the future emphasis on SDGs in the curriculum of the universities included in this study, 45% of the respondents see this topic increasing a lot, 42% believed it is likely to increase a little, 11% see that there will probably be no changes; and only 2% believe it is likely to decrease.

4.2 Integration of SDGs in learning process in higher education institutions

The forms of how SDGs are integrated into the learning process in higher education institutions were explored through an open question and were analyzed in the light of the level of matching obtained in relation to item 4.1: "not really", "a little bit"," partly integrated" and" fully integrated".

The universities framed in "not really" did not answer this question.

A total of 146 answers were classified into 10 categories according to the content analysis. The statements revealed the integration of the SDG in the learning process in the following ways:

1. within the curriculum (formal way)

2. in informal ways in lectures
3. in research activities
4. in extension activities
5. conference lectures
6. courses and capacity building
7. living labs
8. isolated actions for stimulation change of behavior
9. application in master and doctorate programs
10. no answers or respondents that still are planning incorporate the SDG in their teaching.

The respondents who framed as a "little bit" as to the integration of the SDGs in teaching, correspond to 11% of the surveyed universities. This group indicated evidences of specific actions from some professors in their lectures and the approaches about sustainability in a wider way, not dealing directly with SDGs.

In general, the actions do not seem to deepen an understanding of the SDGs. Rather, they usually only give an idea to students about what they are, as this comment illustrates:

"The University has incorporated a course on SDGs. However, students are not made familiar with the indicators. Rather they are only asked to go through the goals."

The categories obtained in this "little bit" integration of the SDG group were research activity (2%), courses and capacity building (8%), curriculum (15%) and lectures (49%) (No answers corresponded to 26%).

The respondents that framed the SDGs in teaching as "partly integrated" correspond to 40% of the universities sampled. The more common category refer to experiences in lectures (25%). It could mean that the SDG approach is mostly the initiative of a professor or lecturer, and not part of a systematic curricular strategy. As a result, most of the goals embedded have a stronger connection with the respective –individual- area of interest of the respondent, as the following statements illustrate:

"…Since my field is energy, I only deal with those goals that have a stronger connection with energy issues. "

"I teach "development economics" and "ecological economics" from perspectives that involve a critical evaluation of the SDGs. I also teach an introductory course to incoming university students who do research on the applicability of the SDGs in Mexico. "

"I have partly integrated the SDGs in my teaching. I teach in a design unit tackling urban regeneration and sustainable communities."

One comment suggests that some initiatives related with the integration of the SDGs in the curriculum (23% of the statements) are bearing fruits, as this comment indicate:

"All students in our School (about 1000 students) - both undergraduate and graduate level - are exposed to SDGs in core courses. We even have them posted around the School"

Other categories of inclusion mentioned by this group were conferences (4%), living labs (5%), courses and capacity building (6,5%), research (8,5%), master and doctorate courses (9%), and extension (e.g. outside events) with 14%. No answers were provided by 5% of the respondents.

The respondents that framed the SDGs as " fully integrated" in teaching correspond to 32% of the universities. For them, the actions for the integration of the SDGs in the learning process were embedded through many ways. Most of the respondents indicated more than one action in their university looking to explore the SDGs and the integration in the curriculum was much cited in this group (35%). Some of the comments provided were:

"In all aspects, looking for a whole comprehension of the SDGs in teaching/learning process, and though the integration with research and extension projects."

"Yes. We have integrated the SDGs into Environmental Science and Education for Sustainable Development courses, mandatory for all students at the International University of Business Agriculture and Technology (IUBAT University) for one semester. We have started to offer this course to all undergraduate programmes."

"By showing the impacts of climate change and how to develop mitigation and preparedness for sustainable development. By engaging students to explore them".

The distribution of the other categories obtained in this " fully integrated" group were conferences (0,7%), extension (1,7%), publications (2%), living labs (3,2%), courses and capacity building (3,9%), research (4,2%), lectures (12,6%), stimulating behaviour (13%) and masters and doctorates programmes (15,4%).

Comparing the three groups according the level of integration, it is noticed that the more integrated the SDGs are with the curriculum, the more initiatives for the learning process are carried out.

5. Discussion

There has been substantial progress in terms of initiatives for the integration of sustainable development at Higher Education Institutions. In addition, there is increasing evidence that HEIs are moving towards holistic and systemic approaches when addressing SD (Lozano et al., 2014, Hoover and Harder, 2015, Ramos et al., 2015). The SDGs are indeed a good opportunity for HEIs to address SD with practical applications, as the results from the survey showed.

