Mapping the Sustainable Development Goals (SDGs) in the University Curriculum
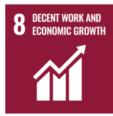
Prepared by Sarah Kate Reid. Published April 2020.

Table of Contents

Our Team and Acknowledgements

Our team at SRS includes Michelle Brown, Matthew Lawson, Rachel Chisholm, and Sarah Kate Read. Senior members of this team not only established the project, but also helped to guide the project and ensure that aims and timelines were applicable and achievable.

Our steering group helped to build and refine the methodology for this review. This team included Sharon Boyd, Kenneth Amaeshi, Liz Grant, Jon Turner, Rachel Howell, Elizabeth Bomberg, Judy Hardy, Peter Higgins, Sarah Parry, Betsy King, Mary Calacott, and Sarah Mcallister.

Our review team mined the SDG data from the Business School courses DRPS pages. These individuals also gave feedback on the review method and suggested routes for student engagement. This team included Rashi Agarwal, Lea Arzbenger, Sascha Bond-Smith, Madeleine Chambers, Rebecca Grant, Hedvig Ponten, Sarah McArthur, Martha Stringer, and Laura Toffolo.

This review was only made possible through the input of all of our team member, as well as contributors from the Institute for Academic Development and Learning for Sustainability Scotland. The funding from the Student Partnership Agreement (SPA) also allowed us to further involve students in this project and make the student experience a priority in this project.
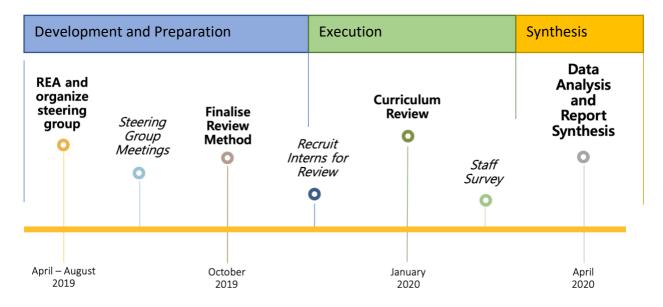
Executive Summary

During this academic year, the University of Edinburgh has committed to implementing more sustainable programmes and projects through their 2030 Strategy. With these commitments in mind, expanding teaching on sustainable topics has never been more opportune. The Department of Social Responsibility and Sustainability established this Curriculum Review project to identify teaching related to the Sustainable Development Goals in a target school's curriculum.

The objectives of this project are to:

(1) review the UG and PG curriculum at the trial school,

(2) identify courses engaging with the SDGs at this school,

(3) share our method and findings to establish the groundwork for more frequent reviews, and

(4) connect staff, students, and academic faculty to support further dissemination of the SDGs at UoE

The 12-month project has been split into 3 periods: Development and Preparation, Execution, and Synthesis. These periods house several major milestones summarised below:

All objectives were met within the timeline of this project. This review was successful in identifying several courses at the Business School exhibiting best practice in teaching the SDGs, and raised questions surrounding the expectations for education on the SDGs. Though the data and recommendations from this report are explored in further sections,

To expand the review project to other schools, the most essential information is consolidated below, though the full method is described in detail in the *Methods* section of this report:

1. a DRPS course description takes on average 15 minutes to review using the search term list provided. This means a ~400 course curriculum can take 110 hrs in total to review, or 2 full-day sessions for 10 people (allowing for a quality check)
2. The non-anonymised survey takes between 5-10 minutes to fill-out and if course organisers are contacted regularly and directly, they are very likely to fill-out this survey
3. Students are interested in cross-curricular lecture series, like the *Our Changing World* series, for learning about sustainability and the SDGs, and feel that there is a bottleneck somewhere which is preventing them from accessing courses dealing with sustainability-related content

In terms of recommendations and next steps, the following schematic summarises recommendations for further actions which can be started immediately to support the University's 2030 Strategy, faculty, and students:

Goals	Actions	Outputs
Define guidelines for SDG delivery	Update the student learning outcomes to include SDG literacy or develop a set of criteria for success in SDG integration	Provide acheivable goal for faculty and school management looking to improve sustianability or SDG education in their curriculum
Expand method to other schools	Move forward with reviewing other school's curriculum using materials in Appendix 5	Confirm commitment to SDGa with consistent and tranparent monitoring
Establish Path for Recognition	Develop SDG Accreditation or awards scheme which can be applied to any School interested in participating	Recognise faculty's efforts in good teaching and support student's in their interest in selecting SDG-related courses
Improve communication across Schools	Use SRS as the central hub for information on SDG tracking	Connecting schools can promote best practice for review activites, reporting, and SDG inclusion

Finally, to support schools in SDG learning and teaching it may be valuable for SRS to clearly define the role they would like to serve in this process. If SRS would like to play an advisory role, the parameters of a 'successful' curriculum, in terms of SDG education, should be further defined. For example, the number of courses or number of goals that each student should encounter would need to be defined, so that during the review process both the reviewer and the target school's management understand how the school compares to these guidelines.

Key Terms and Acronyms

SDG – Sustainable Development Goals

SDGa – Sustainable Development Goal Accord

HEIs – Higher Education Institutations

REA- Rapid Evidence Assessment

LfSS- Learning for Sustainability Scotland

SPA- Student Partnership Agreement

IAD- Institute for Academic Development

Introduction

The SDGs are 17 targets for global development issued by the United Nations in 2015. They aim to end global inequalities in healthcare, education, sanitation, and economic opportunity. Following the proposal of this global project, Higher Education Institutions (HEIs) developed the Sustainable Development Goal Accord (SDGa). The SDGa encourages universities to "localize" SDGs by embedding them into the curriculum, campus, and ethos. This message is echoed by UPAN in their directive on embedding sustainable development goals into academia, stating that "norms and rules will be outweighed by values and behaviours" and "aligning internal ideas with external behaviours [will] produce visible results" (UPAN, 2017). To achieve this alignment or assess their progression towards it, HEIs have optimized traditional curriculum mapping methods to track the inclusion of SDG-related topics in their curricula.