Most of the respondents have some knowledge about the SDGs, and agree with their integration at higher education institutions beyond institutional commitment or

teaching. However, the main issue is the concrete and practical integration of the SDGs, since the results from the survey showed much lower levels of application (Figure 3). Some repsondents were using the SDGs as key course content, others as a topic addressed in a wider curriculum, others as part of assessment but application overall is patchy despite the opportunity for the SDGs to be used to drive further momentum in relation to education for sustainable development. Unfortunately,the SDGs are transversal, interdisciplinary and at the same time regarded as vague (SDSN, 2016, Spangenberg, 2017), with limited obligations to governments, business and consumers. It is therefore no surprise that the survey did not yield substantial insights into new approaches, when it is just as difficult to integrate them in teaching as it is in other domaines. However, practical examples of how specific topics are linked to the SDGs might serve to help academics better understand their relevance and application in particular areas of the curriculum. For instance, the role of microorganisms mapped onto SDGs provides a plethora of linkages between the literature and each of SDGs in relation to microorganisms (Akinsemolu, 2018). Through microorganism examples, Akinsemolu shows how SDGs can be linked to applications in disciplines including engineering, psychology, ecology, forensics, management and business studies and nutritional sciences (2018). Therefore, looking at the links between specific areas of knowledge and the SDGs, for instance through staff development and participatory workshops, could help support their concrete and practical integration in the curriculum.

In this study, the most common reasons for not integrating the SDGs in the curricula are related to lack of training and the difficulty of incorporating the SDGs in courses. This supports other studies, that suggested that staff development is recognised as the main driver for the integration of SDGs in academic activity (Lazzarini et al., 2018). In addition, lack of support from top management is a common barrier for the implementation of education for sustainable development at universities (Leal Filho et al., 2018) so it is likely to be the same for the SDGs. Further, the SDGs and the UN Agenda 2030 are still very recent, but many respondents believe that this topic will largely increase in relevance in the future but have not yet felt the urgency. Many responses suggest that the SDGs could be incorporated in multiple ways not only in the curriculum by creating a new course or within existing courses, but also in research, outreach projects and partnerships. Within a given institution, the SDGs can also be approached through seminars, conferences, workshops, or focus groups. The World Sustainable Development Research and Transfer Centre (WSD-RTC) founded by the Hamburg University for Applied Sciences in January 2017 has been focusing on this topic, and has been organizing or co-organising specialist events on the SDGs in many countries. More recently, the European School of Sustainability Science and Research (ESSSR) was created. The mission of ESSSR is:

"To provide a framework upon which teaching and research within the remit of sustainability science may be further developed at European universities, by means of joint, digitally-oriented teaching programmes, research projects, PhD training and quality scientific publications to be published in high calibre journals".

ESSSR is being brought to life based on the perceived need to explore new ideas, develop new approaches and new methods in the field of sustainability science, to meet current and future needs, and which can also help to achieve the many goals listed in the document "Transforming our world: the 2030 Agenda for Sustainable Development".

Academics, who at least in principle have a crucial role to plan in the integration of SDGs at universities, tend to work combining these activities (e.g. teaching, outreach, research and knowledge exchange) within the university and beyond (Lazzarini et al., 2018). Therefore, providing staff development, support from top management and space in workloads to engage in different activities, could support the effective integration of the SDGs at an institutional level. This, in turn, could also help higher education institutions to strengthen their profile- and perhaps even performance- in teaching, research, outreach and in knowledge exchange.

The sample showed that the goals most addressed in teaching are related to:

i)   climate change,
ii) ii) sustainable cities and communities and
iii) iii) quality education

which are traditionally issues more easily integrated in the curricula of environmental sciences (in the case of the first two goals) or education and teaching programs (in the case of the third goal). Depending on the continent and its characteristic and needs, the goals addressed can be different (see table 1). For example, in North America good health and well-being is the goal most considered in teaching, which could be related to Federal Government policies and private practice health care programmes in the country (McGlynn et al., 2003). In comparison, in South America, quality education is the most addressed goal in teaching, which may be related to lower levels of education compared to, for instance Europe and North America (Brown and Hunter, 2004). Further research should be performed to better understand how different contexts shape the links between specific SDGs and curricula.

The diversity of answers shows that there are no simple solutions, but their complementarity seems dependent on the universities' business model, culture or engagement and the context. There is the need for continuity on integrating SDGs in higher education at strategic level, in terms of financial resources and capacity building. Bottom-up connected to top-down approaches could lead to possible solutions to better application of SDGs at universities. Indeed, without the support of senior management within a university, bottom-up sustainable development initiatives seem destined to fail in the longer term due to lack of investment and administrative support (Ávila et al., 2017). However, traditionally in academia, academic staff have a great level of professional autonomy that make it challenging to implement top down approaches for organizational change (Gornitzka, 1999). Therefore, although strong leadership is crucial for the integration of SDGs, the bottom up impetus cannot be underestimated.

Verhulst and Lambrechts (2015), offer some insights on the success factors and obstacles of SD integration in higher education, based on organizational change management, which can also be applied to the SDG context. Dlouhá and Pospísilov (2018), propose participation processes with multiple societal actors at the national level, to discuss SDGs-related transformations of educational systems, aiming to achieve a wide practical impact. That process has already been started in the Czech national context.

According to Cicmil et al. (2017), responsible education for global sustainability must be facilitated through a combination of approaches: i) educational activism, ii) informal academic collaboration, iii) formal measures and reporting, and iv) practical skills for maintaining legitimacy and ownership of creative and innovative pedagogic models. At the same time negotiation of those approaches need to be aligned with the institutional priorities. The different areas in which Education for Sustainable Development can be embedded at universities, like Campus operations, teaching, research, and community outreach need to include sustainability goals, polices, and programmes. In addition, formal structures can be put in place, so they can guide the implementation of the SDGs at universities. The 'human' dimensions of organizational change processes (where hidden contradictions and tensions are common) must also be accompanied by flexible and human-centered structures and management approaches and move towards 'double loop' organizational learning (Hoover and Harder. 2015).

More teaching training, decision makers' awareness, and engagement in cross curricular and interdisciplinary practices and the SDG themselves can be an important way to engage academics to incorporate the SDGs in teaching. Teaching support materials and guides for universities and education are already being published (e.g. UNESCO, 2017b, SDSN Australia/Pacific, 2017). Also, at University level new materials with new learning approaches are being produced. For instance, in Germany, the project "Digital Implementation of SDGs in the Curriculum", part of the Hamburg Open On-line University (HOOU) is currently producing modules on SDGs 3 (Ensure healthy lives and promote well-being for all at all ages), 4 (Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all), 5 (Achieve gender equality and empower all women and girls), 7 (Ensure access to affordable, reliable, sustainable and modern) and 13 (Take urgent action to combat climate change and its impacts) in order to make them available to university teachers, and hence facilitate the handling of sustainability issues in university teaching.

Universities are known to play and important role in transforming societies, so they could –and should- more actively propose innovative ideas to policy makers leading them to enhance measures towards implementing the SDGs.

Decision makers and the general community must see campuses as places for opportunities and areas that can be the birthplace for new management strategies and the deployment of technologies. At the same time, the need for SDG target achievement can work as a driver for Education for Sustainable Development implementation in teaching at universities, in particular considering SD Goal nº 4, where investments are needed (one of the main barriers of ESD application).

5. Conclusions and Recommendations

Many critics have stressed the fact that the SDG targets are too broad, and far too numerous. Whereas others consider that it is better to have 17 goals that include new targets such on women's empowerment, good governance, and peace and security, for example, than fewer goals that do not address these issues. Amina Mohammed, the UN Secretary General's special adviser on post-2015 development planning, points out that there had been a hard fight to limit the number of goals to 17, so there would be strong resistance to reducing them further. In order to achieve the goals, some member states have wisely determined that SDGs should be tailored and adapted to a country´s circumstances. Further critics suggest SDGs to be too unfocused and unrealistic, vague and aspirational.

Being realistic however, one must admit that despite the problems or concerns which may be expressed in relation to the agreements on SDGs, the fact is that the UN General Assembly has endorsed them, and a constructive approach is needed in order to pursue them. By describing how universities perceive the SDGs this paper fills in a research gap. Indeed, it has outlined that the central role universities may play is hindered by various reasons here outlined. The scientific relevance of this paper and the contribution of this study resides on the fact that it describes the current state of knowledge, by outlining what some universities are doing in this regard and paving the way for further works.