To strive for this alignment at our own University, the Department of Social Responsibility and Sustainability has developed this curriculum mapping project to analyse the inclusion of the SDGs in the curriculum of a trial school. This 12-month project was split into three periods each lasting approximately 4 months: Development, Preparation and Execution, and Synthesis. The tasks and milestones related to these periods are outlined in more detail in the *Methods* section of this report (p. 6). The project team includes staff from SRS and the Business School as well as a PhD student assistant from the School of Engineering. During the project, this team engaged both staff and students with the aim of collecting quantitative data on the Business School curriculum and qualitative information on the student and staff experience as it relates to sustainability and the SDGs in the curricula. These aims were achieved in a systematic manner to pave the way for more frequent monitoring of SDGs in the curriculum at the Business School, and promote the use of the monitoring protocol at other schools in the University.

This project was an opportunity for not only student and staff engagement, but also interdepartmental collaboration to support the inclusion of sustainability-related topics in the curricula at the University of Edinburgh. By reviewing the curriculum at our trial school in a systematic manner, our team was able to (1) illustrate the current inclusion of SDGs in our trial school's curricula; (2) provide a framework for mapping and monitoring of SDG inclusion at other schools; and (3) support staff and students in learning and teaching themes related to these goals. Essentially, this project lays the groundwork for further mapping and auditing of the SDGs at the UoE, foregrounding sustainability commitments like the SDGa and the University's 2030 strategy.

Methods

Curriculum Review

This 12-month project was split into 3 periods: Development and Preparation, Execution, and Synthesis (*Figure 1*).
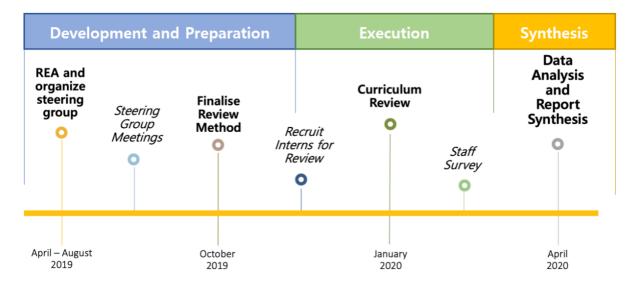

Figure 1: Timeline of the three phases of the curriculum mapping project marked with important deadlines and dates.

The main objective of our project is a curriculum review of our trial school, the Business School, to identify the *current* engagement or *opportunities for* engagement with topics related to the SDGs. To achieve this goal, an appropriate curriculum review method needed to be selected, vetted, and optimised for our purposes. Beginning in April 2019, a standardized Rapid Evidence Assessment (REA) was used to compile methodologies from recently published papers on internal curriculum audits, accreditation methods, and relevant case studies (Colins et al 2014). Since many curriculum reviews have not been published in academic journals, resource banks maintained by National Union of Students and the Sustainability Exchange were also searched.

The REA targeted curriculum review methodologies that have been used to assess graduate outcomes including, but not limited to, sustainability, the SDGs, ethics, and social responsibility topics. The REA was developed to target a set of pre-determined key papers (Appendix 1) and to answer the following key question:

Which methods have been used for curriculum mapping in higher education institutions, and to what extent have they been successful?

Based on information collected through this REA (Appendix 3), different curriculum review methods were compiled for presentation to and optimization by the steering group.

The methodologies identified through these searches were then consolidated into 3 basic review styles and presented to our steering group of stakeholders from UoE. Steering group members then helped to select and optimize one of the audit methods. The steering group included members of the academic faculty, SRS, Institute for Academic Development (IAD), and Learning for Sustainability Scotland (LfSS). Previous internal curriculum audit managers, including Sharon Boyd at the Veterinary school, were consulted more frequently during the Development phase to make sure that we employed best practice. During the method selection and optimisation process, key aspects regarding teaching and sustainability at the University needed to be considered.

Literacy on the SDGs is not yet defined in the university's student learning outcomes/graduate attributes; therefore, the selected method needed to get fundamental information on course engagement with the SDGs rather than detailed information on course assessment and standard of teaching. The timeline of this project, and other limiting resources like manpower, also needed to be considered during method selection and optimization.

For these reasons, the selected method comprised an electronic appraisal of the Business School courses on DRPS followed by a faculty survey to validate or dispute the findings of this search. The DRPS review used the search terms developed and tested by Cote et al (2020). These search terms were vetted further by this project's steering group, leading to a few key additions (Table 1; additions in red).

During the Execution Phase, the curriculum review itself was carried out by 10 interns and the Project Assistant over four 4-hour sessions. The interns were randomly allocated sets of courses by the Project Assistant. Each course's description on DRPS was then searched using each of the search terms using the CTRL+F function. Mentions of each search term were then catalogued for each course as well as general information on the course. A full list of collected information is included in Appendix 4. The template for the curriculum review is also available upon request (SRS K:).

Only courses from the DRPS 2019-2020 curriculum were included in this review. New courses which have been approved for the 2020-2021 academic year but have not been added to DRPS were not reviewed.

A quality check was also added to the review process. During the quality check, each review team member was randomly assigned a different set of courses than the one they originally reviewed (using the Google random number generator). Then were randomly assigned 3 courses in that set to review again (Google random number generator again). Their results

and the first reviewer's were compared and any inconsistencies identified and corrected. This took an additional 1 hr per person.

In future reviews, however, I would recommend doing this halfway through instead of at the end because there were 1 or 2 inconsistencies that needed to be fixed.

Mapping the Sustainable Development Goals (SDGs) in the University Curriculum

Table 1: Search terms developed by Cote et al (2020) including search term additions decided by UoE steering group.

Goal	Description	Search Terms						
Goal 1	No poverty	poverty	income distribution	wealth distribution	socio-economic			
Goal 2	Zero Hunger	agriculture	food	insecurity	nutrition			
Goal 3	Good health and well-being	health	well-being					
Goal 4	Quality education	educat	inclusive	equitable				
Goal 5	Gender equality	gender	women	equality	inequality	girl	queer	
Goal 6	Clean water and sanitation	water	sanitation					
Goal 7	Affordable and clean energy	energy	renewable	wind	solar	geothermal	hydroelectric	
Goal 8	Decent work and economic growth	employment	econom	economic growth	sustainable development	labour	worker	circular econom	wage
Goal 9	Industry, innovation, and infrastructure	infrastructure	innovation	industr	buildings			

Mapping the Sustainable Development Goals (SDGs) in the University Curriculum

Goal 10	Reduced inequalities	trade	inequality	financial market	taxation			
Goal 11	Sustainable cities and communities	cities	urban	resilien	rural			
Goal 12	Responsible consumption and production	consum	production	waste	natural resource	recycl	industrial ecology	sustainable design
Goal 13	Climate action	climat	greenhouse	greenhouse gas	environment	global warming	carbon	weather	climate crisis
Goal 14	Life below water	ocean	marine	water	pollut	conserv	fish	
Goal 15	Life on land	forest	biodiversity	ecology	pollut	conserv	land use	
Goal 16	Peace justice and strong institutions	institution	justice	governance	peace	rights		

Staff Survey

Built into the methods of our review is a vital staff survey step. This staff has been included in several curriculum review studies (Morsi et al 2007; Joyner 2016a, 2016b; Davis et al 2016; Denby and Rickards 2016; Chaney et al 2017). The survey responses not only substantiate search term hits, but also helps to distinguish the 'intended curriculum' from the 'delivered curriculum' as it relates to the SDGs.