Even though the study was performed on a worldwide basis, the number of responses obtained means that it cannot claim to be comprehensive. However, the data collected allows a profile of the current emphasis given to SDGs by HEIs to be built, and some valid conclusions to be drawn. These are as follows:

a) HEIs should align their curricula on the one hand, but also their research on the other, to SDGs and the many commitments they entail. Here, a unique opportunity is provided to combine the content of course with SDGs them, enriching the learning experience;

b)   HEIs may in this context develop, test and use new contents, learning methods and transformative approaches, as some examples were given at the discussion.

c) HEIs should seek to develop more applied research (i.e. practice-oriented) around the SDGs that catalyse approaches, methods and solutions to help both the public and private sectors to become more effective and sustainable; PhD programmes are quite appropriate in this context.

d) HEIs should more actively engage the students´ community, to commit to and act in support of the SDGs.

Finally, universities as a whole and university staff in particular, should try to take more advantage of the many opportunities SDGs provide to them, not only in respect of teaching and research but especially in respect of their outreach activities (the so called "3rd mission") and act as champions of public opinion in support of SDGs. Universities should be ahead of the pack, and not behind it.

References

Aichi-Nagoya Declaration on Education for Sustainable Development (2014), UNESCO, http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/ERI/pdf/Aichi-Nagoya_Declaration_EN.pdf. Accessed 11/07/17.

Akinsemolu, A. A. (2018). The role of microorganisms in achieving the sustainable development goals. *Journal of Cleaner Production*, *182*, 139-155.

Aleixo AM, Azeiteiro UM, Leal S. (2017). Conceptualizations of sustainability in Portuguese higher education: roles, barriers and challenges toward sustainability. J Clean Prod. doi: 10.1016/j.jclepro.2016.11.010.10.1016/j.jclepro.2016.11.010.

Aleixo AM, Azeiteiro UM, Leal S. 2018. The implementation of sustainability practices in Portuguese higher education institutions. J Sustainability Higher Educ. 19(1). doi:10.1108/IJSHE-02-2017-0016.

Annan-Diab, F., Molinari, C. (2017). Interdisciplinarity: practical approach to advancing education for sustainability and for the Sustainable Development Goals. The International Journal of Management Education, 15, 73-83.

Association of Commonwealth Universities (2015). Progress and potential: Higher education playing its part in the Sustainable Development Goals. September 2015. https://www.acu.ac.uk/publication/download?publication=54 Accessed 6/6/17

Ávila, L. V., Leal Filho, W., Brandli, L., MacGregor, C., Molthan-Hill, P., Özuyar, P. G. Moreira, R., M. (2017). Barriers to innovation and sustainability at Universities around the world. Journal of Cleaner Production 164, 1268-1278.

Bardin, L., 1977. Content Analysis "L' Analyse de Contenu", Edicões 70, Lisbon ISBN: 972-44-0898-1.

Brown, D. S., Hunter, W. (2004). Democracy and human capital formation: education spending in Latin America, 1980 to 1997. Comparative Political Studies, 37(7), 842-864.

Cicmil, S., Gough, G., Hills, S. (2017). Insights into responsible education for sustainable development: The case of UWE, Bristol. The International Journal of Management Education 15, 293 – 305.

Dlouh, J. and Pospísilová, M. (2018). Education for Sustainable Development Goals in public debate: The importance of participatory research in reflecting and supporting the consultation process in developing a vision for Czech education. Journal of Cleaner Production, 172, 4314-4327.

Gornitzka, Å. (1999). Governmental policies and organisational change in higher education. Higher education, 38(1), 5-31.

Hák, T., Janoušková, S. and B. Moldan (2016). Sustainable Development Goals: A need for relevant indicators. Ecological Indicators, 379, 565-573.

Hoover, E. and Harder, M. K. (2015). What lies beneath the surface? The hidden complexities of organizational change for sustainability in higher education. Journal of Cleaner Production 106, 175 - 188.

International Institute for Sustainable Development (IISD) (2016): UN launches SDGs financing platform. URL: http://sdg.iisd.org/news/un-launches-sdgs-financing-platform/

Kopnina, H. (2017). Teaching Sustainable Development Goals in The Netherlands: a critical approach. Environmental Education Research, DOI: 10.1080/13504622.2017.1303819

Lazzarini, B., Pérez-Foguet, A., Boni, A. (2018). Key characteristics of academics promoting Sustainable Human Development within engineering studies. Journal of Cleaner Production, 188, 237-252.

Leal Filho, W., Azeiteiro, U., Alves, F., Pace, P., Mifsud, M., Brandli, L., Caeiro, S., Disterheft, A. (2018) Reinvigorating the sustainable development research agenda: the role of the sustainable development goals (SDG). International Journal of Sustainable Development & World Ecology 25 (2), 131-142.

Leal Filho, W., Brandli, L., Becker, D.; Skanavis, C., Kounani, A., Sardi, C., Papaioannidou, D., Paço, A., Azeiteiro, U., de Sousa, L., Raath, S., Pretorius, R., Shiel, C., Vargas, V., Trencher, G., Marans, R. (2018). Sustainable development policies as indicators and pre-conditions for sustainability efforts at Universities: fact or fiction?, International Journal of Sustainability in Higher Education, 19 (1) DOI 10.1108/IJSHE-01-2017-0002 (forthcoming)

Leal Filho, W., Shiel, C., Paço, A. (2017). Implementing and operationalising integrative approaches to sustainability in higher education: the role of project-oriented learning. Journal of Cleaner Production, 126-135.

Lozano, R., et al., (2014). A review of commitment and implementation of sustainable development in higher education: results from a worldwide survey, Journal of Cleaner Production. http://dx.doi.org/10.1016/j.jclepro.2014.09.048

Mader, C., Rammel, C. (2015). Transforming Higher Education for Sustainable Development Brief for GSDR 2015. https://sustainabledevelopment.un.org/content/documents/621564-Mader_Rammel_Transforming%20Higher%20Education%20for%20Sustainable%20Development.pdf. Accessed 09/07/17.

McGlynn, E. A., Asch, S. M., Adams, J., Keesey, J., Hicks, J., DeCristofaro, A., & Kerr, E. A. (2003). The quality of health care delivered to adults in the United States. *New England Journal of Medicine*, *348* (26), 2635-2645.

PRME (2015). Management Education and the Sustainable Development Goals. Transforming Education to Act Responsibly and Find Opportunities.Foundation for the Global Compact. PRME, New York.

Ramos TB, Caeiro S, van Hoof B, Lozano R, Huisingh D, Ceulemans K. 2015. Experiences from the implementation of sustainable development in higher education institutions: environmental management for sustainable Universities. Journal of Clean Production 106, 3–10.

Sachs, J.D. (2012). From Millennium Development Goals to Sustainable Development Goals. In: The Lancet, vol. 379, issue 9823, pp. 2206-2211.

Saunders, M., Lewis, P., Thornhill, A. (2007). Research methods for business students, Pearson Education Limited, London.

SDG Accord (2017) The University and College Sector's Collective Response to the Sustainable Development Goals. URL: http://www.sdgaccord.org/. Accessed 6/7/18.

SDSN Australia/Pacific (2017): Getting started with SDGs in Universities: A guide for Universities, higher education institutions, and the academic sector. Australia, New Zealand and Pacific Edition. Sustainable Development Solutions Network – Australia/Pacific, Melbourne.

Sedlacek S. (2013). The Role of Universities in Fostering Sustainable Development at the Regional Level. Journal of Cleaner Production, 48, 74-84.

Shiel, C., Leal Filho. W., Paco, A., Brandli, L. (2015) Evaluating the Engagement of Universities in Capacity Building for Sustainable Development in Local Communities. Evaluation and Program Planning, 54, 123-134.

Shiel, C., Smith, N., & Cantarello, E. (2019). Aligning campus strategy with the SDGs: an institutional case study. In W. Leal Filho, A. Salvia, L. Bradli, & R. Pretorius (Eds.), Universities as Living Labs for Sustainable Development: Supporting the Implementation of the Sustainable Development Goals - Volume 1. Springer.

Spangenberg, J.H. (2017). Hot Air or Comprehensive Progress? A Critical Assessment of SDGs. Sustainable Development. 25, 311 – 321.

United Nations (2015) Transforming Our World: The 2030 Agenda for Sustainable Development. UN, New York.

UN Conference on trade and development (UNCTAD) (2016). World Investment Report 2016. Investor Nationality: Policy Challenges. Geneva.

UN Sustainable Development Solutions Network (SDSN) (2016). Funding SDGs. URL: http://www.sustainablegoals.org.uk/funding-the-sdgs/.

UN Sustainable Development Solutions Network (SDSN) (2015): Indicators and a Monitoring Framework for the Sustainable Development Goals. Launching a Data Revolution. New York.

UNESCO. 2005. United Nations Decade of Education for Sustainable Development (2005-2014): International Implementation Scheme. Paris, UNESCO.

UNESCO (2016). Education for people and planet: Creating sustainable futures for all. New Global Education Monitoring Report Series. UNESCO, Paris.

UNESCO (2017a). Unpacking Sustainable Development Goal 4 Education 2030 UNESCO, Oct 2017 Edition, | 32p.