Using information collected during the review, course organizers were contacted with the survey to validate or dispute the inclusion of SDGs in their course's curriculum. The survey included questions on course description writing and purpose, SDG engagement, relevant training for faculty, and the attitudes of faculty, students, and school management. A few of the questions are listed below; however, the full survey is available in Appendix 5.

What is the name of your course?

When was the last time you updated your course description?

What do you see as the purpose of your course description?

      a. Provide minimal information
      b. Fully describe course proceedings
      c. Attract students
      d. All
      e. Other

To what extent do you believe you address the goals in your course?

      a. Goal [each number is a separate question]

          i. Not covered
         ii. Implicitly Taught
        iii. Explicitly Taught – by myself
        iv. Explicitly Taught – by tutors
         v. Explicitly Taught – by a guest lecturer
        vi. Assessed –Optional coursework questions related to the SDGs
       vii. Assessed –Required coursework questions related to the SDGs
      viii. Assessed –Group Project
        ix. Assessed –Optional exam question
         x. Assessed –Required exam question

Staff Survey

Surveys pertaining to an identified course were only distributed to faculty whose course exemplified a high-level of engagement. Whereas an anonymised survey was distributed to all staff at the Business School. The intention of distributing multiple surveys was to celebrate faculty members for their initiative, rather than targeting those who might not have the same resources or training.

Connecting Stakeholders: Student and Faculty Engagement

Through the execution and synthesis phases, students were included in the review process and the final steering group meeting to forefront the student experience in these progressive curriculum changes. To ensure that their experience was accurately represented, our student review team were given a short presentation on student engagement options and then led through participatory brainstorming session. They then broke into teams and worked to develop three student engagement routes that they believed worked best with the student schedule. These routes included: (1) student surveys for SDG literacy, (2) sustainability representatives, and (3) greater access to cross-curricular programmes.

Faculty Strikes and COVID-19

Though most of our project was unhindered by COVID-19, we were hoping to apply some of these student engagement options during the synthesis phase of the review project. The COVID-19 pandemic has restricted many of these engagement routes, and the working period for our curriculum mapping assistant ends in May 2020. However, these student engagement routes may be applied in future iterations of this review project and are included in *Results* and *Discussion* of this report.

Results

Curriculum Review

In terms of the REA, several search string iterations were tested with the final search string returning 85 papers related to curriculum mapping at HEIs. Previous iterations of the final search string as well as their output are provided in Appendix 2 and a list of the consolidated review options are listed in Appendix 3.

Data from the UG and PG curricula differed in the specifics; however, they showed some similar trends, particularly for the relatively high inclusion of Goals 8, 9, and 13 in both curricula (UG Figure 2 ; PG Figure 5). Both schools also had a similar proportion of courses with no mentions of the SDGs (14% of courses in UG ; 16% of courses in PG) and courses with at least one mention (86% UG ; 84% PG). These proportions are visualised in *Figure 4* and *Figure 7*. The postgraduate school has more mentions in general (PG = 1957 ; UG = 1009), but also has more courses than the UG curriculum (PG= 264 ; UG = 110).

A more in-depth breakdown of each curriculum follows.

Undergraduate Curriculum

In the Undergraduate curriculum, the top three courses are Goals 8 (321 mentions), Goal 9 (204), and Goal 13 (144) (*Figure 2*; *Figure 3, p. 14*). However, if the search term *econom** accounts for 199 mentions, and without this added term the total number of mentions for Goal 8 is 122. The goals with the least mentions are Goal 15 (0), Goal 2 (2), and Goal 7 (2). Goal 2 only has 1 hit for *food* and 1 for *insecur**. The only search term with any hits for Goal 7 is *energ** in the whole UG curriculum, with no mentions of any of the alternative energy production methods.

Of the courses with more than 1 SDG mention, 54% had less than 10 mentions and only 2% had above 41 mentions (*Figure 4, p. 14*).
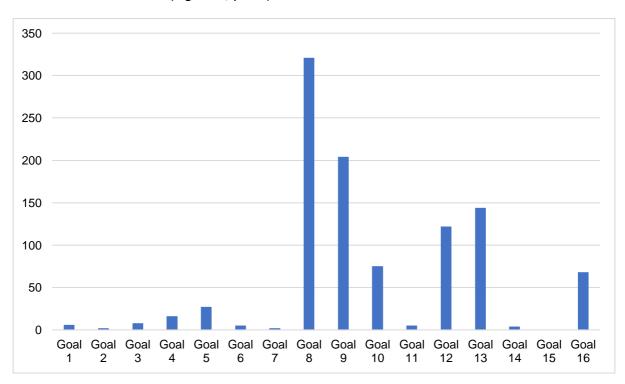

Figure 2: The breakdown of mentions per goal in the undergraduate curriculum.

Mapping the Sustainable Development Goals (SDGs) in the University Curriculum
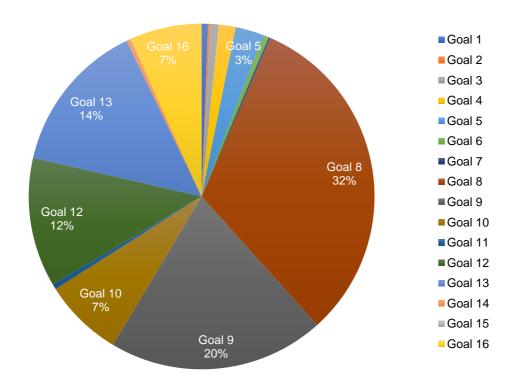

Figure 3: The proportion of search term hits related to each goal in the undergraduate curriculum.

Figure 4: The proportion of courses with no mentions v. at least one mention, with further breakdown of the number of mentions in each course in the undergraduate curriculum.

Postgraduate Curriculum

In the postgraduate curriculum, the top three courses are Goal 13 (469 mentions), Goal 8 (443), and Goal 9 (400) (*Figure 5*; *Figure 6*, *p.16*). However, if the search term *econom** accounts for 320 mentions, and without this added term the total number of mentions for Goal 8 is 93. For Goal 13, the top four courses account for 41% (193 mentions) of the Goal 13 mentions. The goals with the least mentions are Goal 2 (2), Goal 15 (2), and Goal 6 (4). Goal 2 only has 2 hits for *insecur**. Goal 15 has two matches for *forest*, and Goal 6's 4 hits are for *water*. Goal 1 and 11 are also quite low in mentions (5 each).

Of the courses with more than 1 SDG mention, 61% (101 courses) had less than 10 mentions and only 3% had above 41 mentions (*Figure 7*, *p. 16*).

Figure 5: The breakdown of mentions per goal in the postgraduate curriculum.

Mapping the Sustainable Development Goals (SDGs) in the University Curriculum

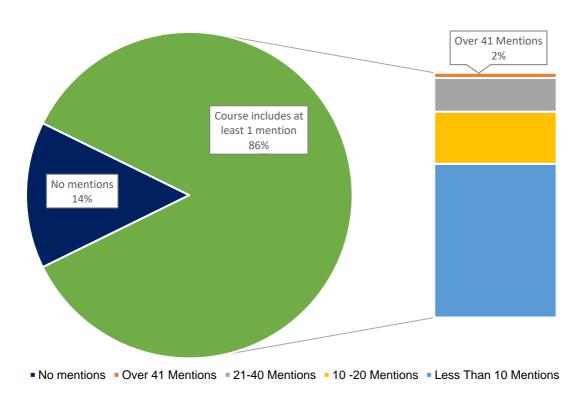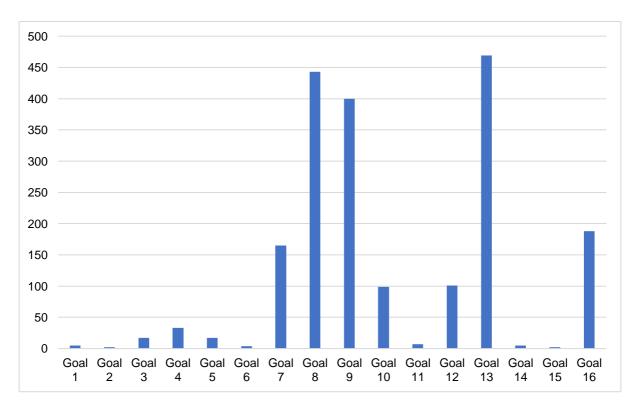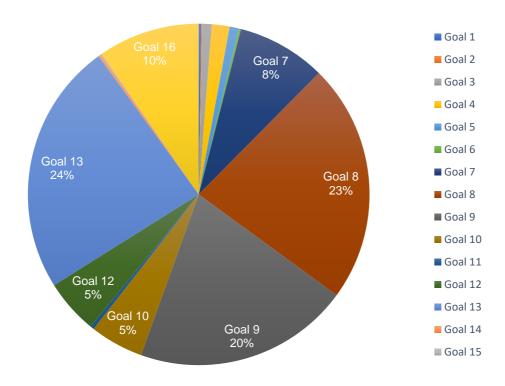*Figure 6: The proportion of search term hits related to each goal in the undergraduate curriculum.*
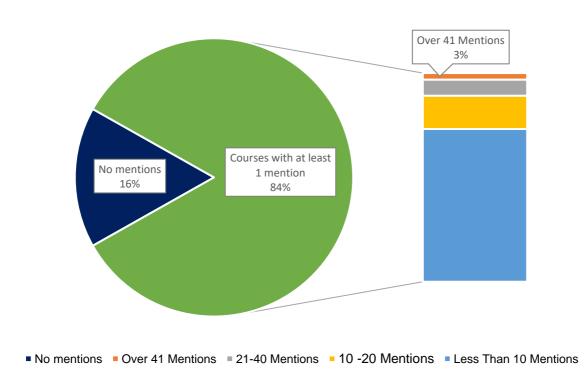
Figure 7: The proportion of courses with no mentions v. at least one mention, with further breakdown of the number of mentions in each course in the postgraduate curriculum.

Staff Survey

A survey requesting specific course information was distributed to the top 20 courses from the UG curriculum and the top 30 from the PG curriculum (*Table 2*). Staff survey responses corrected several courses which were misidentified as strongly relating to the SDGs (Reported in Red, *Table 2*).

Table 2: The response outcome of the top course organisers in the undergraduate and postgraduate programmes at the Business School.

	Undergraduate	*Postgraduate*
Responded to Survey	Carbon and Environmental Accounting	Applications of Finance
	Carbon Markets	Global Challenges for Business
	Climate Change and Environmental Policy	Brand Culture
	Energy and Environmental Markets	Business and Society: The Impact of Globalisation
	Low Carbon & Green Investment (10 credits)	Business Economics
	Low Carbon and Green Investment	Business Simulation
	Organising for Social Change: Strategy, Governance & Innovation	<u>Global Business and the Sustainable Development Goals</u>
	Organising for Social Change: Strategy, Governance & Innovation (20 Credit)	Human Resource Management 2
		International Business in Emerging Markets
		International Business: Globalisation and Trade 2A
		Managing Across Border and Culture
		Marketing

		Organising for Social Change: Creating Value and Impact
		Social and Sustainable Entrepreneurship
Did Not Fill-Out Survey	Business Strategy for Environmentally-Suitable Futures (MBA)	Innovation and Entrepreneurship
	Carbon and Environmental Consulting Project	Business and Climate Change
	Consumer Behaviour	Consumer Behaviour
	Global Finanical Markets and Emerging Economies	Global Creative Industries: The art of business and the business of art
	Innovation Management and Design Thinking (MBA)	Industrial Management 1
	Managing Employment Relations	International HRM and Comparative Employment Relations
	Multinational Entetrprises and Comparative Employment Relations	Managing Employment Law
	Qualitative Research	Services Management in an international context
		Services Marketing
		Taxation Practices
		The future of work
Misidentified Courses	Translational Study - Innovation and Entrepreneurship Masterclass (Biz)	Introduction to Entrepreneurship
		Creativity in Theory and Practice

	Economic Aspects of Competition Policy
	Fundamentals of Innovation-Driven Entrepreneurship
	The Business Response to Climate Change

Of the 25 survey responses, all but 2 have updated their course description since the goals were established in 2015. 26% of respondents believe the course description should provide minimal information about the course (*Figure 8*), 26% believe they should fully describe the proceedings, and the rest of the respondents, including those who selected the 'Other' option, believe that their description should attract students.

Figure 8: The breakdown of staff survey responses to the prompt 'How would you describe the purpose of your course description.'

Of the respondents, a majority felt they were able to teach some or all the goals (15 of 25; *Figure 9*).[1] While 4 respondents were not aware of the SDGs prior to the survey. The following survey results are categorised based on these two groups, referred to as the *Group 1* (*Feel able to teach some or all of the goals*) and Group 2 (*Not aware of the SDGs prior to this survey*).

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[1] This question was preceded by the following statement:

Section note: For 'Feel able to teach some of the SDGs' and 'Feel able to teach all of the goals,' you do not need to have already integrated the SDGs into your course. We would like to know what you might be comfortable with integrating. There will be a question in the next section on what you have already integrated into your course.

Legend:
- Not aware of the SDGs prior to this survey — 4 (15.4%)
- Aware of the SDGs prior to this survey — 6 (23.1%)
- Understand the principles of the SDGs, but not comfortable with incorporating these goals into my teaching — 1 (3.8%)
- Feel able to teach some of the goals — 10 (38.5%)
- Feel able to teach all of the goals — 5 (19.2%)
- Other — 0

Figure 9: The breakdown of staff survey responses to the prompt 'How familiar are you with the SDGs?'. This question was preceded by a section note.[1]

In *Group 1*, for those who felt able to teach some of the goals, all goals were selected by at least one of the respondents except for Goal 14 and 15 (*Figure 10, p. 20*). Some of the respondents felt that they already implicitly teach topics related to Goals 1, 3, 5, 7, 8, 13, 16, and 17, and some respondents felt they could also include Goal 4 and Goals 9-12. All the respondents would be interested in more professional development opportunities to improve their ability to teach these goals, particularly via more administrative support and guidance to relevant resources.

Group 1's survey responses validated the inclusion of several goals in these courses, though did not cover all of the (*Table 3, p. 20*).

Mapping the Sustainable Development Goals (SDGs) in the University Curriculum

Table 3: Goals which have been validated by survey and search results are filled in blue*, goals which were only identified in the survey in* orange*, goals which were only identified in the search in* yellow*, and goals which are not covered in* grey*. Courses which have already planned to cover more goals in the next academic year are marked with an * . In this table, no distinction is made between implicit and explicit teaching. Courses in which a majority of the covered goals are validate are* **bolded***.*

Course	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7	Goal 8	Goal 9	Goal 10	Goal 11	Goal 12	Goal 13	Goal 14	Goal 15	Goal 16	Goal 17
Business and Society: The Impact of Globalisation	blue	orange	orange	orange	blue	orange	orange	blue	blue	blue	orange	blue	blue	orange	orange	blue	orange
Business Simulation	grey	grey	grey	grey	grey	grey	grey	blue	blue	grey	grey	orange	blue	grey	grey	grey	grey
Carbon & Environmental Accounting	grey	grey	grey	yellow	grey	grey	orange	grey	grey	orange	orange	grey	blue	grey	grey	grey	orange
Carbon Pricing	grey	grey	grey	yellow	grey	grey	orange	yellow	orange	yellow	orange	orange	blue	grey	yellow	grey	grey
Climate Change and Environmental Policy	grey	grey	grey	grey	grey	grey	orange	blue	blue	grey	orange	orange	blue	yellow	grey	grey	orange
Energy and Environmental Markets	grey	grey	grey	grey	grey	orange	blue	grey	blue	yellow	orange	orange	blue	grey	grey	grey	grey
Global Business and the Sustainable Development Goals	blue	orange	blue	blue	blue	blue	blue	blue	blue	blue	blue	blue	blue	blue	orange	blue	orange
Global Challenges for Business	orange	blue	orange	orange	blue	blue	blue	blue	blue	blue	blue	blue	blue	blue	orange	blue	orange

Mapping the Sustainable Development Goals (SDGs) in the University Curriculum

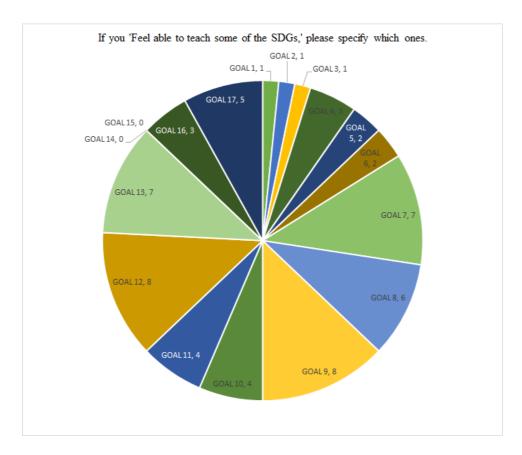|																	
Future of Work																	
International Business: Globalisation and Trade																	
Low Carbon Green Investment*																	
Marketing																	
Managing Employment Relations																	
Business Response to Climate Change																	
Managing Across Borders and Cultures																	

Figure 10: The breakdown of staff survey responses to the prompt 'If you feel able to teach some of the SDGs, please specify which ones'.

In *Group 2*, some of the respondents felt that they already implicitly taught topics related to Goals 1, 3, 5, 7, 8, 13, 16, and 17, and some respondents felt they could also include Goal 4 and Goals 9-12. All the respondents would be interested in more professional development opportunities to improve their ability to teach these goals, particularly via more administrative support and guidance to relevant resources.

In the interest of brevity, the rest of the survey responses can be accessed through the SRS Bristol surveys account.

Student Engagement Routes

To continue to develop our understanding of the Business School, our student review team developed a few engagement routes including a suitable student survey method, and promotion of cross-curricular pathways.

For the student survey route, the review team suggested using Top Hat. Top Hat is a quiz app, which is already commonly used at the University, to give short, quick quizzes to large cohorts of students. Using this app, a course organiser or tutor could deliver a short quiz either on the

student's SDG literacy, or gauge the student's perception of SDG engagement in the concerned course.

The next strong suggestion from our student team was to provide more collaborative cross-curricular programmes. Cross-curricular lecture series or programmes, like Our Changing World, might allow students to engage with a range of sustainability topics in one place. Staff survey responses also support this type of programme. One respondent who teaches an SDG-focused module stated that:

> *"**3x more students are auditing this course** [than enrolled]. There is clear interest, but [my course] is not set-up as an optional course for [auditing students]. Students auditing the course are coming from geosciences and management"*

This respondent was trying to highlight the importance of better communications between Schools to support student's creating their own path for learning.

Discussion

Using this two-part method, our review and mapping exercise was successful in identifying courses that are engaging with the SDGs and also allowed for a simple method of validation with the top-preforming course organisers. Further surveying to academic staff and students could help to parse out the specifics of teaching and assessment as well as rank student outcomes; however, the method used in this review has been incredibly useful for opening up the dialogue around the SDGs and identifying excellence in sustainability teaching. This method also allowed us to meet our objectives in a timely manner.

 Our objectives for this project were to (1) review the UG and PG curriculum at the Business School; (2) identify courses engaging with the SDGs in the Business School; (3) share our findings to establish the groundwork for more frequent reviews; and, (4) connect staff, students, and academic faculty to support further dissemination of the SDGs at UoE. By working closely with all concerned parties, we were able to meet these objectives. Objective 1 was completed through our student-led and -executed curriculum review in January. Objective 2 was completed in February and March by promoting a survey tailored for course organisers identified during the review process. Surveys were complete by the course organizers online or with the help of the curriculum mapping intern via a phone interview. Objective 3 was completed in early March through two key meetings. Firstly, at the end of February, a meeting with members of the ERS Team at the Business School including Sarah Ivory, Winston Kwon, Kenneth Amaeshi, and Tara Morrison promoted. Finally, in early March, we completed objective 4. Before the closure of the University, we were able to connect our steering group, composed of mainly academic staff, with students from the curriculum review, members of SRS and IAD, as well as representatives from Learning for Sustainable Scotland. During this meeting, we vetted out further actions that should follow on from the

curriculum review, completing our fourth objective. To expand student engagement, our student review team were given a presentation on student engagement options and then led through participatory brainstorming session to define student options. They then broke into teams and worked to develop three student engagement routes: (1) student survey routes, (2) sustainability representatives, and (3) sustainability literacy assessment. Their results from this exercise were so valuable and allowed us to prioritise the student experience in our recommended next steps.

Next Steps

By connecting students in faculty in our final discussions on recommendations and outputs, we also developed 3 key recommendations for further actions to support the University's 2030 Strategy and SDGa commitment.

Firstly, during data analysis, it became obvious that guidelines for 'success' in delivering the SDGs is lacking. Though we have data on the number of mentions of each SDG, there are no mandated guidelines on. This sentiment was expressed by members of the Business School, who were left without guidance on what constitutes a 'successful' curriculum in terms of delivering the SDGs. Defining sustainability and the SDGs in the graduate learning outcomes would not only support faculty in prioritising curriculum changes but is also becoming a desirable outcome for students and graduates (De St Jorre and Oliver 2018; Denby and Rickards et al 2016; Mckinsey et al 2014). Denby and Rickards (2016) asserts this finding that:

> *"There is ... a growing demand from business, for graduates to be sustainability literate, with company leaders increasingly seeing sustainability as one of the top 3 priorities (McKinsey, 2014)."*

This step of committing to sustainability topics through the graduate attributes has been identified as a vital step to preparing each HEI's curriculum for alignment (Denby et al 2016); similarly, there is also evidence that improving the "visibility" of previously implied learning outcomes can improve "reflection and potentially enhance the quality of their learning processes" (Wijngaards-de Meij et al 2018, p. 221 ; De St Jorre and Oliver 2018).

Secondly, the review process should be expanded to additional schools. Future reviews can be facilitated or led by SRS to promote standardisation of the methodology and allow for some comparison between schools. Now that the review method has been established, 10 students could complete a ~400 course review over 2-4 x 4-hour sessions, with time for a quality check and introductory training session.

Thirdly, developing an accreditation or recognition scheme to "certify" courses in a way that is accessible to students **AND** encourages staff engagement without forcing them to do so would benefit all concerned parties.

Finally, building better communication between schools to promote cross-curricular enrolment and auditing of courses could help students to achieve sustainability learning goals without requiring changes to the graduate learning outcomes in the short-term. Both staff and students in our meetings expressed a lack of continuity and communication of sustainability education options for students.

By prioritising these goals in the short to medium-term, the University can improve not only monitoring and alignment in the curricula, but can also support students in their interests and bolster their employability following on from university (*Figure 11*).

Goals	Actions	Outputs
Define guidelines for SDG delivery	Include sustainability or SDG literacy in the defined graduate attributes of the University or on a School by School basis	Provide acheivable goal for faculty looking to improve sustianability in their course
Expand method to other schools	Move forward with reviewing other school's curriculum using materials in Appendix 5	Confirm commitment to SDGa with consistent and tranparent monitoring
Establish Path for Recognition	Develop SDG Accreditation or awards scheme which can be applied to any School interested in participating	Recognise faculty's efforts in good teaching and support student's in their interest in selecting SDG-related courses
Improve communication across Schools	Use SRS as the central hub for information on SDG tracking	Connecting schools can promote best practice for review activites, reporting, and SDG inclusion

Figure 11: An action plan based on the results and recommendations of this project. This figure supplies the actions and outputs associated with each of the goals for further action.

Improvements to Future Reviews

In terms of improvements, the survey and the review itself could be improved or optimised to work better for the target school. For the review, the search term list was not the most reliable tool for identifying the degree of engagement with each specific SDG, but was

efficient in highlighting the presence of engagement in a course. However, searching the courses prior to contacting the academic faculty provided a foundation for contact with members of the trial school, and we maintain that the search term list should be kept for future curriculum reviews. Based on the findings of this study, the *econom** search term for goal 8 should be reviewed on a school-to-school basis to ensure that the inclusion of this term isn't skewing results.

For the survey, there were a few issues namely concerning question phrasing. Some of the questions on SDG inclusion were slightly ambiguous and may have skewed some of the answers. Changes to the way survey questions are posed are included in the survey in Appendix 5.

Conclusion

This review was useful in providing not only fundamental information on teaching and the SDGs at our trial school, but also allowed time for reflection and critique of our expectations for teaching and the SDGs. Many of the stakeholders involved in this project were aware that the University was a champion of sustainability education, but were not clear on what the expectations were for SDG teaching and student learning outcomes. Students also felt that there was a bottleneck somewhere in their school's communications, which prevented them from accessing courses that included sustainability content. One of the main findings of this project is this blind spot. The interest and expertise is there for adequate SDG teaching, but the goalposts have not been defined. By taking the Next Steps outlined in the discussion, this blind spot can be remedied through improved guidance to schools and improved communication with students.

In essence, with further reviewing of other schools, SRS could start the process of monitoring and defining successful SDG learning and teaching at University of Edinburgh, supporting the University's goals, students' outcomes, and faculty's interests in the process.

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Appendix 1 – Key papers for REA

1. Bell, C.E., Ellaway, R.H. and Rhind, S.M., 2009. Getting started with curriculum mapping in a veterinary degree program. *Journal of veterinary medical education*, *36*(1), pp.100-106.
2. Denby, L. and Rickards, S., 2016. An approach to embedding sustainability into undergraduate curriculum: macquarie university, Australia case study. In *Teaching education for sustainable development at university level* (pp. 9-33). Springer, Cham.
3. Joyner, H.S., 2016. Curriculum mapping: a method to assess and refine undergraduate degree programs. *Journal of Food Science Education*, *15*(3), pp.83-100.

Appendix 2 – Inclusion criteria and search string iterations

1. (TS=(curricul* OR "curricul* map*") AND TS=(educat* OR learn* OR "learning outcome*" OR "learning objective*") AND TS=(sustainab* OR "sustainable development goal*")) *AND* **LANGUAGE:** (English) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*

   ⟹ Results: 3,295

2. (TS=("curricul* map*") AND TS=(educat* OR learn* OR "learning outcome*" OR "learning objective*") AND TS=(sustainab* OR "sustainable development goal*")) *AND* **LANGUAGE:** (English) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*

   ⟹ RESULTS: 6

3. (TS=("curricul* map*") AND TS=(educat* OR learn* OR "learning outcome*" OR "learning objective*") AND TS=(universit* OR "higher educat*")) *AND* **LANGUAGE:** (English) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*

   ⟹ RESULTS: 85

4. (TS=("curricul* map*") AND TS=(educat* OR learn* OR "learning outcome*" OR "learning objective*") AND TS=(universit* OR "higher educat*" OR colleg*)) *AND* **LANGUAGE:** (English) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*

   ⟹ RESULTS: 85

Inclusion criterion

   ⟹ Paper addresses a method of curriculum mapping
   ⟹ Proposes or describes a novel method

Exclusion Criterion

   ⟹ Programme design/creation rather than mapping for the purpose of alteration or outcome assessment
   ⟹ Technology to support accreditation
   ⟹ Assessment of curriculum visibility
      o May be kept on file for recommendations for our project, but should not be included in review

Information to be Extracted

⇒ Method
⇒ Results
⇒ Recommendations

Appendix 3 - Curriculum Review Options Based on REA

1. A paper-based audit or electronic appraisal of the course/courses to understand the intended curricula and topic engagement
   a. Create a ranking system for the level of inclusion of SDGs in each required course for a degree
   b. Maybe only undergraduate or postgraduate courses
   c. Maybe too much to include all
   d. Can get Student Volunteers to review the course information in the Degree Pathway Finder
      i. http://www.drps.ed.ac.uk/19-20/dpt/drpsindex.htm
      ii. This service is managed by the Student Systems team – need to ask if there is html data on this

⇒ This method is resource-intensive particularly in time and manpower. Most studies which employ this methodology have access to high levels of student volunteers to review course information or are reviewing a single course/school. This method is also predominately used to confirm accreditation standards, and are reviewing the course materials for the inclusion of specific topics, which have been previously defined by the school or an accreditation body. However, is there is an electronic and searchable database available at UoE we could develop a list of related search terms (I have a draft copy in case), and try searching for course inclusion this way.

2. A paper-based or electronic appraisal of the course/courses followed by a survey to validate or dispute the findings based on this search
   a. This often includes a common ranking system between the audit/surveying phases
   b. E.g.
      i. The Sustainable Development Goals are:
         1. Assessed on/Examined for (3)
         2. Explicitly Addressed (2)
         3. Implicitly Addressed (1)
         4. Not Covered (0)
   c. This ranking system can be included for students
      i. Compare student and faculty responses on the importance of SDGs in course information
   d. Most studies have a pre-defined objective or Student Learning Outcome that has been explicitly defined by the course, school, or university and they are trying to judge the inclusion of this objective

⇒ This method of curriculum audit is time-intensive due to the paper-based or electronic review of course materials. The use of a ranking system in the faculty and student surveys can be used to interpret how integrated into the curriculum specific topics/ideas are. Questions involving this ranking system could be used to assess the integration of individual SDGs or SDGs more generally.

3. Survey to faculty and survey to students (without an independent audit of course material)

      a. Faculty survey tends to focus on their inclusion of a topic in their course (e.g. University College Union Template)
          i. Could use ranking system to understand topic engagement
      b. Students are
          i. evaluated for literacy on a specific topic
         ii. Asked to what extent certain qualities are included in course material ("student ranking of domain coverage – Plaza et al 2007)
        iii. Could use ranking system to understand topic engagement
        iv. Include in course evaluation
           1. This will simultaneously address the curriculum audit and frequent evaluation criterion of the Responsible Futures criteria developed by NUS

⇒ This methodology does not require an audit prior to faculty or student surveys and relies on the alignment of student and faculty responses to illustrate the inclusion of material in the curriculum. Stakeholders would need to be engaged extensively from each school to promote the survey amongst faculty and students; though, the level of promotion required will depend on the distribution route of the survey. For example, if we are able to include the SDG survey questions in evaluations which are mandatory or already highly distributed (i.e. course evaluations for students and annual programme monitoring for faculty), the magnitude of stakeholder engagement may be diminished.

4. Survey to faculty only to determine the intended and delivered curricula
      a. Could
          i. Ask to rank topic engagement
         ii. Assess staff literacy
        iii. Ask about the individual's buy-in potential
           1. What could facilitate the inclusion of these topics

⇒ This method would not provide very robust data in terms of what students are actually learning in each course, but could be useful if inclusion of SDGs in to the curriculum is expected to be low. This option would require stakeholder engagement to distribute and promote survey completion, but could provide valuable information on how staff perceive their role in steering the curriculum towards sustainability and SDGs.

Appendix 4 – Additional information gathered for each module during curriculum review

- College School
- UG or PG
- Course DRPS URL
- Module Name
- Module Code
- Availability
- Semester
- SCQF Credits
- SCQF Level
- Course Organiser Email
- Pre-requisites
- Co-requisites

Appendix 5 - Staff Survey

Any text shown in red indicates questions or response options, which have been added based on feedback from the review. All question responses that allow for '*Other*' to be selected have an optional section after for respondents to elaborate.

Survey Purpose:

Following the proposal of the United Nations Sustainable Development Goals (SDGs) in 2015, Higher Education Institutions developed the SDG Accord. The SDG Accord encourages universities to "localize" SDGs by embedding them into the curriculum, campus, and university ethos. University of Edinburgh signed this accord, committing to the aims set out in the SDG accord, and has also reinforced this commitment through principles presented in the 2030 Strategic Plan.

To promote the alignment of intent and action at our University, the Department of Social Responsibility and Sustainability has developed this curriculum mapping project to analyse the inclusion of the SDGs in the curriculum of a trial school. The Business School has been selected as the trial school for this project due to its recent efforts to evaluate sustainability and social responsibility topics in its curriculum.

We see this project as an opportunity to illustrate the current inclusion of SDGs in the trial school's curricula, provide a framework for mapping and monitoring of SDG inclusion at other schools, and, most importantly, **support staff and students in learning and teaching themes related to these goals**.

We decided to distribute this survey anonymously, so that you might feel comfortable answering these questions without fear of judgement.

Course Description Questions

1. What is the name of your course?
2. When was the last time you updated your course description?
3. What do you see as the purpose of your course description?
    a. Provide minimal information
    b. Fully describe course proceedings
    c. Attract students
    d. All
    e. Other
4. Was this format prescribed by your school administration?
    a. Yes
    b. No

Prior Knowledge of the SDGs

Section note: For 'Feel able to teach some of the SDGs' and 'Feel able to teach all of the goals,' **you do not need to have** *already* **integrated the SDGs into your couse.** We would like to know what you *might* be comfortable with integrating. There will be a question in the next section on what you have already integrated into your course.

5. How familiar are you with the SDGs?
    a. Not aware of the SDGs prior to this survey
    b. Aware of the SDGs prior to this survey
    c. Understand the principles of the SDGs, but not comfortable with incorporating these goals into my teaching
    d. Feel able to teach some of the goals
    e. Feel able to teach all of the goals
    f. Other
6. If you 'Feel able to teach some of the SDGs,' please specify which ones.
    a. [List Each Goal]

Current Teaching Related to the SDGs

Section Note: This question is a vital question for our review, so please take the time to answer to the best of your ability. We thank you in advance!

If you would prefer to answer this for each goal individually, please select **'view as separate questions'.**

We define the teaching types as follows:

Implicitly Taught - mentioned in passing, but not included in a formal manner

Explicitly Taught - planned into discussion/workshop/lecture etc. with specific attention paid to the goal and themes related to it

7. To what extent do you believe you address the goals in your course?
    a. Goal [each number is a separate question]
        i. Not covered
        ii. Implicitly Taught
        iii. Explicitly Taught – by myself
        iv. Explicitly Taught – by tutors
        v. Explicitly Taught – by a guest lecturer

      vi. Assessed –Optional coursework questions related to the SDGs

     vii. Assessed –Required coursework questions related to the SDGs

   viii. Assessed –Group Project

     ix. Assessed –Optional exam question

      x. Assessed –Required exam question

Teaching the SDGs - Going Forward

8. Do you think there are opportunities for themes related to SDGs **you do not already cover** to be included in your course?
   a. Yes
      i. If yes, which goals?
         1. [List of Goals]
   b. No
      i. If no, why?
         1. I disagree with the ideology of the SDGs
         2. I don't feel it is my responsibility
         3. Inappropriate to my course
         4. Resources no available to include
         5. Not enough time to plan to course appropriately
         6. Not enough space to include
         7. Other
      ii. (Include as optional for No respondents only) To include more SDGs, you would need:
         1. More administrative support
         2. More professional development
         3. Guidance to related resources
         4. Other
9. Have your received support or training from your school or the University to help embed SDGs in the curriculum?
   a. Yes
      i. If yes, how?
   b. No
10. Have you received support of training from external, professional bodies on embedding SDGs in the curriculum?
    a. Yes
       i. If yes, which body did you receive support from and what was the nature of the support?
    b. No

Question from Learning for Sustainability Scotland

Section Note: To provide meaningful support to academic staff, responses to this question will be used by LfSS to draft and develop a more impactful professional development opportunity focused on teaching the SDGs.

11. Would you be interested in further professional development opportunities to teaching in sustainability and the SDGs?
    a. Yes
        i. If yes, which would you be most likely to participate in:
            1. Half-day workshop
            2. Participative online course
            3. Lecture
            4. Other
    b. No

Attitudes and Culture

Section Note: Answers to the following questions will be used to understand the environment or culture at the Business School as it relates to the SDGs. They are not intended to 'target;' or 'blame' any of the listed parties, but to build an understanding of the culture at the Business School in respect to sustainability and the SDGs.

12. What is your attitude on the SDGs as it relates to the teaching in your course?
    a. Not interested
    b. Not yet aware
    c. Aware, but not interested in learning more
    d. Aware, and interested in learning more
    e. Actively trying to incorporate these topics in my course

13. In your opinion, what is the general attitude on the SDGs as it relates to the teaching among the academic staff?
    a. Not interested
    b. Not yet aware
    c. Aware, but not interested in learning more
    d. Aware, and interested in learning more
    e. Actively trying to incorporate these topics in their courses

14. In your opinion, what is the general attitude on the SDGs as it relates to the teaching among the students?
    a. Not interested
    b. Not yet aware
    c. Aware, but not interested in learning more
    d. Aware, and interested in learning more
    e. Actively trying to engage with these topics

15. In your opinion, what is the general attitude on the SDGs as it relates to the teaching among the senior management?
    a. Not interested

b. Not yet aware
c. Aware, but not interested in learning more
d. Aware, and interested in learning more
e. Actively pushing for these topics to be embedded in the curriculum

Additional Comments

Please free to add any additional comments, insights, or initiatives that you weren't able to comment on in this survey. If you are very interested in this project, please leave your email below and we can find a way to get you involved!

Thank you!

Thank you for taking the time to fill out our survey! We hope that this survey was an opportunity for you to take time out of your day to reflect on the SDGs and how they relate to your course.

This report can be made available in alternative formats on request.

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