UNESCO (2017b). Education for Sustainable Development Goals Learning Objectives. The Global Education 2030 Agenda. UNESCO, Paris.

Verhulst, E. and Lambrechts, W. (2015). Fostering the incorporation of sustainable development in higher education. Lessons learned from a change management perspective. Journal of Cleaner Production 106 (2015) 189 – 204.

Wals, A. (2009). Review of Contexts and Structures for Education for Sustainable Development: Learning for a Sustainable World. UNDESD 2005-2014. UNESCO, Paris, France.

Wilks, A., Van den Belt, M. (2017). Mapping Victoria's Curriculum through the Sustainable Development Goals, Wellington: University of Victoria, NZ. URL: https://www.victoria.ac.nz/about/governance/sustainability-office/teaching-report.pdf

Willats, J., Molthan-Hill, P., Erlandsson, L., Dharmasasmita, A., Simmons, E. (2017). A University Wide Approach to Integrating the Sustainable Development Goals in the Curriculum – A Case Study from the Nottingham Trent University Green Academy' in Leal Filho, W (Ed.) Implementing Sustainability in the Curriculum of Universities: Approaches, Methods and Projects, World Sustainability Series, Berlin: Springer International Publishing (forthcoming).

Appendix – Questionnaire survey

SUSTAINABLE DEVELOPMENT GOALS AND SUSTAINABILITY TEACHING AT UNIVERSITIES: FALLING BEHIND OR GETTING AHEAD OF THE PACK?

1) Your country (please specify):

| |
| |

2) Your gender:

( )Male ( )Female

3) Are you aware of the Sustainable Development Goals and what they mean?

( )Yes, fully ( )Yes, partly ( )Yes, a little bit ( )Not really

4) Do you approach the Sustainable Development Goals as part of your teaching? IF THE ANSWER IS NO, PLEASE GO TO QUESTION

( )Yes, fully ( )Yes, partly ( )Yes, a little bit ( )Not really

5) Have you integrated SDGs into your teaching? If yes, how?

| |
| |

6) Are SDGs in the example you have just given part of the core curriculum? If not, could you give another example where you include them in the core curriculum?

| |
| |

7) Do you agree or disagree with the following statements:

Questions	Yes	No
Each student should know SDGs		

SDGs should be part of the core curriculum		
It is up to the individual to choose one or more of SDGs and work towards them		
There should be an institutional commitment to work towards one or more of SDGs		
My university has made the strategic decision to embed SDGs		

8) Which of SDGs do you address in your teaching?

( ) GOAL 1: No Poverty ( ) GOAL 2: Zero Hunger ( ) GOAL 3: Good Health and Well-being

( ) GOAL 4: Quality Education ( ) GOAL 5: Gender Equality ( ) GOAL 6: Clean Water and Sanitation

( ) GOAL 7: Affordable and Clean Energ ( ) GOAL 8: Decent Work and Economic Growth

( ) GOAL 9: Industry, Innovation and Infrastructure ( )GOAL 10: Reduced Inequality

( ) GOAL 11: Sustainable Cities and Communities ( ) GOAL 12: Responsible Consumption and Production ( ) GOAL 13: Climate Action ( ) GOAL 14: Life Below Wate ( ) GOAL 15: Life on Land

( ) GOAL 16: Peace and Justice Strong Institutions ( ) GOAL 17: Partnerships to achieve the Goal

9) Please consider the following statements in relation to your university's engagement with SDGs. The institution is:

Questions	Yes, fully	Yes, partly	Yes, a little bit	Not really
A) Ensure everyone on campus knows what the goals are and why they are importante				
B) Embedding SDGs into the curriculum				
C) Embedding SDGs into class assignments/discussions/Lectures				
D) Students explore possible solutions through extension projects				
E) Work on the goals within your own institution				
F) Use SDGs to guide research priorities and impact				

G) Developing partnerships to advance the goals			
H) Report on your efforts and impact in relation to SDGs			

10) The reason(s) why you do not approach the Sustainable Development Goals as part of your teaching are?

( ) lack of relevance ( ) lack of materials ( )lack of time ( ) lack of opportunity ( )lack of training ( ) Others "please specify"

11) How do you see the future emphasis to SDGs on teaching at your university?

( ) It is likely to increase a lot ( ) There will probably be no changes

( ) It is likely to increase a little ( ) It is likely to decrease

12) Please write here your e-mail address if you wish to receive a copy of the paper with the results of the survey: