Mapping the Sustainable Development Goals and Education for Sustainable Development Competencies in the University Curriculum: School of GeoSciences

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Contents

Executive Summary

This report discusses the integration of the United Nations Sustainable Development Goals (SDGs), Education for Sustainable Development (ESD) competencies, and Curriculum Transformation Project (CTP) elements into the University of Edinburgh's School of GeoSciences Curriculum. By integrating these components into school curricula, GeoSciences may better equip its students with interdisciplinary skills and knowledge that meet employer demands for graduates who can contribute positively to society. This report builds upon GeoSciences' previous curriculum mapping in 2020[1] and supports the university's Strategy 2030.[2] The content focuses exclusively on undergraduate (UG) curriculum.

The objectives of this project are to: (1) map the current climate, nature, and sustainability learning options in UG curriculum, (2) map the ESD competencies in UG programmes and curriculum learning goals, (3) map the UG courses' similarity to CTP's distinctive element requirements, and (4) produce a holistic set of recommendations for increasing both climate, nature, and sustainability learning options and ESD competencies in UG curriculum. The project's approach includes key word mapping of SDGs and ESD competencies in all 132 UG GeoSciences courses, assigning a Likert scale score to each UG GeoSciences course rating its similarity to key CTP elements, a student and staff survey, and an integrated student-staff workshop.

The SDG and ESD competency mapping found that out of 132 undergraduate GeoSciences courses, 118 explicitly contained at least one SDG, with 41 containing five or more and 4 containing ten or more. All seventeen SDGs were represented, with SDGs 6, 8, 11, 13, 14, and 15 being the most common. For ESD competencies, 124 courses mentioned at least one, with critical thinking being the most prevalent. The CTP elements rating found that most courses scored low for challenge course criteria, mainly due to limited group work and upperclassmen restrictions. Scores for experiential courses and enrichment elements tended to be higher, indicating more courses currently align with these criteria. On a programme level, Environmental Geoscience had the highest average number of SDGs per course, while Geography addressed the most SDGs and competencies overall. On a course level, the courses "Sustainability, Society and Environment," "Development and Decolonization in Latin America," and "Human Geography" ranked highest in addressing SDGs, ESD competencies, and CTP elements.

The workshop involved student-staff discussions regarding the integration of climate, nature, and sustainability content into the GeoSciences curriculum. The discussion highlighted challenges at the programme-design level, identified barriers to enrolment and cross-school collaborations, and assessed methods for disseminating information on professional and academic opportunities in sustainability. Feedback was provided on the workshop in the form of a survey, and participants expressed that they found value in the discussion and highlighted the importance of increased idea sharing.

Based on the findings in this report, the School of GeoSciences is recommended to collaborate with staff, students, and university decision-makers to enhance the integration of climate, nature, and sustainability content in its curriculum while addressing challenges related to enrolment, cross-school collaborations, and course feedback. By adopting a collaborative, interdisciplinary approach, GeoSciences can improve its educational experience, strengthen its commitment to sustainability, and prepare students to become future leaders in addressing global environmental challenges.

[1] https://www.ed.ac.uk/sites/default/files/atoms/files/geosciences_report_aug2020.pdf
[2] https://www.ed.ac.uk/about/strategy-2030

1. Background

In 2015, the United Nations published seventeen Sustainable Development Goals (SDGs)[3] with the intention of setting a "blueprint for peace and prosperity for people and the planet, now and into the future" (Figure 1). These goals form the foundation of Education for Sustainable Development (ESD), a pedagogy that teaches the interdisciplinary nature of sustainability, connecting students not only to the environment but the economic, social, and technical aspects of sustainable development.[4] In addition to sustainability-related content, ESD also teaches a broad range of professional skills, including systems thinking, future thinking, critical thinking, strategic competency, collaboration, problem-solving, self-awareness, and normative and cultural competencies.[2] Implementation of ESD in university curriculum is therefore increasingly important as employers seek students with interdisciplinary skills and the University of Edinburgh seeks to deliver graduates who are driven to make a positive difference.[5]

Figure 1. United Nations Sustainable Development Goals.

As there has not been a substantial update to university curriculum in over three decades, the University of Edinburgh has begun a major transformation through their Curriculum Transformation Project (CTP). The primary goals of the CTP[6] are to: (1) improve the educational experience of students, (2) maximize opportunities, (3) cultivate a working and teaching environment that is more satisfying for staff, and (4) support the university's Strategy 2030[7] (with themes of people, research, teaching and learning, and social and civic responsibility). The CTP is focusing primarily on undergraduate (UG) and postgraduate taught (PGT) programmes.

Critical to the success of the CTP and their updating of the curriculum framework is understanding what curriculum, pedagogies, and student engagement opportunities currently exist in the university that could align with climate and nature working group recommendations as well as how successfully they are delivered and received. Previously, the Business School and School of GeoSciences conducted

[3] https://sdgs.un.org/goals
[4] https://www.qaa.ac.uk/the-quality-code/education-for-sustainable-development
[5] https://graduate-attributes.ed.ac.uk/framework
[6] https://www.ed.ac.uk/staff/teaching-matters/curriculum-transformation-programme
[7] https://www.ed.ac.uk/about/strategy-2030

reviews to map the extent to which SDGs appear in their curriculum. Both used a mix of keyword mapping and staff surveys. The Business School found that UG curriculum most predominantly referenced SDGs 8, 9, and 13. Of the courses reviewed, 86% mentioned at least one SDG, but of these, 54% had less than 10 mentions.[8] The School of GeoSciences found that UG curriculum focused most predominantly on SDGs 7, 13, 14, and 15, and that postgraduate programmes had more SDG mentions despite having fewer courses.[9] This mapping will enhance the findings of the previous mapping by also mapping suitability of current course design to meet requirements of distinctive elements (below) of the proposed new course archetypes which the CTP has developed.

> **Challenge Course:** In interdisciplinary groups, students explore solutions to issues that are unbounded and complex and resist straightforward definition. These courses will be 20 credits and open to all students in their 1st and 2nd year.[10]
>
> **Experiential Course:** Learning by doing and reflecting on the experience. According to the CTP, these courses will be 20 credits and students must take at either level 9 or 10.[11] However, to adapt to the needs of GeoSciences, field courses (which are strongly experiential but perhaps not reflective) will also be assessed.
>
> **Enrichment Element:** Linked courses running alongside their main disciplinary programme under a specific theme. These will be a set of 10 or 20 credit subsequent courses that combine to 80 credits throughout a student's degree.[12]

Upon reviewing the currently visible climate and nature learning options in the School of GeoSciences, the social media accounts (Instagram, Facebook, YouTube, X, and TikTok) and website appear to predominantly advertise to prospective students, discussing overwhelmingly the variety of programmes and/or student life. The school's X account and mailing list are most actively utilized and advertise numerous events available to students and staff, including optional lectures, workshops, and conferences covering a variety of earth science and sustainable development topics. However, across all platforms, visibility is lacking for credited course options for existing students.

Primarily, the benefit of this mapping will be the identification of opportunities to enhance climate and nature in the GeoScience curriculum which consequently could improve student degree experience. However, curriculum mapping against SDGs could also benefit the school's communication channels by offering information to advertise on courses and certifications available to both current and prospective students that address a broader range of SDGs and ESD competencies.

1.1. Objectives

The objective of this project is to map currently available climate change and sustainability curriculum in UG programmes in the School of GeoSciences under the framework of SDGs and ESD competencies. It also aims to identify courses that could meet requirements to be distinctive CTP curriculum elements.

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[8] https://www.ed.ac.uk/sites/default/files/atoms/files/mapping_the_sustainable_development_goals_in_the_university_curriculum.pdf

[9] https://www.ed.ac.uk/sites/default/files/atoms/files/geosciences_report_aug2020.pdf

[10] https://uoe.sharepoint.com/sites/CurriculumTransformation/SitePages/Challenge-Courses.aspx

[11] https://uoe.sharepoint.com/sites/CurriculumTransformation/SitePages/Experiential-Learning.aspx

[12] https://uoe.sharepoint.com/sites/CurriculumTransformation/SitePages/Enrichment-Elements.aspx

Expected outputs of this project for the School of GeoSciences include:

- Mapping of climate, nature, and sustainability learning options in UG curriculum.
- Mapping of ESD competencies in UG programmes and curriculum learning goals.
- Mapping of similarity to CTP's distinctive element requirements.
- A holistic set of recommendations for increasing both climate, nature, and sustainability learning options and ESD competencies in UG curriculum.

2. Methods

2.1. SDG and ESD Competency Key Word Mapping

By filtering through the course timetables[13], 132 undergraduate GeoScience courses were found to be offered in the academic year 2023-2024. Key word mapping was used for all these courses, relying primarily on the Degree Regulations and Programmes of Study (DRPS)[14] or Path[15] (when information was not available on the DRPS) for curriculum data. To find explicit instances of SDGs and ESD competencies, this data was input to a keyword mapping tool provided by the University of Edinburgh. The tool was an excel workbook prepopulated with key term recognizing algorithms that required the user to input a list of terms related to specific themes (SDGs) then copy curriculum data as text into an active cell. This iteration uses the same approach as the previous Business School and School of GeoSciences SDG mappings but is developed with a more efficient key word identification method and refined and expanded key words and categories.[8,9,16] The complete lists of key words, related to the below categories (which are shown with the number of key words per category), are included in the Appendix.

SDGs: *these indicated curriculum had content related to distinct themes within sustainability.*

1. **No Poverty** (21) – economic inequality, social safety, financial opportunities, poverty eradication
2. **No Hunger** (34) – food security, food waste, agricultural productivity, nutrition
3. **Good Health** (45) – healthcare access, disease prevention and control, mental health
4. **Quality Education** (45) – education access, knowledge systems, sustainability education
5. **Gender Equality** (26) – gender, sexuality, gender-based violence, women empowerment
6. **Clean Water and Sanitation** (31) – safe drinking water, pollution prevention, water conservation
7. **Renewable Energy** (32) – renewable energy, fossil fuels, carbon capture and sequestration
8. **Good Jobs and Economic Growth** (31) – job creation, green jobs, circular economy
9. **Innovation and Infrastructure** (19) – infrastructure development, technological innovation
10. **Reduced Inequalities** (45) – discrimination, wealth distribution, decolonisation
11. **Sustainable Cities and Communities** (38) – urban planning, transportation, housing
12. **Responsible Consumption** (24) – sustainable consumption, natural resources, markets
13. **Climate Action** (43) – climate change, carbon neutrality, climate adaptation and resilience
14. **Life Below Water** (13) – aquatic and marine habitats, ocean literacy
15. **Life on Land** (22) – land conservation and restoration, flora and fauna, biodiversity
16. **Peace and Justice** (32) – governance, human rights, accountability, social change
17. **Partnerships for the Goals** (24) – international cooperation, public-private partnerships

[13] https://browser.ted.is.ed.ac.uk/
[14] http://www.drps.ed.ac.uk/23-24/
[15] https://path.is.ed.ac.uk/
[16] https://sustainability.utoronto.ca/inventories/sustainable-development-goals-sdgs-keywords/

18. **Miscellaneous** (1) – intended to identify curriculum that addresses sustainability holistically

ESD competencies: *these indicated curriculum was incorporating skills that contribute to sustainability.*

- **Systems thinking** (6) – systems thinking, interconnectedness, complex systems
- **Future thinking** (7) – future thinking, forward thinking, foresight
- **Critical thinking** (10) – critical thinking, analysis, reflection, synthesis
- **Strategic competency** (5) – strategic competency, communication
- **Collaboration** (11) – collaboration, group work, networking, compromising
- **Problem-solving** (5) – problem-solving, analytical thinking, multidisciplinary thinking
- **Self-awareness** (7) – self-awareness, emotional intelligence, compassion
- **Normative competencies** (6) – normative and cultural competencies, ethics, values

Additionally, nine UG programmes were identified on the School of GeoSciences website.[17] The compulsory courses in each of these programmes were then identified using Path. This mapping is used to identify which SDGs and which ESD competencies are featured in each of these programmes, as well as the average number of SDGs and competencies per (compulsory) course in each of these programmes. The goal of this mapping was to obtain a more comprehensive understanding of current learning options and learning frameworks and reflect on the previous mapping as some updates to GeoSciences curriculum have been made since then.

2.2. Mapping for Challenge, Experiential, and Enrichment Courses

In addition to mapping SGDs and ESD competencies, each course in the undergraduate curriculum will be assessed in its similarity to the CTP's qualifications for challenge, experiential, and enrichment courses. While challenge and experiential courses will be evaluated based on the CTP's "essential criteria" (as described below), because enrichment courses have a broader definition, this project will focus specifically on enrichment as it relates to climate, nature, and sustainability.[18] This evaluation is based on the structure and assignments of each course, and a Likert scale (using numbers 1-3) is used to quantify the similarity, with the ranking being: (1) No or minimal similarities, (2) some similarities, (3) many similarities. Fulfillment of criteria is based on researcher judgement.

Challenge course criteria:

- Features groupwork as a key component of the course.
- Intended for students in the first or second year of their degree, and ideally is open to students from numerous programmes.
- Explores unbounded and complex issues.

Experiential course criteria:

- Emphasises learning by doing (e.g., field courses), and ideally includes a reflective learning component.
- Intended for upper-level students.

Climate and nature enrichment element criteria:

[17] https://www.ed.ac.uk/geosciences/study/degrees/undergraduate
[18] https://uoe.sharepoint.com/sites/CurriculumTransformation/SitePages/Challenge-Courses.aspx

- Explores climate, nature, and sustainability topics complementary to students' primary discipline(s), often exploring soft sciences or arts as opposed to strictly hard sciences.
- Is typically not a compulsory course, although this is not a required criterion.

These scores will then be summed up to show one overall CTP element score (ranging between three and nine) as some overlap can exist between each of these categories. Having high overlap, and therefore a high cumulative score, indicates courses with significant opportunity for scaling these elements.

2.3. Staff and Student Survey

A survey was sent to staff and students through the GeoSciences mailing list. The survey included background information on the CTP, SDGs, and ESD competencies, and was incentivised with the opportunity to win one of fifteen £10 Blackwell's vouchers provided by the CTP. It was structured to only include multiple choice and ranking or rating questions to minimise the amount of time required to take the survey and maximise participation, apart from an area to leave comments and questions at the end of the survey. The content of the survey, excluding demographic questions (e.g., year and programme), ranged between twelve and fifteen questions. The survey was conducted for two weeks and received 38 student responses and 16 staff responses.

A sample of what the student questions gauged include:

- Interest in enrolling in courses where sustainability, climate, and/or nature are a key component of the course content.
- Perception of how SDGs and ESD competencies have already been integrated into curriculum, and how confident they feel in their knowledge each of them.
- Incentives and barriers to enrolling in courses with sustainability, climate, and/or nature, as well as courses that address SGDs and ESD competencies that are not already core elements of their programmes.
- Interest in additional professional opportunities, training, and certifications that pertain to sustainability, climate, and/or nature.
- Confidence in and awareness of available sustainability, climate, and/or nature outcomes.
- Perceptions of CTP essential criteria for challenge, experiential, and enrichment courses in their programmes, as well as interest in having an increase of these types of courses in their programmes.

A sample of what the staff questions gauged include:

- Interest in teaching courses where sustainability, climate, and/or nature are a key component of the course content.
- Perception of how SDGs and ESD competencies have already been integrated into curriculum, and how confident they feel in their knowledge of and teaching ability for each of them.
- Incentives and barriers to including ESD competencies and sustainability, climate, and/or nature into their current courses, as well as ideas for further integration.
- Perceptions of CTP essential criteria for challenge, experiential, and enrichment courses in their courses or programmes as they currently are.

- Perceptions on the ease of which they could increase implementation of CTP essential criteria for challenge, experiential, and enrichment courses into their courses or programmes, as well as interest in increasing this implementation.

The full list of survey questions can be found in the Appendix.

2.4. Staff and Student Workshop

Finally, a workshop or working group was hosted that brought together staff and students to synthesize perceptions and ideas on current sustainability, climate, and/or nature learning options, and CTP elements such as student-directed learning and criteria for challenge, experiential, and enrichment courses. Most staff and students in attendance had completed the survey outlined in Section 2.3 in preparation for this workshop, and discussions between staff and students were facilitated to encourage collaboration between both parties. The invitation to the workshop was sent to the GeoSciences mailing list, survey respondents, and the contact email for two student societies. In total, the workshop featured nine participants, including three students and six staff members. The workshop invite and event description are listed in the Appendix.

The discussion section of the workshop included ten key discussion questions that were put together based on input from Dan Swanton, the Director of Undergraduate Teaching in GeoSciences, Ian Glen, the Curriculum Transformation Specialist, and the results of the survey. These discussion questions are included with their responses in Section 3.3. Numerous "stations" were set up around the room, each with one to two of the discussion questions (depending on table space) and resources (paper and digital whiteboards) to write down the key points of their discussion. Participants were divided into groups of two to three and given approximately between five to ten minutes to rotate to each station, where they were encouraged to engage with previous groups' answers and add their own to a digital whiteboard that was consequently saved as record of discussion. An additional survey concluded the workshop both to gauge perceptions before and after the discussion and to receive feedback on the event.

3. Results

3.1. SDG, ESD Competencies, and CTP Elements Mapping

3.1.1. School-Level Findings

Data from the SDG key word mapping for UG GeoSciences curriculum showed that 118 of the 132 courses explicitly contained at least one SDG, while 100 contained two or more, 41 contained five or more, and 4 contained ten or more. No courses had all seventeen SDGs, and only one course was found to mention the word in the "miscellaneous" category that did not otherwise have any direct mentions of SDGs. Figure 2 shows the breakdown of SDGs mapped in the School of GeoSciences. The most common SDGs in the School, found in greater than forty courses, are 6 (Clean Water and Sanitation), 8 (Good Jobs and Economic Growth), 11 (Sustainable Cities and Communities), 13 (Climate Action), 14 (Life below Water), and 15 (Life on Land), however all seventeen SDGs are represented in the curriculum.

Similarly, data shows that 124 of 132 courses contain mention of at least one ESD competency, while 90 contained two or more and 4 contained five or more. No courses contained all eight competencies. Figure 3 shows the overall breakdown of the competencies mapped in the School of GeoSciences. The most common competencies found explicitly mentioned in the school, in 111 courses (more than double

the next most common competency), is critical thinking. This is followed by collaboration, strategic competency, and problem-solving. Systems thinking was only mapped in four courses.

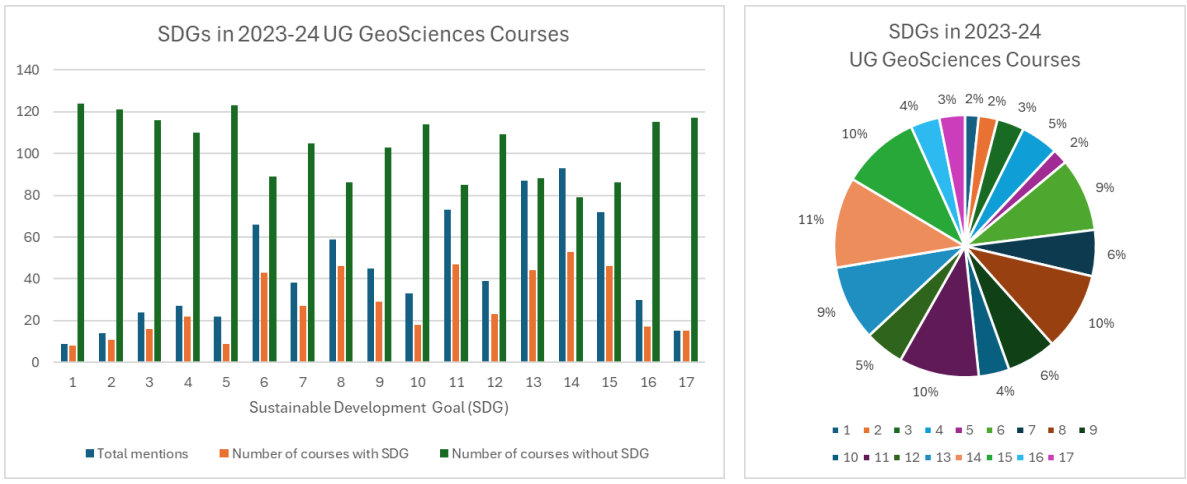

Figure 2. Breakdown of SDGs in all 132 UG GeoSciences courses. The bar graph shows the total mentions for each SDG, as well as the number of courses with and without each SDG. The pie chart shows the relative distribution of the representation for each SDG.

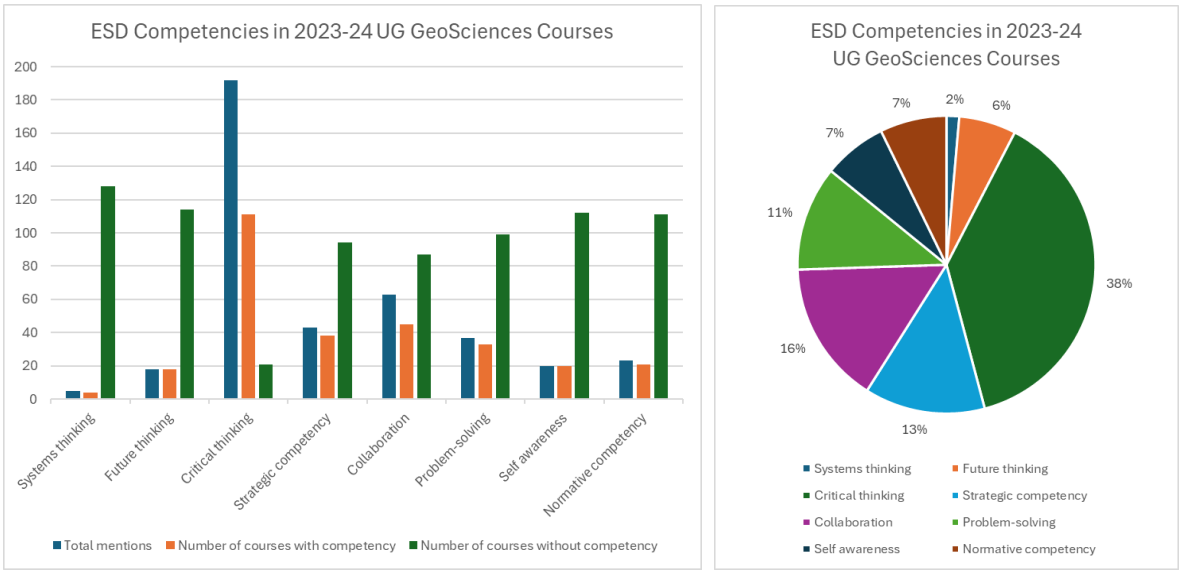

Figure 3. Breakdown of ESD competencies in all 132 UG GeoSciences courses. The bar graph shows the total mentions for each competency, as well as the number of courses with and without each competency. The pie chart shows the relative distribution of the representation for each competency.

Furthermore, 111 course descriptions were found to contain at least one each of the SDGs and ESD competencies. Figure 4 shows the distribution of these courses. Most of these courses were found to have between one and four competencies and SDGs, with another cluster of courses having about the same number of competencies but with seven to nine SDGs. The most common combination was two SDGs and two competencies. Seven courses were found to contain mentions of SDGs but no competencies, and thirteen courses were found to contain mentions of ESD competencies but no SDGs. It should be noted that a limitation of the key word mapping for SDGs and ESD competencies is that it only identifies those that are explicitly stated in the course description. Therefore, courses with shorter

or no course descriptions were less likely to receive hits. This was especially the case with dissertation course descriptions, which are very likely to contain numerous competencies (and potentially SDGs).

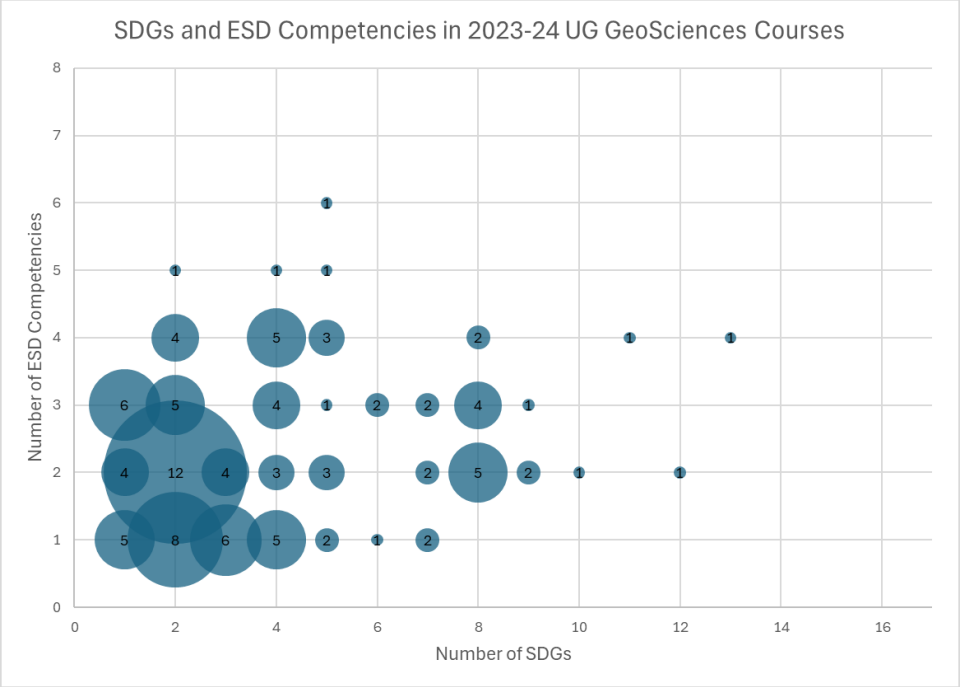

Figure 4. Breakdown of the overlap between the mapped SDGs and ESD competencies. The horizontal axis shows the number of SDGs in each course, and the vertical axis shows the number of competencies in each course. The size of the bubbles (labelled on each point) represents the number of courses with that combination of SDGs and competencies.

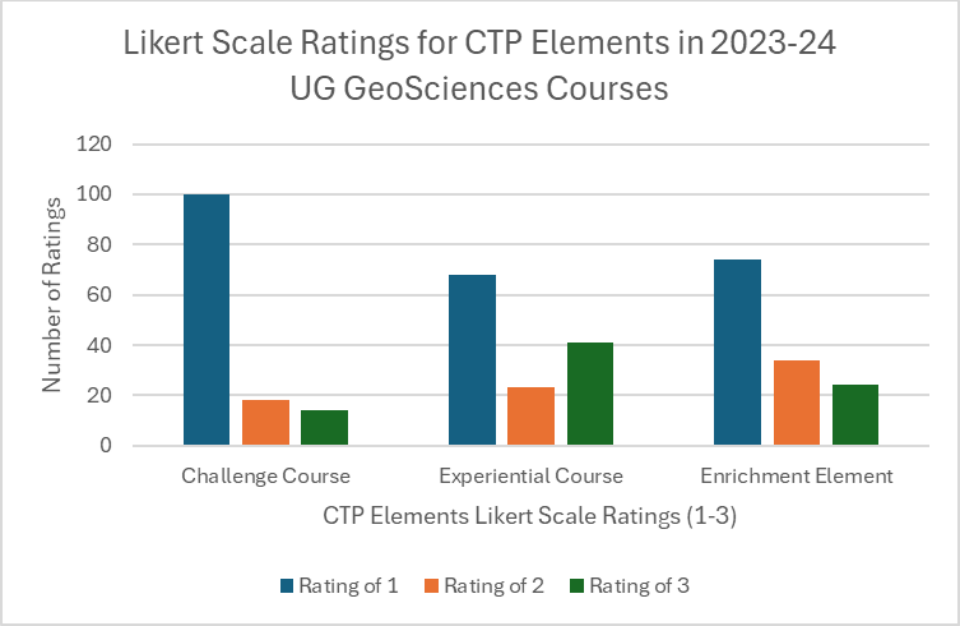

Figure 5. Distribution of ratings for each course's similarity to the three key CTP elements. The ratings indicate: (1) no or minimal similarities, (2) some similarities, (3) many similarities.

Each course was also assigned a Likert scale rating for its similarity to each of the three CTP elements (challenge course, experiential course, and enrichment element) to receive a cumulative CTP score between three and nine. Full results for individual and cumulative scores can be found in Appendix. Figure 5 breaks down the distribution of how the courses were rated for each element. For the challenge course rating, 100 courses received a score of one, 18 received a score of two, and 14 received a score of three. The two biggest barriers for having a larger challenge course rating were having no or limited groupwork and being limited to upperclassmen (this impacted 13 course ratings). For the experiential course rating, 68 courses received a score of one, 23 received a score of two, and X received a score of three. For the enrichment element rating, 74 courses received a score of one, 34 received a score of two, and 24 received a score of three. Overall, 106 courses received a combined score greater than three, 12 courses received a score more than six, and 2 courses received the highest score of nine.

Figures 6 and 7 are similar to Figure 4 except that they compare the number of SDGs to the courses' combined CTP scores, and the number of ESD competencies to the courses' combined CTP scores, respectively. For the comparison between SDGs and CTP scores, the majority of courses were found to have between one and five SDGs and a score between three and six. The most common combination was two SDGs and a CTP score of five. For the comparison between competencies and CTP scores, the majority of courses were found to have between one and three competencies and a score between three and seven. The most common combination was two or three competencies and a CTP score of five.

3.1.2. Programme-Level Findings

Table 1 breaks these results down from a school to a programme level by considering the courses that are mandatory in each of the nine UG GeoSciences programmes. These programmes and the number of mandatory courses they have are:

- Environmental Geoscience (19)
- Earth Sciences (18)
- Earth Science and Physical Geography (14)
- Geophysics (12)
- Geophysics and Geology (13)
- Geophysics and Meteorology (17)
- Ecological and Environmental Sciences (9)
- Ecological and Environmental Sciences with Management (10)
- Geography (13)

<u>SDGs</u>

Environmental Geoscience was found to have the highest average number of SDGs per course (4.2) and Geography was found to address the most SDGs throughout their programme (15). On the other end, Earth Science and Physical Geography was found to have the lowest average number of SDGs per course (2.3) and Ecological and Environmental Sciences was found to address the least SDGs throughout their programme (9).

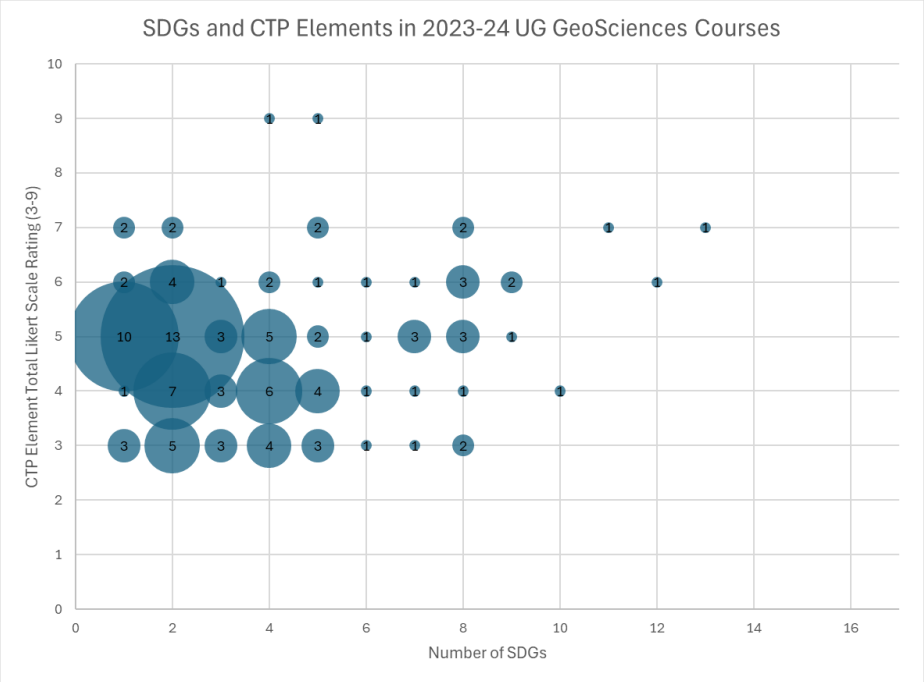

Figure 6. Breakdown of the overlap between the mapped SDGs and combined CTP element ratings. The horizontal axis shows the number of SDGs in each course, and the vertical axis shows the total CTP score of each course. The size of the bubbles represents the number of courses with that combination of SDGs and CTP scores.

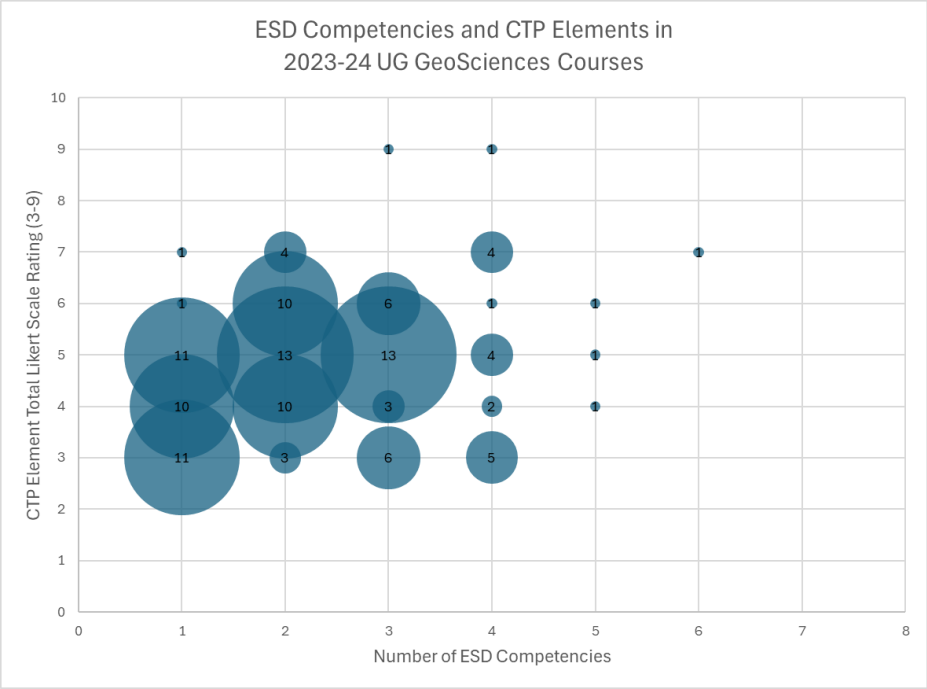

Figure 7. Breakdown of the overlap between the mapped ESD competencies and combined CTP element ratings. The horizontal axis shows the number of competencies in each course, and the vertical axis shows the total CTP score of each course. The size of the bubbles represents the number of courses with that combination of competencies and CTP scores.

Competencies

Table 1 further shows that Geography has the highest average number of ESD competencies per course (2.7), while Environmental Geoscience, Earth Science and Physical Geography, Geophysics and Geology, and Geography address the most competencies throughout their programmes (6). Conversely, Geophysics and Meteorology has the lowest average number of competencies per course (1.4) and Ecological and Environmental Sciences was found to address the least competencies throughout their course.

UG GeoSciences Programme	Average & Total Number of SDGs	Average & Total Number of ESD Comp.	Average Challenge Course Rating	Average Experiential Course Rating	Average Enrichment Element Rating	Average Total CTP Element Score
Environmental Geoscience	4.2 / 14	2.2 / 6	1.2	1.9	1.4	4.5
Earth Sciences	2.8 / 13	2.1 / 5	1.1	1.9	1.1	4.1
Earth Science and Physical Geography	2.3 / 13	1.9 / 6	1.0	1.9	1.0	3.9
Geophysics	3.3 / 13	1.7 / 5	1.0	1.6	1.2	3.8
Geophysics and Geology	3.2 / 14	1.5 / 6	1.0	1.9	1.2	4.2
Geophysics and Meteorology	2.8 / 13	1.4 / 5	1.0	1.6	1.3	3.9
Ecological and Environmental Sciences	2.6 / 9	2.3 / 3	1.2	2.1	1.1	4.4
Ecological and Environmental Sciences with Management	2.7 / 10	2.3 / 4	1.2	2.1	1.1	4.4
Geography	2.8 / 15	2.7 / 6	1.3	1.9	1.6	4.8

Table 1. Breakdown of SDGs, ESD competencies, and CTP (elements and cumulative) ratings. The numbers in this table reflect the average per course and only consider the courses that are mandatory in each programme.

CTP distinctive elements

Regarding CTP ratings, the highest average cumulative rating was 4.8 for Geography (Table 1). For the individual elements, Geography received the highest average score for challenge courses and enrichment elements (1.3 and 1.6, respectively), and Ecological and Environmental Sciences and Ecological and Environmental Sciences with Management received the highest average experiential course rating (2.1).

3.1.3. Course-Level Findings

Table 2 breaks this down further to a course level by highlighting the highest-scoring fifteen courses in three categories: number of SDGs, number of ESD competencies, and cumulative CTP rating. Full course data is available in the Appendix. Three courses were found to exist in the top fifteen of each of these three categories: ECSC08010 Sustainability, Society and Environment; GEGR10114 Development and Decolonization in Latin America; and GEGR08007 Human Geography. ECSC08010 and GEGR10114 are not required in any programme, whereas GEGR08007 is required in the first or second year of Geography. Each of these three courses contains key content focused on the connections between sustainability and contemporary social issues. This trend of co-analysing sustainability and social issues

(or other human issues, such as economic or political concerns) holds true for many of the classes in all three categories in Table 2.

# SDGs	Course Name
13	**ECSC08010 Sustainability, Society and Environment**
12	EASC08011 Natural Hazards
11	**GEGR10114 Development and Decolonization in Latin America**
10	EASC08004 Oceanography
9	GEGR08003 Economic and Political Geography*
9	EASC10108 Petroleum Systems
9	GEGR10144 Religion, Place and Politics
8	EASC08029 Earth Sciences for Society*
8	GEGR10102 Encountering Cities
8	ECSC09005 Environmental Pollution
8	EASC10049 Environmental Problems and Issues
8	GEGR10129 Geographies of Mobility
8	**GEGR08007 Human Geography**
8	EASC10015 Hydrocarbon Reservoir Quality*
8	GEGR10138 The Geography of Health*

# ESD Comp.	Course Name
6	GEGR08004 Social and Cultural Geography
5	EASC10101 Applied Hydrology and Near Surface Geophysics
5	GEGR10134 Researching with Media
5	GEGR10128 The Blue Humanities: Studying the Sea
4	ECSC10036 Conservation Science*
4	ECSC10034 Critical Thinking in Ecological and Environmental Sciences
4	**GEGR10114 Development and Decolonization in Latin America**
4	ECSC10033 Ecological and Environmental Science field course (including management)
4	GEGR08009 Fundamental Methods in Geography
4	GEGR10140 Geographies of Food
4	EASC08021 Geomaterials
4	EASC10087 Geoscience Outreach and Engagement*
4	**GEGR08007 Human Geography**
4	EASC10015 Hydrocarbon Reservoir Quality*
4	**ECSC08010 Sustainability, Society and Environment**

CTP Rating	Course Name
9 *(3,3,3)*	EASC10087 Geoscience Outreach and Engagement*
9 *(3,3,3)*	GEGR10116 Space, Place and Sensory Perception
7 *(3,1,3)*	ECSC10036 Conservation Science*
7 *(3,1,3)*	ECSC10037 Current Issues in Ecology and Environmental Science
7 *(1,3,3)*	GEGR10130 Data Science for Geographers
7 *(1,3,3)*	ECSC10038 Data Science in Ecology and Environmental Science
7 *(3,1,3)*	**GEGR10114 Development and Decolonization in Latin America**
7 *(3,1,3)*	**GEGR08007 Human Geography**
7 *(3,1,3)*	GEGR08004 Social and Cultural Geography
7 *(3,1,3)*	**ECSC08010 Sustainability, Society and Environment**
7 *(3,1,3)*	GEGR10138 The Geography of Health*
7 *(3,1,3)*	ENVI10001 Topics in Global Change
6 *(3,1,2)*	EASC08029 Earth Sciences for Society*
6 *(2,1,3)*	GEGR08003 Economic and Political Geography*
6 *(3,1,2)*	ECSC10025 Effective Project Planning and Management

Table 2. Highest-scoring fifteen courses in three categories: number of SDGs, number of ESD competencies, and cumulative CTP rating. For scores that tied, courses were listed alphabetically amongst the 132 UG courses unless they were found to overlap in categories. The CTP Rating column includes the scores for the individual elements in parentheses in the order of challenge course, experiential course, and enrichment course. The bolded courses are listed in all three categories and the starred courses are listed in two of the three categories.

An additional six courses were found to exist in two of the three categories: GEGR08003 Economic and Political Geography, EASC08029 Earth Sciences for Society, EASC10015 Hydrocarbon Reservoir Quality, GEGR10138 The Geography of Health, ECSC10036 Conservation Science, and EASC10087 Geoscience Outreach and Engagement. Of these classes, only EASC08029 is required in any programmes, being a compulsory course in Environmental Geoscience and Earth Sciences.

3.2. Survey Results

Amongst the student survey responses, all UG programmes were represented except for Earth Sciences. Some postgraduate students also responded to the survey that included the following programmes: MA Geography; MSc Environment and Development; MSc Carbon Management; MSc Environment, Culture and Society; MSc Food Security; MSc Soils and Sustainability; and MSc Energy, Society, and Sustainability. These postgraduate responses were included in the school-wide analysis. Of the 38 student responses, 26 were UG students, of which 5 were first year students, 4 were second year, 4 were third year, 12 were fourth year, and 1 was fifth year. From a staff perspective, of the 16 respondents, 2 have been at the university for between three to five years, 6 have been at the university for five to ten years, and 8 have been at the university for more than ten years.

3.2.1. Experience of Sustainability in Learning and Teaching

To contextualise the subsequent results, we asked respondents to rate their familiarity with the SDGs. Figure 8 indicates that most students and staff rate their familiarity between five and ten, with only two students and one staff member indicating familiarity below this level. No respondents indicated that they are completely unfamiliar with the SDGs.

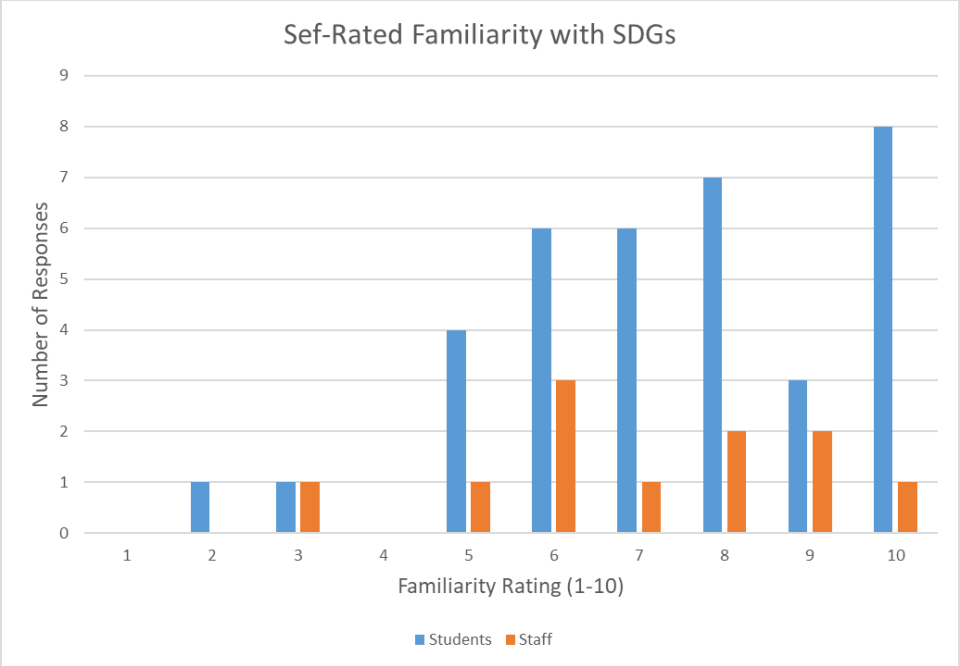

Figure 8. Student and staff self-rated familiarity with the SDGs (using a scale of 1-10).

Table 3 shows the distribution of the SDGs in each of the nine UG programmes, both from the results of the key word mapping and in how student and staff respondents identified the SDGs in their programmes. Overall, there is found to be a strong presence of SDGs 4 and 6-15, in the School of Geosciences but a somewhat weak presence of SDGs 1-3 and 16-17. The results of the mapping and the

survey generally agree apart from a few key differences. First, five programmes were identified in the survey as interacting with SDG 5 as compared with only one in the mapping. Second, for each programme that was represented in the survey, an additional one to four SDGs were identified based on student and staff responses; similarly, none of the survey results identified every single one of the mapped SDGs in any of the programmes. One UG student from the Geophysics programme responded "none" and one UG student from the Geography programme responded "unsure" when asked to identify which of the SDGs are present in their programme. No survey results are available for the Earth Sciences programme.

In addition to asking respondents to identify which SDGs their programme interacts with, staff were asked to assess their confidence in their ability to teach SDGs (Figure 9). For each SDG, the most common response was "somewhat confident" apart from SDG 13 (climate action), which saw "highly confident" as the most common response. SDGs 1-2, 4, 8, and 17 had the lowest rates of overall confidence.

UG Programme	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Environmental Geoscience		X		X		X	X		X		X	X	X	X	X	X	X
Earth Sciences																	
Earth Science and Physical Geography	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Geophysics				X	X		X		X		X	X	X				X
Geophysics and Geology				X	X		X		X		X	X	X	X	X		X
Geophysics and Meteorology				X	X		X		X		X	X	X	X	X		X
Ecological and Environmental Sciences						X	X	X	X		X	X	X	X	X		
Ecological and Environmental Sciences with Management				X	X	X	X	X	X	X	X	X	X	X	X		
Geography	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Table 3. Each of the SDGs in the nine UG programmes. The shaded boxes represent SDGs that were mapped in each programme, and the X's identify where students and staff identified SDGs in programmes. Earth Sciences does not have any X's because there were no student or staff responses associated with that programme.

A similar cross-analysis was performed for ESD competencies. Table 4 shows which of the competencies mapped in each of the nine UG programmes, along with students' self-reported confidence in engaging with each of the SDGs. This presents several interesting results. First, although collaboration was only mapped in one programme (Geography), students in all other programmes reported somewhat to high confidence in this skill (except for Geophysics and Meteorology, which students reported as feeling neutral towards, and Earth Sciences, which did not have respondents). Second, although strategic competency was mapped in five of the nine programmes, of the eight programmes that had survey participants, only two reported feeling confident in this skill (one programme of which the competency was not mapped in). Third, the students that participated in the survey displayed overall confidence in

most of the competencies, although in only one programme students displayed confidence in engaging with all eight competencies (Ecological and Environmental Sciences with Management).

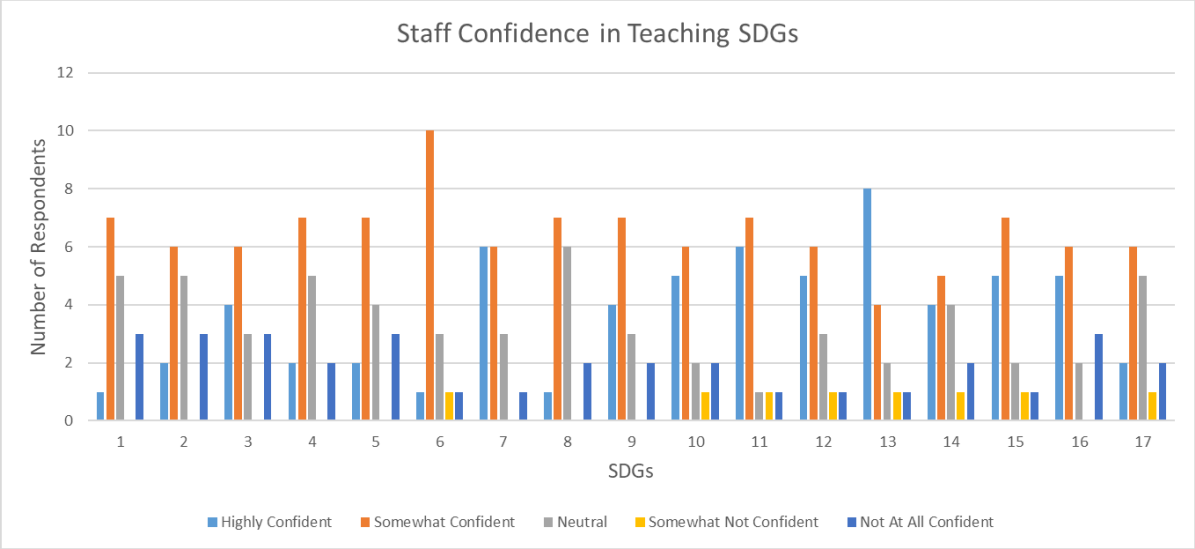

Figure 9. Staff confidence in their ability to teach each SDG.

	Systems Thinking	Future Thinking	Critical Thinking	Strategic Comp.	Collab.	Problem Solving	Self-Aware.	Norm. Comp.
Env. Geos.	0	+	+	0	+	+	+	0
Earth Sci.								
Earth Sci. & Phys. Geog.	+	+	+	0	+	0	+	+
Geophys.	+	0	+	0	+	0	0	-
Geophys. & Geol.	+	+	+	0	+	+	0	+
Geophys. & Met.	+	+	0	-	0	+	+	+
Ecol. & Env. Sci.	0	+	+	+	+	0	+	0
Ecol. & Env. Sci. w/ Man.	+	+	+	+	+	+	+	+
Geog.	+	+	+	0	+	+	+	+

Table 4. Each of the ESD competencies in the nine UG programmes. The shaded boxes represent competencies that were mapped in each programme. The symbols represent students' self-reported confidence in their ability to understand and interact with each competency using the following scale: (+) somewhat to highly confident, (0) neutral, and (-) somewhat not to not at all confident. Earth Sciences does not have any symbols because there were no student or staff responses associated with that programme.

To gauge a staff perspective on the ESD competencies in the UG programmes, staff were also asked to assess how highly their course(s) engage with each ESD competency (Figure 10). Staff reported that their course(s) tend to engage most highly with systems thinking, future thinking, critical thinking and problem-solving. Further, their course(s) tend to engage moderately with collaboration, self-awareness, and normative competency, and minimally in strategic competency. The minimal engagement with

strategic competency supports the result in Table 4 that students similarly feel less confident in this competency when compared with the other seven.

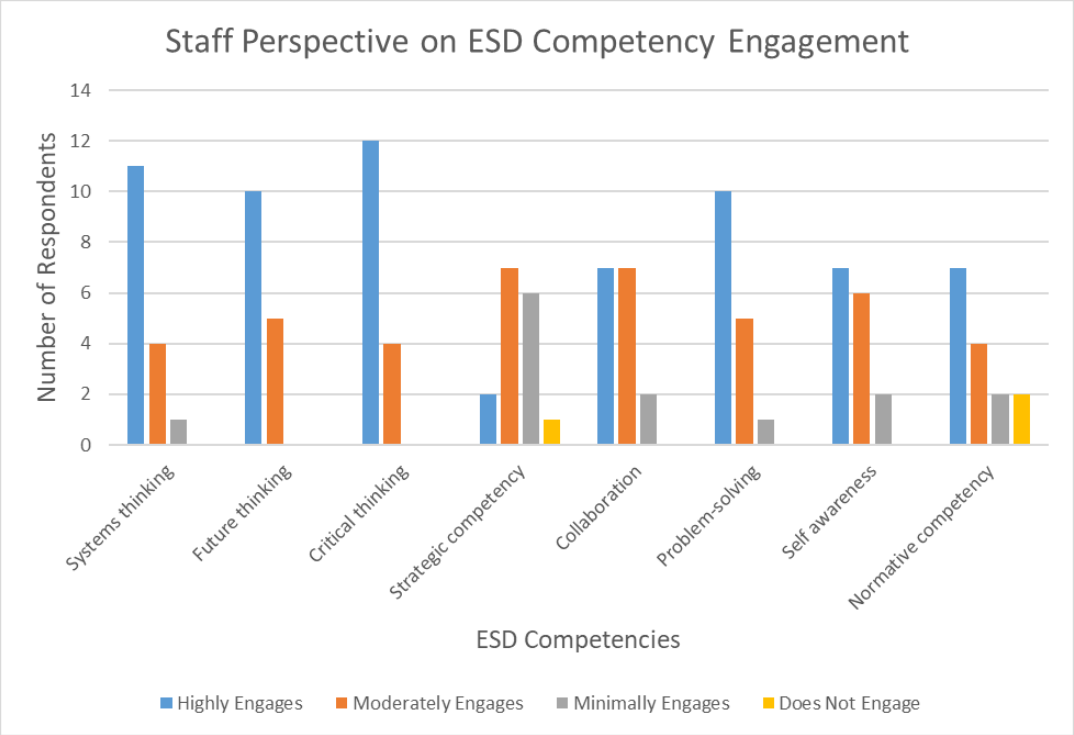

Figure 10. Staff perspective on which ESD competencies their course(s) engage with.

3.2.2. Motivations for Engaging with Sustainability Teaching

Figure 11 assesses the perceived likelihood of students enroling in courses where climate, nature, and/or sustainability are key components of the course content, as well as staff perspective on the importance of embedding SDGs and ESD competencies into GeoScience curriculum. Most students (92%) rated their likelihood of enroling to be between five and ten; of these, 77% (71% overall) rated their likelihood to be between eight and ten. There are no clearly identifiable trends with programme or year in students' answers to this question. Staff answers were slightly more scattered than students' answers, with 81% rating the importance of SDG and ESD competency content between five and ten, and 63% rating the importance between eight and ten. The length of time the staff members who ranked the importance between zero and two have worked at the university are: 5-10 years (rating of 0), 3-5 years (1), and more than ten years (2).

Figure 12 supports the findings of Figure 11 by assessing: (1) students' top reasons for enroling in courses where climate, nature, and/or sustainability are key components, (2) students' top barriers to enroling in these courses, and (3) staff's top barriers to incorporating SDG or ESD competency content in their course(s). In general, students reported that the reputation of a course or professor has a high impact on whether they will enroll in a course that centers sustainability. However, the predominant reason for enroling in this type of course is interest in the subject matter, while the predominant reason for not enroling in this type of course is the lack of space in their degree programmes. A lack of interest or confidence in the subject matter was reported as the two least important barriers to enrolment amongst the students.

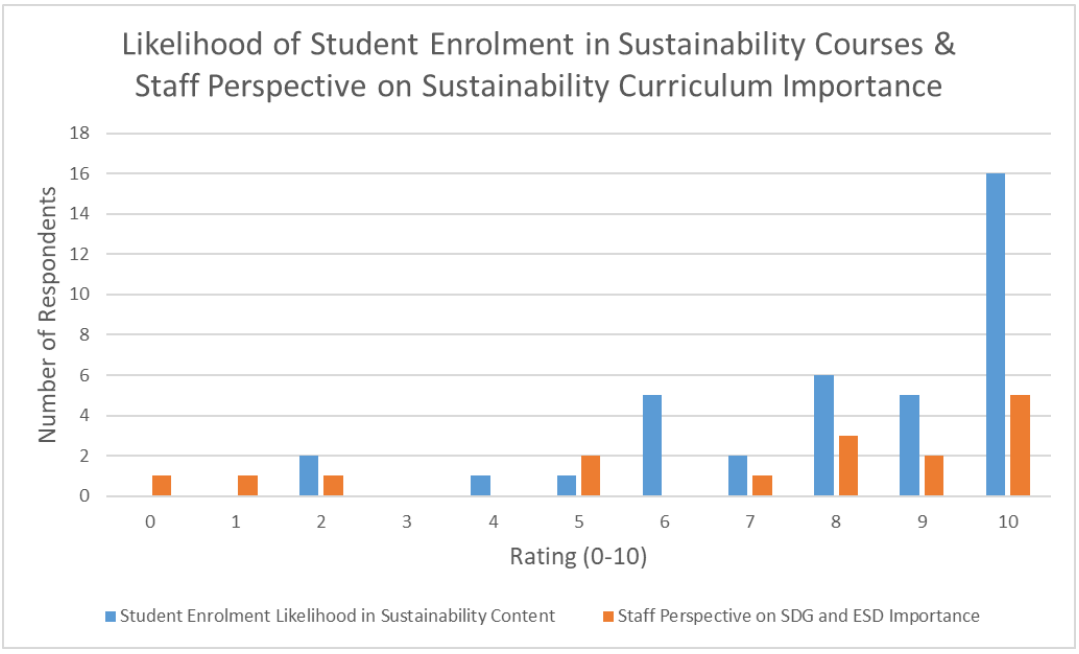

Figure 11. This figure shows (1) students rating how likely they would be to enrol in courses where sustainability, climate, and/or nature are key components of the course content, and (2) staff rating how important they believe it is that content on SDGs and ESD competencies are embedded into curriculum.

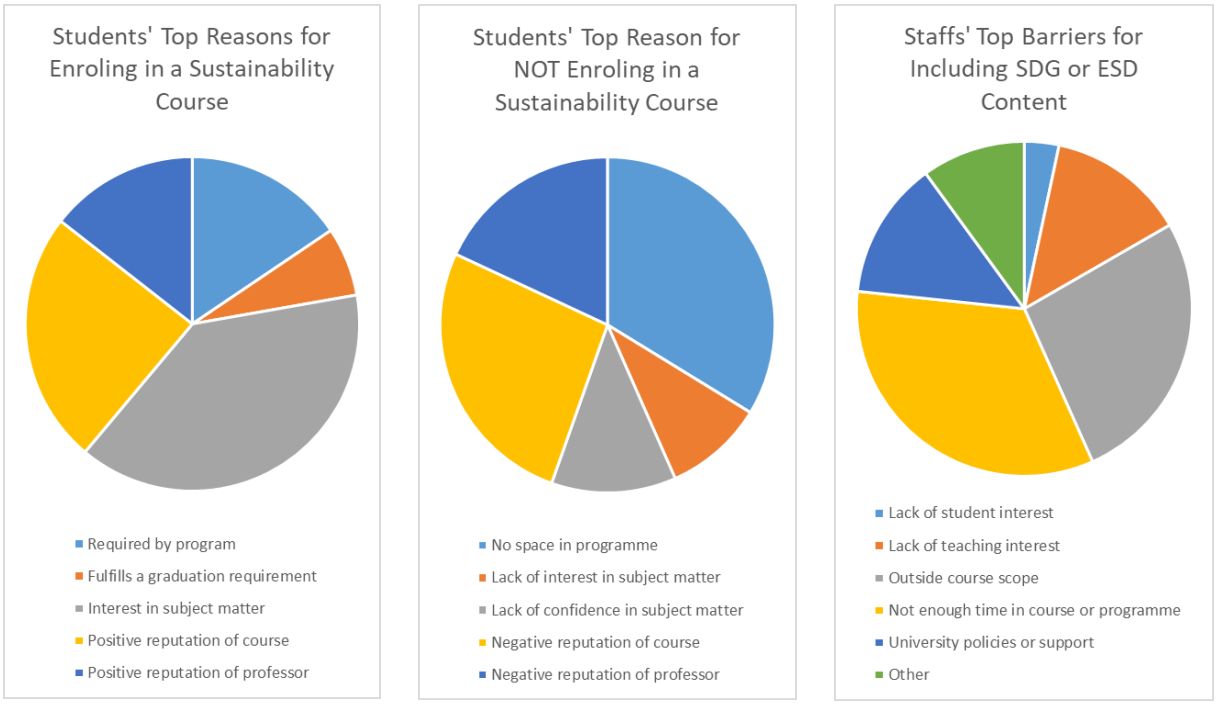

Figure 12. (*Left*) Students' self-reported top reasons for enroling in courses where climate, nature, and/or sustainability are key components. (*Middle*) Students' self-reported top barriers to enroling in courses where climate, nature, and/or sustainability are key components. (*Right*) Staff's self-reported top barriers for incorporating SDG or ESD competency content in their course(s).

Staff responses highlight two predominant barriers for incorporating SDG or ESD competency content in their course(s). The primary reason supports the student responses, being the lack of time or space in the courses or programmes. The secondary reason, however, is that they believe the content to be

outside the scope of their courses. University policies and support and lack of teaching interest were less significant, and the smallest perceived barrier is lack of student interest, aligning well with the overwhelming interest in sustainability, climate, and nature reported by students. The three "other" responses by staff include: (1) that there are no barriers, (2) that there is a "weak teaching curriculum school strategy," and (3) expanding on the response of "outside course scope":

> *"The SDGs are incredibly problematic and much of what I teach does not theoretically align with them. Also, they are narrow and as a teaching framework, they are limiting in both content and disciplinary approach. ESD [competency]s are good but our courses and programs are not flexible or long enough to do them justice."*

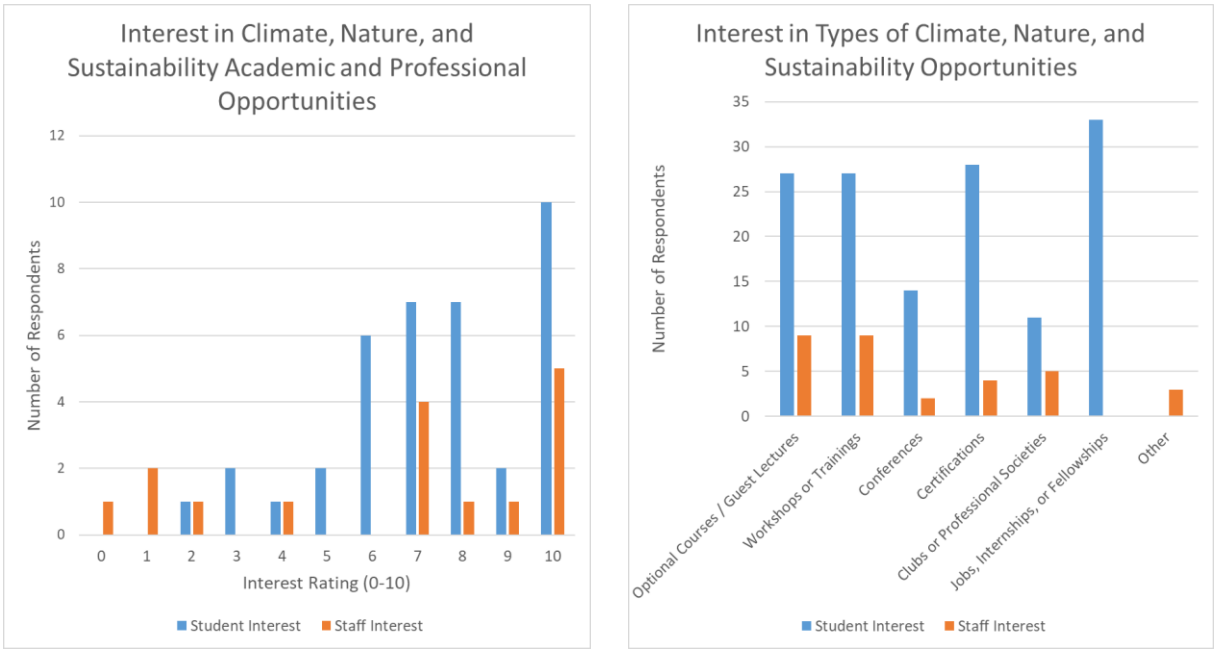

Figure 13. (*Left*) Student and staff interest in receiving communications about professional and academic opportunities in climate, nature, and sustainability subjects. (*Right*) Student and staff interest in different types of professional and academic opportunities in this field. For the first opportunity listed, "optional courses" was presented to students while "guest lectures" was presented to staff. Furthermore, "jobs, internships, or fellowships" was only presented to students.

This survey also assessed interest in professional and academic opportunities in climate, nature, and sustainability subjects beyond the courses that already exist in GeoSciences. Figure 13 shows a high interest in communications regarding such opportunities, especially among students, with most students (89%) and staff (69%) rating their interest between five and ten. The types of opportunities that students prefer to hear about are optional courses, workshops or trainings, certifications, and jobs, internships, and fellowships. The types of opportunities that staff prefer to hear about are predominantly guest lectures and workshops or trainings. In both groups, less interest was expressed for conferences and clubs or professional societies. The "other" responses by staff include: (1) no interest, as this is outside the scope of their expertise and interest, (2) having a "school wide discussion of teaching strategy," and (3) some reorganisation within the school to improve visibility of the current expertise on sustainable development.

Figure 14 then gauges student and staff preference on the communication format they prefer regarding these opportunities. Overwhelmingly, students and staff both prefer emails or announcements given in

class or meetings. The key difference comes from the less preferred communication methods, where students would prefer having information disseminated over social media whereas staff would prefer having information on the GeoSciences website. Of the two "other" responses, one emphasised in-person meetings and the other noted that they are considered an in-house expert on this area, so they would more likely be someone to help share information.

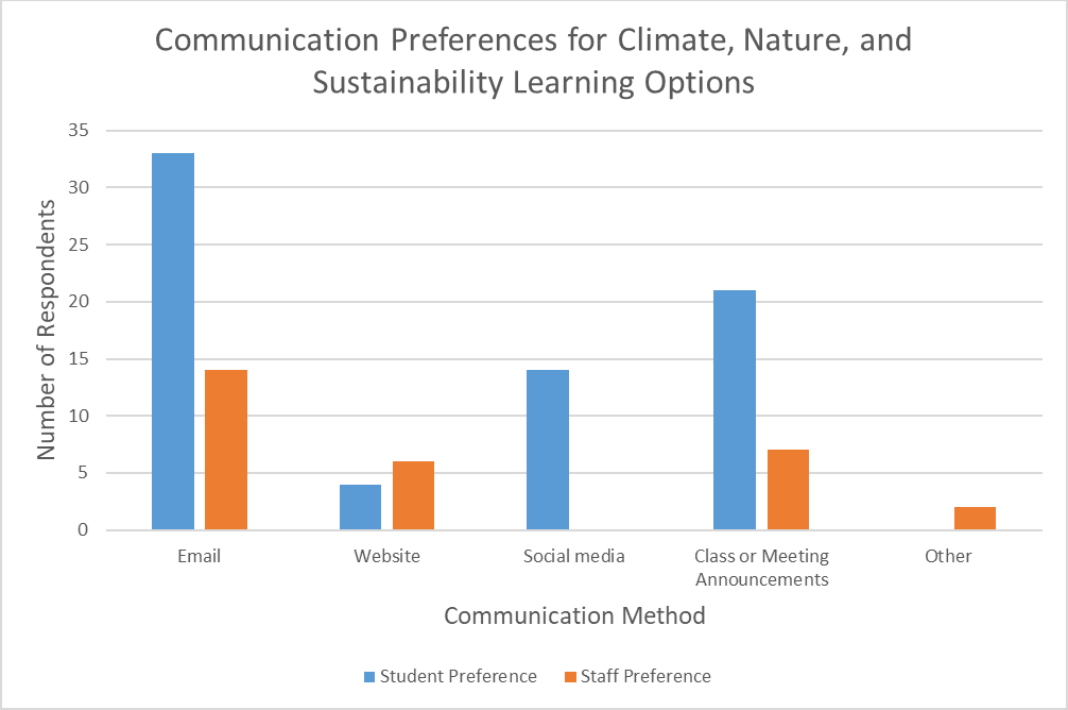

Figure 14. Student and staff preferences on means of communication regarding professional and academic opportunities in climate, nature, and sustainability subjects.

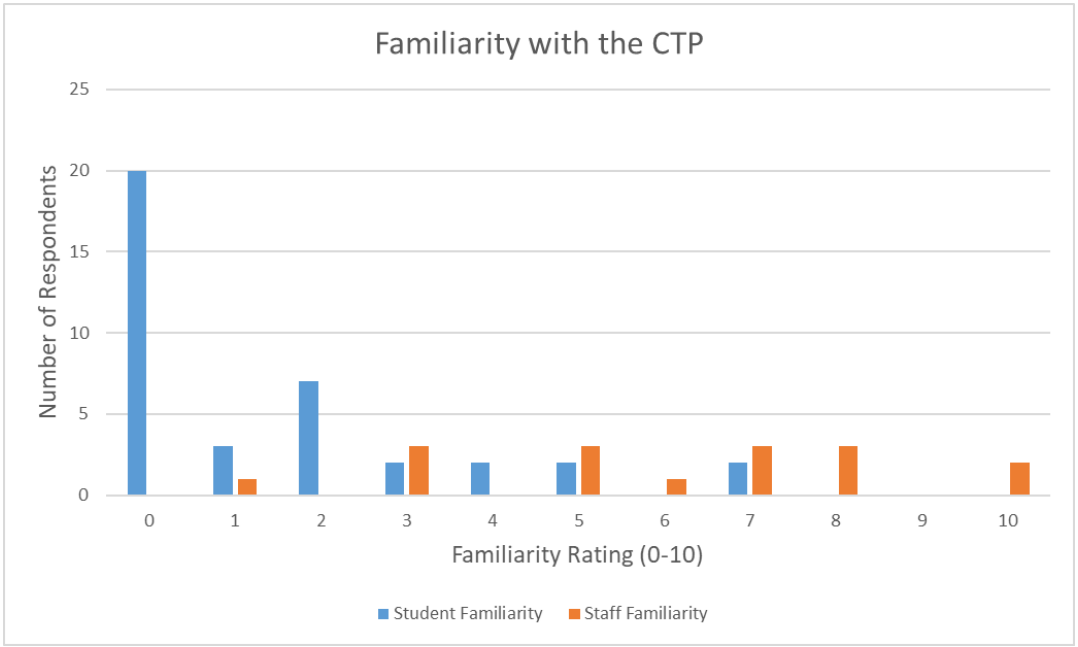

Figure 15. Students' and staff's self-reported familiarity with the CTP.

3.2.3. Views on Curriculum Transformation Project

Finally, the remaining questions in the survey assessed familiarity with the CTP and interest in the CTP elements. Figure 15 shows that most students (95%) are reportedly unfamiliar with CTP, rating their familiarity as between zero and four, and 56% of those responses (53% overall) rating their familiarity as zero. Figure 16 shows student and staff interest in the CTP elements. Students reported almost equal interest in all three elements, with experiential courses receiving the most positive feedback and enrichment elements receiving the least negative feedback. Staff reported the most interest in teaching experiential courses and the least interest in teaching enrichment elements.

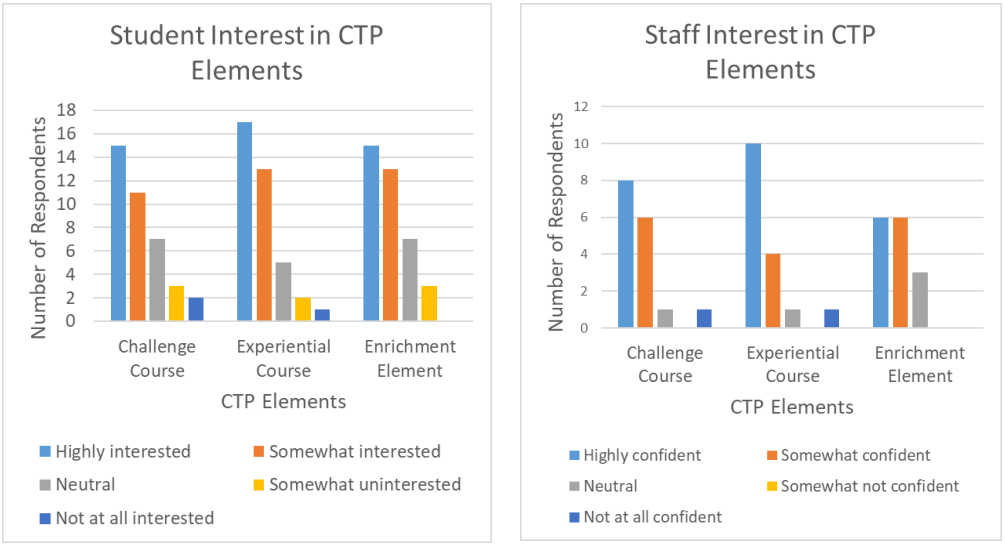

Figure 16. (*Left*) Student interest in enroling in a course that reflects each of the three CTP elements. (*Right*) Staff interest in teaching a course that reflects each of the three CTP elements.

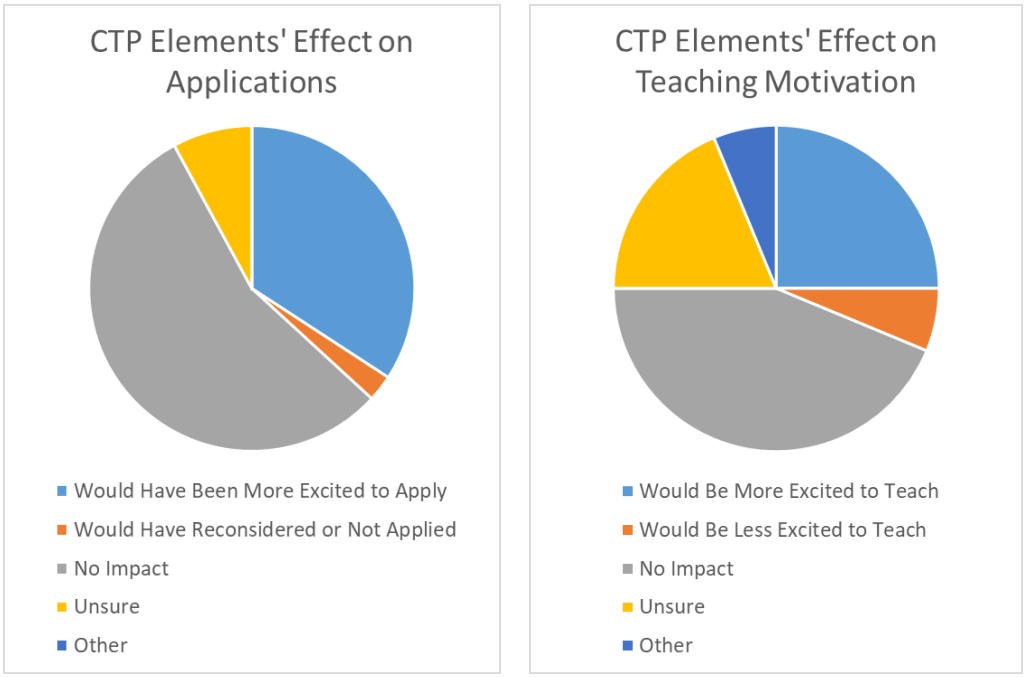

Figure 17. (*Left*) Students' perspective on how the addition of CTP elements into GeoScience curriculum would have affected their application to the school. (*Right*) Staff's perspective on how the addition of the CTP elements would affect their motivation to teach.

Figure 17 shows how the addition of these elements would have impacted students' applications to the university and how it would impact teaching motivation. The majority of students and staff reported that the addition of these elements would not have impacted on their application or motivation to teach. The next most common response for both students and staff were that they would have been more excited to apply or teach, while the least common response was that they would have been less excited to apply or teach.

3.2.4. Additional Feedback

In the section of the survey that allowed for optional questions and comments, two student comments were received:

> *"I definitely feel that there needs to be more options around this topic and it is not discussed widely enough with students."*
>
> *"My answers for the competencies questions reflects the fact that I think my programme is excellent at analysing and unpacking systems and institutions, however there is not an emphasis on finding solutions to things as often the complexity of things is highlighted. I think many students are cautious of courses and grades based on group work as it can go either way and involves other people's motivation and competency, which is why I would not be interested in the Challenge Course. I personally am not interested in the climate/sustainability side of [my degree] and I think leaning too much towards this may not be as popular with MA students who are the largest cohort in Geosciences. Looking at this year's dissertation titles you will find that other topics are just as popular as sustainability and these course options should not be replaced."*

Similarly, numerous staff comments were received, including:

> *"GeoSciences must make itself more relevant to the challenges facing the world today."*
>
> *"I would be very keen to contribute to teaching more interdisciplinary courses across programmes."*
>
> *"My research focus and expertise are in SD and just transitions. And it is the core stuff of several of our masters programmes (not always formally labelled as such, for several good reasons). The MA in SD sits in SPS, but many of our geography students take courses there already (which is why I never sought to teach it at undergrad level in the school). In short, we have a lot of in-house expertise on this already and should consider links across schools and between undergrad and postgrad teaching offering."*
>
> *"I don't think the SDGs and the ESD competencies are so easily paired."*

3.3. Workshop Results

The participants of the workshop (both students and staff) were provided with ten discussion questions. The questions and the answers received are provided below, although questions one and two did not receive written responses, as noted below.

> *(1) In many of the GeoSciences programs, SDGs, climate, and nature are key to existing curricula. What do you feel that your program does well with teaching and engaging with these topics, and what, if anything, do you feel might be missing? Is there anything being done that you would like to see more of?*

(2) What skills and competencies do you feel your program focuses on developing for students? What do you feel that your program does well with teaching and engaging with these skills, and what, if anything, do you feel might be missing? Is there anything being done that you would like to see more of? Which of these support sustainability, and how?

No written responses were provided for questions one and two due to time constraints.

(3) Is there anything we do at programme design levels to ensure all GeoSciences students get enhanced exposure and education to climate and sustainability topics? This can include types of assessment, learning outcomes, placements, skills frameworks, etc.

Participants were unable to identify anything done at the programme design level surrounding climate and nature apart from external accreditation, such as the Institute of Environmental Management and Assessment (IEMA) Course Approval which many of the MSc programmes in the School of GeoSciences have.[19] The participants also emphasised the importance of catering to the needs of each individual programme as opposed to requiring that every programme follow the exact same procedure. Some suggested increasing or enhancing procedures for teaching design quality, such as encouraging staff to peer review each other's course handbooks. Staff in particular also cautioned against requiring that each course be required to incorporate certain content, as that may build resentment over reducing certain freedoms regarding courses structure and content. Finally, participants emphasised the need for creating easier methods of cross-school collaborations on courses, but raised some concern regarding how that might affect workload.

(4) We received an insightful suggestion in the survey about the importance of establishing links across different schools within our institution and between undergraduate and postgraduate teaching offerings. In what ways do you think collaboration between schools could enhance the overall educational experience for students? How might bridging undergraduate and postgraduate teaching offerings benefit both student learning and academic progression? Additionally, what specific opportunities or initiatives can we explore to foster greater integration and collaboration across academic programs for sustainability?

Workshop participants agreed that GeoSciences, due to its interdisciplinary nature, can be a very interconnected school. However, numerous barriers were identified to increasing cross-school collaborations. First, GeoScience students are likely to face issues with the number of seats available for them in courses from other schools, as schools tend to prioritise space for their own students. The second barrier is timetabling issues, as schools and lecturers are not currently required to check that their courses do not overlap with other key courses and there are limited time slots that courses are able to be held. Third, cross-school collaborations may be hindered by funding and resource (e.g., grading) barriers. Fourth, some schools at the university have somewhat different credit structures, which may impede students' ability to find space for them in their schedule. Finally, some staff members shared that due to logistical issues, there is some effort in the School of GeoSciences to bring courses "back home" to GeoSciences.

Considering these barriers, numerous opportunities were likewise identified. Staff participants noted that colleagues that are also friends may be more willing to work together on timetabling or seating

[19] https://www.iema.net/skills/training/educational-partner-register

issues and suggested increased opportunities for informal networking. Students and staff suggested joint degrees as a form of cross-school collaboration (e.g., Earth Sciences with Chemistry, Geography and Law, etc.), or a "major" and "minor" structure similar to many universities in the US. to create more holistic degree opportunities. In doing so, by encouraging engagement with other disciplines, students get the chance to learn common language and connections that better prepare them for future careers. Finally, participants suggested improvements to the user experience of the GeoSciences website, noting that it currently feels like a "link labyrinth" in that it is fairly easy to get lost or overwhelmed in it.

> *(5) Results of the survey indicated that for students, they would prefer to see communication on opportunities relating to climate and sustainability in the form of email, class announcements, and school social media. Staff indicated their preferred communication methods to be email, meeting announcements, or on the school website. Where, if any, do you currently find climate and sustainability opportunities, how often are they communicated, and how effective have those communications been? Additionally, beyond focusing on using the preferred platform, what opportunities for improving communication do you see?*

Participants agreed that email is a very useful tool for disseminating information regarding such opportunities, especially as it is more permanent and easier to organise. However, they cautioned that too many emails can be sent, which can lead to information overload and prevent people from reading them. Therefore, they suggested a comprehensive "weekly digest" of opportunities be sent; further, some participants referenced the daily email newsletter they receive from Carbon Brief as an example structure. With this, participants also thought it would be helpful to have a communal calendar of events or opportunities that they could reference.

When asked about their opinions on the use of social media, participants noted that social media can be tricky to use because of the timing of posts (i.e., there is a certain window in which students or staff may see the post before it is no longer circulated in people's feeds). Some ethical concerns were also raised regarding social media due to the social issues surrounding certain major platforms. Rather, other methods of informal sharing were encouraged, such as posters or advertisements on screens (e.g., computers, TVs) around campus where people are spending time (e.g., libraries or cafes rather than elevators).

> *(6) Results of the survey, from both students and staff, indicated that the predominant reason students would not enroll in a course where sustainability, climate, and/or nature are key components of the course content is that there is no space in their program. What is your experience with this, and where do you think there is potential in your programme(s) to make space?*

Both students and staff agreed that lack of space in programmes for students to pursue their interests beyond their primary subject is a major issue. Participants noted that more space is needed in relevant sustainability courses and that sometimes course enrolment caps are arbitrarily placed. Timetabling was again emphasised as a huge issue for limiting which courses a student can take, with one staff member noting citing the lack of course timeslots (e.g., some students or lecturers may prefer a night course, but there is currently no structure for that). Participants also again mentioned resource constraints for courses, especially those with field work elements (which would rank highly as the CTP element "experiential course"). Time and grading were further cited as barriers for increased enrolment, especially for upper level (honours) and postgraduate courses, which are much stricter with grading

procedures; larger classes are therefore more currently conducive to first- and second-year courses, creating somewhat of an imbalance of courses across years. Students in particular further advocated that pre-requisites can sometimes be restrictive.

Numerous opportunities to address this concern were then identified by participants. Students suggested increasing awareness of optional courses (e.g., through an email, such as that discussed in question five), as well as increasing options for online or hybrid courses to reduce seating restrictions. Increasing courses taught with a "flipped classroom" methodology was also suggested, as was finding an improved balance between course size and marking quality.

> *(7) In the survey, students indicated that course reputation is a key factor in deciding whether to take a course on climate and sustainability. As students, can you share what specifically influences your perception of a course's reputation? Please feel free to share your thoughts openly; there are no right or wrong answers, and your input will help us understand how we can enhance the learning experience. For staff, what do you believe contributes most to the reputation of a course? Are there specific elements of your teaching approach, course content, or interactions with students that you think significantly influence how your course is perceived by students? Additionally, how do you think a course's reputation affects student enrollment and engagement?*

Students expressed that course reputation is predominantly established through informal sharing of information. They expressed that content or material is what initially attracts them to a course, but they can potentially be dissuaded from enrolling due to the reputation of course's difficulty, negative interactions with markers, or quality of lectures. It was also expressed that if a course is highly valued by the home discipline, students from other programmes may be less inclined to enrol in it due to the feeling of having a disadvantage with the material.

Staff, on the other hand, expressed concern regarding course feedback, noting that the structure for students to provide feedback is quite rigid and sometimes inaccessible so they are less aware of their perceived reputation. Staff also noted that they tend to receive less feedback from third- and fourth-year students, which they attributed to those students leaving the university soon and therefore having a lower incentive to provide feedback. Thus, staff expressed that incentivising course feedback may be useful, especially for mid-term feedback so they can adjust their courses in real-time to improve reputation. To increase accessibility, it was suggested for GeoSciences to create a database of previous course feedback (or summaries of previous course feedback) for lecturers, as well as send out a summary to staff of what generally was and was not received well by students that semester.

> *(8) We received a thought-provoking perspective in the survey, suggesting that sustainable development goals and education for sustainable development competencies might not be easily paired. Let's explore this further: What are some of the challenges or complexities you see in aligning SDGs with ESD competencies? Are there specific aspects of each that you believe make integration difficult? Additionally, do you think there are potential benefits or opportunities in overcoming these challenges?*

Participants did not necessarily agree with the premise that SDGs and ESD competencies are difficult to pair, especially as the competencies are already intrinsic to GeoScience curriculum (although it was recognised that perhaps more competencies are being addressed than are explicitly stated). Enthusiasm

was expressed over incorporating the competencies, which students perceive will increase their eventual employability. Students and staff further recognised that taking courses that collectively address all eight competencies and seventeen SDGs may require the timespan of the entire degree, and questions were posed about the ability to achieve this while maintaining discipline depth. Further, students considered the possibility of having a formal introduction to the SDGs and competencies early in the degree programmes. Finally, participants noted that as the university addresses any potential changes to sustainability in the curriculum, they should be careful in marketing the university as the *only* educational institution that truly addresses sustainability.

> *(9) In recent years, there has been increasing emphasis on student-directed learning, where students take a more active role in shaping their education. How important do you believe student-directed learning is in today's educational landscape? Does it support sustainability?*

As similarly discussed in question seven, staff identified an issue with student-directed learning to be receiving feedback. Concerns were raised regarding students' confidence (especially younger students) impacting their willingness to participate in self-directed learning modules. This led to staff further expressing concern over participation in challenge courses, which they perceived as potentially intimidating in structure.

> *(10) How important do you feel it is that GeoSciences embed climate, nature, and/or sustainability content in its curriculum? Why or why not? If you believe it is important, how should we do it?*

Both students and staff expressed that incorporating climate, nature, and sustainability into GeoScience curriculum is incredibly important. However, as not all courses seem to be open to assessing the "bigger picture" aspects of the core discipline material, it was suggested to approach this issue from a broader lens. Particularly, participants expressed interest in a framework that could be applied to any course or programme that covers a checklist of the competencies or SDGs.

3.3.1. Workshop Feedback

Workshop participants were asked to respond to six short survey questions providing feedback on the event. The questions and their associated answers are provided below.

> *(1) What aspects of the workshop did you find most beneficial or valuable?*

Responses to this question generally focused on the shared discussion, as they were keen to both share their experiences and learn from their peers and colleagues. Having the discussion broken into small groups was remarked upon favourably.

> *(2) Were there any topics or areas that you felt were not adequately covered in the workshop? If yes, please specify.*

Most responses to the feedback survey did not identify topics they thought were missing or inadequately covered. However, some responses indicated they hoped to discuss the legitimacy of the SDGs and have a more in-depth discussion of the barriers preventing the school from incorporating topics from the discussion. Also, one response indicated they wished for more time to discuss as a larger group at the end of the workshop.

(3) Has this workshop at all influenced your opinion on any of the following? (A) Integrating sustainability, climate, and/or nature into GeoSciences curriculum. (B) Integrating education for sustainable development competencies into GeoSciences curriculum. (C) Integrating Curriculum Transformation Project (CTP) elements into GeoSciences curriculum.

Some respondents answered that they had already believed all three components (A, B, and C) to be important, and they continue to believe that following the workshop. Others responded more specifically about the importance of sustainability curriculum, and some focused on their increased understanding of the CTP.

(4) What, if any, are your biggest takeaways from this workshop?

Staff responses to this question focused on: (1) the need for increased sharing of ideas, (2) that restrictions from university policies and structures can be limiting to increasing sustainability content despite the rise in student and staff interest, (3) the workshop was helpful for generating ideas for future course design, and (4) it might be useful to make it more explicit where the ESD competencies are covered. Student responses indicated they share the concerns addressed in this workshop and appreciate that the university is considering them.

(5) How likely are you to implement any insights or ideas gained from the workshop into your teaching or learning practices?

All but one staff member responded either "very likely" or "somewhat likely" (the remaining staff member was neutral on their opinion). The student responses were "unsure" and "very unlikely."

(6) Do you have any additional feedback or suggestions for improving future workshops or sessions on similar topics?

The predominant bit of feedback received was regarding increasing workshop attendance. One suggestion involved inviting university decision-makers and increasing the amount of information available about the workshop ahead of time. Other suggestions included providing more discussion time as a larger group to better synthesise the discussion questions, and to investigate the course "Sustainability and Social Responsibility" as a case study of a course that successfully integrates SDGs and ESD competencies.

4. Conclusion

This report analyses the integration of the UN SDGs, ESD competencies, and CTP elements into the University of Edinburgh's School of GeoSciences Undergraduate Curriculum. It aimed to map the current climate, nature, and sustainability learning options in UG curriculum, the ESD competencies in UG programmes and curriculum learning goals, and the map the UG courses' similarity to CTP's distinctive element requirements. The project utilised a key word mapping of SDGs and ESD competencies in all UG GeoSciences courses, Likert scale scores to rate courses' similarity to the three key CTP elements, a student and staff survey, and an integrated student-staff workshop.

The SDG mapping found that 118 of the 132 UG GeoSciences courses contained at least one SDG, with courses addressing an average of 3.6 (median of 3) SDGs each. All seventeen SDGs were addressed within the School's UG courses, however SDGs 6, 8, 11, 13, 14, and 15 were the most common. The ESD competency mapping found that 124 courses contained mention of at least one competency, with

courses addressing an average of 2.2 (median of 2) competencies per course. Critical thinking was by far the most addressed competency, followed by collaboration, strategic competency, and problem-solving. However, although strategic competency was the third most common skill addressed, students indicated in the survey that this is the competency they are the least confident in overall. The CTP element ranking found that current UG courses align better with the definitions of experiential courses and enrichment elements rather than that of challenge courses.

On a programme level, the mapping showed that Environmental Geoscience had the highest average number of SDGs per course, while Geography addressed the most SDGs and competencies overall. On a course level, the courses "Sustainability, Society and Environment," "Development and Decolonization in Latin America," and "Human Geography" were found to address the most SDGs and ESD competencies and feature high overall ratings for CTP elements. While this mapping provides great insight into the sustainability learning options in the School of GeoSciences, it is limited by the accuracy and depth of the course descriptions available on the DRPS and Path websites; therefore, the key word mapping may have inaccurately categorised some courses with short descriptions. If the key word mapping were to be performed again, it is recommended that more thorough descriptions or course handbooks be provided as source of curriculum data.

The survey and workshop indicate a strong interest among students and staff in sustainability, climate, and nature topics, suggesting support for further curriculum development in these areas. Both the survey and workshop discussion highlighted challenges at the programme-design level, identified barriers to enrolment (which students and staff unanimously agreed to be issues with timetabling and space within programmes) and cross-school collaborations (which was predominantly attributed to resource and funding limitations), and assessed methods for disseminating information on professional and academic opportunities in sustainability. The survey also showed that most students and staff are either excited by or neutral about the addition of CTP elements to the curriculum, and the workshop highlighted the importance of increasing the quantity and accessibility of course feedback. Feedback was provided on the workshop in the form of a survey, and participants expressed that they found value in the discussion and highlighted the importance of increased idea sharing. The results of the survey and workshop are limited by the number of respondents and participants and are recommended to be conducted again on a larger scale; furthermore, if another workshop is to be conducted, it would be beneficial to invite university decision-makers to the discussion to receive more holistic perspectives.

Moving forward, it is recommended that staff, students, and university decision-makers work together to increase climate, nature, and sustainability content in GeoSciences curriculum without overwhelming the curriculum such that students with other interests are unable to pursue them. It may also be helpful to provide more detail and clarity as to which ESD competencies are addressed on each course. As ideated in the survey and workshop, for interested students, perhaps an optional framework could be created such that it allows students to take courses throughout their degree that address all seventeen SDGs and all eight competencies. It is further recommended that challenges with enrolment, cross-school collaborations, and course feedback be further investigated and addressed so that current opportunities for students and staff may be better identified and utilised.

In conclusion, as the School of GeoSciences works to navigate the complexities of integrating sustainability principles and CTP elements into its curriculum, this report has found it evident that a collaborative, interdisciplinary approach is essential. By working together to address the above

challenges, there is high potential for improvement in the student and staff experience, and the School of GeoSciences can further enhance its commitment to sustainability education and prepare its students to be future leaders in tackling global environmental challenges.

Acknowledgements

Thank you to Lucy Paterson for her excellent guidance and supervision of this project, and to the Edinburgh Earth Initiative and Earth Fellows programme for making this project possible. Thank you to Ian Glen for his assistance in presenting at the workshop and in providing the survey vouchers. Thank you to Dan Swanton for his guidance on the project direction and assistance in sending out the survey and workshop invitations. Thank you to Andy Cross and Kate Donovan for their early input on the project direction.

Appendix

SDG Key Word List

The below table represents the SDG key word list used in the SDG mapping. Words marked with an asterisk indicate words that have multiple possible endings. Some words, such as “labor” (the American spelling of “labour”) are found within larger words (e.g., “laboratory”). Quality control measures were used to check these instances and remove them from the final mapping results.

SDG	Key Words
1 – No Poverty	Poverty, income distribution, wealth distribution, socio economic, socio-economic, socioeconomic, homeless, low-income, low income, affordab*, disparity, welfare, social safety, developing countr*, vulnerability, precarity, precarious, global south, third world, poor, majority world countr*
2 – No Hunger	Agricultur*, nutrition, food security, food insecurity, food-secure, food system, hunger, food justice, food scarcity, food sovereignty, food culture, culinary, agro*, permaculture, crop, regenerative agriculture, urban agriculture, organic food, biodynamic, food literacy, food education, benefit sharing, malnourish, malnutrition, end hunger, food price, hungry, food, insecurity, food waste, rural, stunted, stunting, nourish
3 – Good Health	Well being, wellbeing, well-being, mental health, public health, global health, health care, healthcare, health issues, mental wellness, disability*, sexual education, mindfulness, holism, illness, health education, communicable disease, health determinants, vaccin*, substance abuse, maternal mortality, family planning, hazardous chemicals, pollution, health equity, neonatal mortality, infant mortality, child health, reproductive, epidemic, universal health, health, wellness, mortality, morbidity, sick, disease, medic, infect, death, body, bodily, virus, viral, bacteria*

4 – Quality Education	Equitable, pedagogy, indigenous knowledge, worldview, knowledges, traditional knowledge, land-based knowledge, place-based knowledge, decoloni*, anticolonial, settler, equity, anti-racis*, racis*, anti-oppress, oppress, anti-discriminatory, early childhood development, sustainability education, sustainability teaching, universal literacy, literacy, place-based education, humane education, land-based learning, nature-based education, climate change education, universal numeracy, environmental education, education for sustainable development, ecojustice education, vocational, technical learning, free education, accessible education, primary education, secondary education, tertiary education, educat*, inclusive*, literate, global citizenship, scholarship, numeracy, politics of knowledge
5 – Gender Equality	Gender, women, girl, queer, female, feminis*, non-binary, non binary, sexes, LGBT*, patriarchy, transgender, two-spirit, gender equality, violence against women, trafficking, forced marriage, equality, inequality, human right*, sexual violence, social inclusi*, violence against girls, violence against female, workplace equality, equal opportunit*
6 – Clean Water and Sanitation	Water, sanita*, contaminat*, arid, drought, hygiene*, sewage, water scarcity, groundwater depletion, water education, remediation, wastewater, water harvesting, desalinate*, water efficiency, desertification, water filtration, latrine, defecation, hydrological cycle, water and energy nexus, stormwater management, low impact development, green infrastructure, living infrastructure, aquifer, flood, lake, river, water-use, water use
7 – Renewable Energy	Renewabl*, geothermal, hydroelectric, fuel efficient, fuel-efficient, carbon capture, carbon sequester, emission, greenhouse, biofuel, energy sovereignty, energy security, energy education, energy insecurity, fuel, fossil fuel, fossil-fuel, electric vehicle, coal, oil, renewable power, sustainable power, clean power, solar power, wind power, water power, hydropower, wave power, battery, emit, alternative energy
8 – Good Jobs and Economic Growth	Employment, economic growth, sustainable development, labour, labor, worker, wage, economic empowerment, entrepreneur, small- and medium-sized enterprises, SMEs, sustainable tourism, youth employment, green job, economic recovery, green growth, sustainable growth, circular economy, econom*, finance*, job, productiv*, slavery, trade, unemploy*, decent work, GDP, gross domestic product, equal pay, banking, paid
9 – Innovation and Infrastructure	Infrastructur*, buildings, capital investment, internet, globaliz*, globalis*, industry*, value chain, affordable, credit, innovate*, roads, trade, transportation, public transport, technolog*, irrigate*, phone, service, mobile network
10 – Reduced Inequalities	Trade, inequality, financial market, taxation, equit*, equalit*, humanitarian, minorit*, refugee, BIPOC, of colour, of color, indigenous, reconciliation, truth and reconciliation, underserved, privileged, affordab*, equal access, marginalized, marginalized, impoverished, vulnerable population, social safety, social security, government program, disparity, income, anti-oppressive, anti-racist, anti-discriminatory, decoloni*, ageism, ethnic, homeless, human right, relig*, racism, racist, sexism, sexist, migration, migrant, homophobi*, empower

11 – Sustainable Cities and Communities	Cities, urban, resilien*, rural, sustainable development, public transport, metro, housing, green infrastructure, low impact development, climate change adaptation, climate change mitigation, green buildings, affordable housing, walkab*, transit, civic spaces, open spaces, accessib*, indigenous placemaking, indigenous placekeeping, air pollution, air quality, communit*, disaster risk reduction, adapt, green space, settlement, natural disaster, overcrowd, over crowd, public space, smart cit*, suburban, waste, town planning, city planning, decentrali*
12 – Responsible Consumption	Consum*, production, waste, natural resource, recycle*, industrial ecology, sustainable design, supply chain, outsource*, offshore*, reuse, decarboni*, carbon tax, carbon pricing, food waste, public procurement, fossil fuel subsidies, capitalis*, retail, market, material goods, tourism, resource use, greenwash
13 – Climate Action	Climat*, weather, greenhouse gas, global warming, extreme weather, emissions, carbon dioxide, CO2, carbon-neutral, carbon neutral, net zero, net-zero, methane, sea level, climate change mitigation, climate change adaptation, climate impacts, climate scenarios, climate solutions, climate justice, global climate models, carbon capture, carbon sequestration, low carbon, resilience, Anthropocene, offsets, carbon trading, carbon markets, UNFCCC, climate finance, loss and damage, Paris, greenhouse, carbon, climate crisis, global temperature, emit, ice loss, warming, rising sea, natural disaster, low-carbon
14 – Life Below Water	Ocean, marine, fish, maritime, coral, ocean literacy, overfish, water, coast, beach, wetland, seas, aquatic
15 – Life on Land	Forest, biodivers*, ecolog*, land use, land, ecological restoration, forest conservation, soil, erosion, habitat loss, deforestation, reforestation, animal, desert, dryland, extinct, plants, terrestrial, tree, poach, fauna, flora, bees
16 – Peace and Justice	Institut*, governance, peace, justice, injustice, criminal justice, human rights, democra*, legal system, social change, corrupt, nationalism*, authoritarian, indigenous, judic*, ecojustice, self-determination, sovereignty, violence, trafficking, terroris*, rights, accountab*, conflict, police, theft, weapon, arms, freedom, crime, national security, bribe
17 – Partnerships for the Goals	Capacity building, civil society, partnerships, communication, debt sustainability, development assistance, data sharing, entrepreneur, foreign direct investments, fostering innovation, free trade, global partnership, global stability, international aid, international cooperation, international support, knowledge sharing, multi-stakeholder partnerships, poverty eradication, public-private partnerships, public private partnerships, science cooperation agreements, technology cooperation agreements, technology transfer, transboundary cooperation
Miscellaneous	Sustainab*

ESD Competencies Key Word List

The below table represents the ESD competency key word list used in the mapping. Words marked with an asterisk indicate words that have multiple possible endings.

Competency	**Key Words**
Systems Thinking	Systems thinking, systems-thinking, interconnect*, holistic, complex system, interdepend*
Future Thinking	Future thinking, future-thinking, forward thinking, forward-thinking, foresight, predict, future-oriented

Critical Thinking	Critical thinking, critically think, analys*, analyz*, evaluat*, reflection, reflecting, reasoning, conceptual, synthesi*
Strategic Competency	Strategic competenc*, strateg*, communicat*, develop solution, developing solution
Collaboration	Collabor*, work together, group pr*, group work, work in group, work with peer, teamwork, cooperat*, networking, mediat*, compromis*
Problem-Solving	Problem-solv*, problem solv*, analytic*, multidisciplinary, interdisciplinary
Self Awareness	Self awar*, self-awar*, introspecti*, emotional intelligen*, perspective, compassion, motivation
Normative/Cultural Competency	Normative competenc*, cultural competenc*, ethic*, values, responsibility, moral reason

Student Survey Questions

- What is your program of study?
- What year of study are you in?
- The United Nations published 17 Sustainable Development Goals in 2015. Please rate your familiarity with these goals overall. *To learn more about these goals, please visit https://sdgs.un.org/goals.*
- The 17 Sustainable Development Goals (SDGs) are listed below. Which of the SGDs do you feel your programme **strongly** engages with? Please select all that apply.
- The following represents a list of Education for Sustainable Development (ESD) competencies (definitions provided below). Please indicate your confidence in understanding and engaging with these skills.

> *<u>Systems thinking:</u> Recognise and understand relationships; analyse complex systems; consider how systems are embedded with different domains and scales; deal with uncertainty.*
>
> *<u>Future thinking:</u> Understand and evaluate multiple outcomes; create their own visions for the future; apply precautionary principles; assess the consequences of actions; deal with risks and changes.*
>
> *<u>Critical thinking:</u> Question norms, practices, and opinions; reflect on one's own values, perceptions, and actions; take a position in the sustainable development discourse.*
>
> *<u>Strategic competency:</u> Develop and implement innovative actions that further sustainable development at the local level and further afield.*
>
> *<u>Collaboration:</u> Learn from others; understand and respect the needs, perspectives, and actions of others; deal with conflict in a group; facilitate collaborative and participatory problem solving.*
>
> *<u>Problem-solving:</u> Apply different problem-solving frameworks to complex problems; develop viable, inclusive, and equitable solutions; utilise appropriate competencies to solve problems.*

<u>Self-awareness:</u> Reflect on their values, perceptions, and actions; reflect on their role in the local community and global society; continually evaluate and further motivate their actions.

<u>Normative competencies:</u> Understand and reflect on the norms and values that underlie one's actions; negotiate sustainable development values, principles, goals, and targets, in a context of conflicts of interests and trade-offs, uncertain knowledge, and contradictions.

- How likely are you to enroll in a course where sustainability, climate, and/or nature are key components of the course content?
- What are the top reasons you would currently enroll in a course where sustainability, climate, and/or nature are key components of the course content? Please select up to 3.
- What are the top reasons you would **NOT** currently enroll in a course where sustainability, climate, and/or nature are key components of the course content? Please select up to 3.
- How interested are you in participating in additional professional opportunities, training, and certifications that pertain to sustainability, climate, and/or nature?
- What types of opportunities to engage with sustainability, climate, and/or nature would you be most interested in hearing about? Please select all that apply.
- What method of communication would you prefer from GeoSciences regarding academic or professional opportunities that pertain to sustainability, climate, and/or nature? Please select all that apply.
- The University of Edinburgh is in the process of updating its undergraduate curriculum through its Curriculum Transformation Project (CTP). Please rate your familiarity, if any, with the CTP.
- The Curriculum Transformation Project (CTP) is developing essential criteria for challenge, experiential, and enrichment courses in undergraduate programmes. Please indicate how interested you would be in taking a class that falls under each of these working categories.

  <u>Challenge Course:</u> In interdisciplinary groups, students explore solutions to issues that are unbounded and complex and resist straightforward definition. These courses will be 20 credits and open to all students in their 1st and 2nd year.

  <u>Experiential Course:</u> Learning by doing and reflecting on the experience. According to the CTP, these courses will be 20 credits and students must take at either level 9 or 10. In GeoSciences, field courses (which are strongly experiential but perhaps not reflective) may also be considered.

  <u>Enrichment Element:</u> Linked courses running alongside their main disciplinary program under a specific theme. These will be a set of 10 or 20 credit subsequent courses that combine to 80 credits throughout a student's degree.

- If the above course types (challenge, experiential, enrichment) were to have been implemented before you applied to study at the University of Edinburgh, would that have impacted your decision to apply?
- Do you have any comments or questions about the content of this survey? You may also use this space to elaborate on any of your above answers.

- Are you interested in being contacted about a workshop this spring for GeoSciences students and staff members on improving climate and sustainability options in the curriculum? *By selecting yes, you are indicating interest in participation but are not committing to this event.*

Staff Survey Questions

- What is your role at the university?
- Which course(s) do you teach or are involved with?
- How long have you worked at the university?
- The United Nations published 17 Sustainable Development Goals in 2015. Please rate your familiarity with these goals overall. *To learn more about these goals, please visit https://sdgs.un.org/goals.*
- The 17 Sustainable Development Goals (SDGs) are listed below. Which of the SGDs do you feel your program or course **strongly** engages with? Please select all that apply.
- How confident do you feel in your ability to teach each SDG?
- The following represents a list of Education for Sustainable Development (ESD) competencies (definitions provided below). Please indicate the level to which you believe your course or programme engages with these skills. (Note: the same definitions as the student survey were provided.)
- How important do you feel it is for students that content on SDGs and ESD competencies are embedded into your courses or programs?
- What do you perceive are the biggest barriers to embedding more SDG or ESD content in your courses or programmes? Please select all that apply.
- How interested are you in participating in additional professional opportunities, training, and certifications that pertain to sustainability, climate, and/or nature?
- What types of opportunities to engage with sustainability, climate, and/or nature would you be most interested in hearing about? Please select all that apply.
- What method of communication would you prefer from GeoSciences regarding opportunities that pertain to sustainability, climate, and/or nature? Please select all that apply.
- The University of Edinburgh is in the process of updating its undergraduate curriculum through its Curriculum Transformation Project (CTP). Please rate your familiarity, if any, with the CTP.
- The Curriculum Transformation Project (CTP) is developing essential criteria for challenge, experiential, and enrichment courses in undergraduate programs. Please indicate how confident you would feel in teaching a class that falls under each of these proposed categories. (Note: the same definitions as the student survey were provided.)
- Would increasing content on SDGs or ESD competencies, or increasing the number of courses following proposed CTP structures, impact your motivation to teach your course(s) or programme(s)?
- Do you have any comments or questions about the content of this survey? You may also use this space to elaborate on any of your above answers.
- Are you interested in being contacted about a workshop this spring for GeoSciences staff members and students on improving climate and sustainability options in the curriculum? *By selecting yes, you are indicating interest in participation but are not committing to this event.*

Workshop Invite

Recently, Dan Swanton, the Director of Undergraduate Teaching in the School of GeoSciences, sent out a survey reviewing climate and sustainability curriculum in the School of GeoSciences. As a continuation of this project, I would like to invite you to register for a collaborative student-staff workshop, which will be held on Thursday, April 4th from 1-2:30pm in The Pod at the ECCI.

The workshop will feature group discussions on key questions pertaining to the Curriculum Transformation Project (CTP) and GeoSciences' vision for climate and sustainability curriculum. It is part of a broader curriculum mapping project being conducted by the CTP and Edinburgh Earth Initiative and will focus predominantly on undergraduate curriculum. Tea and coffee will be provided. If you have any questions about the workshop, please reach out to Rebecca Foody, an Earth Fellow and student on the MSc in Carbon Management, who is organising the event (rfoody@ed.ac.uk).

Workshop registration: https://www.eventbrite.co.uk/e/uoe-curriculum-transformation-geosciences-student-staff-workshop-tickets-862141286797?aff=oddtdtcreator

Many thanks and I hope to see you there!

Workshop Event Description (Eventbrite)

Event title: UoE Sustainability in Curriculum: GeoSciences Student-Staff Workshop

All GeoSciences students and staff are welcome to register for this workshop, although those involved with undergraduate GeoSciences programs are especially encouraged to register.

This workshop will be hosted in The Pod in the Edinburgh Climate Change Institute. Tea and coffee will be provided.

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As there has not been a substantial update to university curriculum in over three decades, the University of Edinburgh has begun a major transformation through their Curriculum Transformation Project (CTP). The primary goals of the CTP are to: (1) improve the educational experience of students, (2) maximize opportunities, (3) cultivate a working and teaching environment that is more satisfying for staff, and (4) support the university's Strategy 2030 (with themes of people, research, teaching and learning, and social and civic responsibility).

In response, the Edinburgh Earth Initiative is hosting several Earth Fellows to support the CTP's efforts. The objective of their project is to map currently available climate change and sustainability curriculum in undergraduate programs in the School of GeoSciences under the framework of the UN Sustainable Development Goals (SDGs) and Education for Sustainable Development (ESD) competencies. It also aims to identify courses that could meet requirements to be distinctive CTP curriculum elements.

Expected outputs of this project for the School of GeoSciences include:

- Mapping of climate, nature, and sustainability learning options in undergraduate curriculum.
- Mapping of ESD competencies in undergraduate program and curriculum learning goals.
- Mapping of similarity to CTP's distinctive element requirements.
- A holistic set of recommendations for increasing both climate, nature, and sustainability learning options and ESD competencies in undergraduate curriculum.
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Full Results of SDG and ESD Competency Mapping and CTP Element Rating

Below is the full mapping and rating results. The number of mentions for each SDG (including the "miscellaneous" or "M" category) and ESD competency in each UG GeoSciences course for the academic year 2023-2024 are shown. For each of these courses, the total number of SDGs and competencies (along with the total mentions for each) are shown in the shaded columns. The table also shows the rating for each course against each of the three CTP elements, along with its cumulative CTP score (shaded). This table also indicates which, if any, programmes the courses are compulsory in.

Course Name	Compulsory Programme(s)	Mentions for Each SDG and the "Miscellaneous" Category																	Totals		Mentions for Each ESD Competency								Totals		CTP Elements			Total Score
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	M	SDGs	Men.	ST	FT	CT	SC	Co	PS	SA	NC	Comp.	Men.	CC	EC	EE	
EASC10048 Applied Environmental Geochemistry	Environmental Geoscience	0	0	0	0	0	1	2	0	0	0	0	0	0	2	1	0	0	0	4	6	0	1	0	0	0	0	0	0	1	1	1	2	2	5
EASC10101 Applied Hydrology and Near Surface Geophysics	Environmental Geoscience, Earth Sciences	0	0	0	0	0	2	1	0	0	0	0	0	0	1	1	0	0	0	4	5	0	1	1	0	1	1	1	0	5	5	1	3	1	5
METE10001 Atmospheric Dynamics	Geophysics and Meteorology	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	2	0	0	0	0	0	0	1	0	1	1	1	1	1	3
METE10002 Atmospheric Physics	Geophysics and Meteorology	0	0	1	0	0	0	1	0	0	0	1	0	4	0	1	0	0	0	5	8	0	0	0	0	0	0	0	0	0	0	1	1	1	3
METE10006 Atmospheric Science Field Skills	Geophysics and Meteorology	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	2	2	1	3	1	5
GEGR10023 Catchment Water Resources	-	0	0	0	0	0	3	0	0	0	0	1	0	0	1	2	0	0	1	4	7	0	0	1	0	2	0	1	0	3	4	2	1	2	5
EASC10123 Changing Marine Biogeochemical Cycles	-	0	1	0	0	0	0	0	0	0	0	0	0	3	2	1	0	0	0	4	7	0	1	2	0	1	0	0	0	3	4	2	1	2	3
ECSC10036 Conservation Science	-	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	3	0	0	1	1	0	1	1	0	4	4	3	1	3	7
ECSC10034 Critical Thinking in Ecological and Environmental Sciences	Ecological and Environmental Sciences, Ecological and Environmental Sciences with Management	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	2	0	0	3	1	1	0	1	0	4	6	3	1	1	5
ECSC10037 Current Issues in Ecology and Environmental Science	-	0	0	0	0	0	1	0	0	2	0	0	0	1	4	2	0	0	0	5	10	0	0	0	0	1	0	0	0	1	1	3	1	3	7
GEGR10130 Data Science for Geographers	-	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	1	0	0	2	3	1	3	3	7
ECSC10038 Data Science in Ecology and Environmental Science	-	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	2	0	0	1	0	5	0	0	0	2	6	1	3	3	7
GEGR10114 Development and Decolonization in Latin America	-	0	0	1	3	3	1	1	1	1	3	0	1	0	1	0	4	0	0	11	20	0	0	3	1	1	0	1	0	4	6	3	1	3	7
ECSC10030 Dissertation in Ecological and Environmental Sciences	Ecological and Environmental Sciences	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	3	1	5

Course Name	Compulsory Programme(s)	Mentions for Each SDG and the "Miscellaneous" Category																		Totals		Mentions for Each ESD Competency								Totals		CTP Elements			Total Score
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	M	SDGs	Men.	ST	FT	CT	SC	Co	PS	SA	NC	Comp.	Men.	CC	EC	EE	
ECSC10031 Dissertation in Ecological and Environmental Sciences with Management	Ecological and Environmental Sciences with Management	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	3	1	5
EASC10043 Dissertation in Geology and Physical Geography	Earth Science and Physical Geography	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2	4	1	3	1	5
EASC08026 Earth Modelling and Prediction 2	Environmental Geoscience, Earth Sciences, Earth Science and Physical Geography	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	2	0	1	0	0	0	0	0	0	1	1	1	1	1	3
EASC08028 Earth Science Data Analysis 1	Environmental Geoscience, Earth Sciences, Earth Science and Physical Geography	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	2	4	1	2	1	4
EASC08029 Earth Sciences for Society	Environmental Geoscience, Earth Sciences	0	0	0	0	0	1	3	3	1	0	4	2	3	2	0	0	0	1	8	19	0	0	2	0	2	1	0	0	3	5	3	1	2	6
EASC10127 Earth's Atmospheric Composition	Environmental Geoscience, Geophysics and Meteorology	0	0	1	0	0	0	1	0	0	0	1	0	3	0	0	0	0	0	4	6	0	0	0	1	0	0	0	0	1	1	1	1	2	4
ECSC09004 Ecological Measurement	Ecological and Environmental Sciences, Ecological and Environmental Sciences with Management	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	2	4	0	0	2	0	1	0	0	0	2	3	1	3	1	5
ECSC08008 Ecological and Environmental Analysis	Ecological and Environmental Sciences, Ecological and Environmental Sciences with Management	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	1	1	0	0	0	0	3	3	1	3	1	5
ECSC10033 Ecological and Environmental Science field course (including management)	Ecological and Environmental Sciences, Ecological and Environmental Sciences with Management	0	0	0	0	0	1	1	0	0	0	1	0	0	2	4	0	0	0	5	9	0	1	3	2	1	0	0	0	4	7	1	3	1	5
GEGR08003 Economic and Political Geography	-	0	0	0	1	1	0	0	4	2	2	2	3	0	0	0	1	1	1	9	17	0	0	2	1	0	0	0	0	2	3	2	1	3	6
ECSC10025 Effective Project Planning and Management	-	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2	2	0	0	1	1	0	0	0	1	3	3	3	1	2	6
GEGR10102 Encountering Cities	-	0	0	0	0	2	1	0	1	3	2	3	0	0	1	0	3	0	1	8	16	0	0	4	0	1	1	0	0	3	6	2	1	2	5
EASC08024 Environmental Geochemistry of the Earth's Surface	Environmental Geoscience	0	0	0	0	0	3	1	0	0	0	1	1	1	1	1	0	0	0	7	9	0	0	1	0	1	1	0	0	3	3	1	3	1	5
GEGR08013 Environmental Geography	Geography	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	1	1	0	0	0	3	6	1	3	1	5
EASC10086 Environmental Geoscience 4th Year Field Course	Environmental Geoscience	0	0	0	0	0	1	0	0	0	0	0	0	0	4	0	0	0	0	2	5	0	1	1	0	0	0	0	0	2	2	1	3	1	5

Course Name	Compulsory Programme(s)	Mentions for Each SDG and the "Miscellaneous" Category																		Totals		Mentions for Each ESD Competency								Totals		CTP Elements			Total Score
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	M	SDGs	Men.	ST	FT	CT	SC	Co	PS	SA	NC	Comp.	Men.	CC	EC	EE	
EASC10009 Environmental Geosciences Projects	Environmental Geoscience	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	3	1	5
GEGR10123 Environmental Justice	-	0	0	2	1	0	0	0	2	0	0	1	0	0	0	1	1	0	1	6	8	0	0	3	0	0	0	1	1	3	5	2	1	3	6
ECSC09005 Environmental Pollution	Environmental Geoscience	0	2	2	0	0	3	3	0	0	0	3	0	3	1	1	0	0	0	8	18	0	0	1	0	1	0	0	0	2	2	1	1	2	4
EASC10049 Environmental Problems and Issues	Environmental Geoscience	1	0	0	0	0	0	1	1	1	0	1	1	2	1	0	0	0	0	8	9	0	0	1	0	1	0	0	0	2	2	1	1	1	3
GEGR10136 Eroding Landscapes: Mountains, Hills and Rivers	-	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	2	2	0	1	1	0	1	0	0	0	3	3	1	1	1	3
EASC10121 Evolution of the Modern Earth and Cyprus Excursion for Geologists	Earth Sciences	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	1	1	3	1	5
EASC10120 Evolution of the Modern Earth and Cyprus Excursion for Geology and Physical Geography	Earth Science and Physical Geography	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	1	1	3	1	5
EASC09036 Field Course in Tropical Marine and Terrestrial Geoscience	Environmental Geoscience	0	0	0	0	0	2	0	1	1	0	0	1	0	5	2	0	0	0	6	12	0	0	1	0	1	1	0	0	3	3	1	3	1	5
ECSC08007 Field Ecology	Ecological and Environmental Sciences, Ecological and Environmental Sciences with Management	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	2	5	0	0	1	0	0	0	0	0	1	1	1	3	1	5
EASC10105 Field Skills for Geology	Earth Sciences, Geophysics and Geology	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	3	3	0	0	2	0	0	0	0	0	1	2	1	3	1	5
EASC09051 Field Skills for Geology and Physical Geography	Earth Science and Physical Geography	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	3	0	0	2	0	0	0	1	0	2	3	1	3	1	5
GEGR09025 Fieldwork in Human Geography (A)	-	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	3	0	0	1	0	2	0	0	1	3	4	1	3	1	5
GEGR09026 Fieldwork in Human Geography (B)	-	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	3	0	0	1	0	2	0	0	1	3	4	1	3	1	5
EASC10080 Formation and Evolution of Continents	Earth Sciences	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	1	0	0	3	5	1	1	1	3
GESC11003 Frontiers in Earth Science	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	2	1	1	4
GEGR08009 Fundamental Methods in Geography	Geography	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	1	0	1	4	6	1	1	1	3
GEGR10133 Fundamentals of Research Design	-	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	1	3	3	1	1	1	3
GEGR10140 Geographies of Food	-	0	2	0	0	0	0	0	1	3	0	0	4	0	0	0	0	0	0	4	10	1	0	2	0	3	0	0	1	4	7	2	1	2	5
GEGR10129 Geographies of Mobility	-	1	0	1	0	1	0	0	1	2	3	2	0	2	0	0	0	0	1	8	13	0	0	2	0	0	0	1	0	2	3	2	1	2	5

Course Name	Compulsory Programme(s)	Mentions for Each SDG and the "Miscellaneous" Category																		Totals		Mentions for Each ESD Competency								Totals		CTP Elements			Total Score
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	M	SDGs	Men.	ST	FT	CT	SC	Co	PS	SA	NC	Comp.	Men.	CC	EC	EE	
GEGR10126 Geographies of the Border	-	0	0	1	2	1	0	0	1	1	4	0	0	0	0	0	5	0	0	7	15	0	0	4	1	0	2	0	0	3	7	2	1	2	5
GEGR10053 Geography Dissertation	Geography	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	5
GEGR10064 Geography in the Archive	-	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	0	4	4	0	0	1	0	0	0	0	0	1	1	1	1	1	3
GEGR10120 Geography, Science, Civil Society	Geography	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	1	3	3	2	1	3	6
EASC10124 Geological Evolution of the British Isles	-	0	0	0	0	0	0	0	1	1	0	0	0	2	1	0	0	0	0	4	5	0	0	2	0	1	0	0	0	2	3	1	2	1	4
EASC10011 Geology Dissertation	Earth Sciences	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	2	0	0	1	0	0	1	0	0	2	2	1	3	1	5
EASC08030 Geology and Landscapes	Environmental Geoscience, Earth Sciences, Earth Science and Physical Geography, Geophysics and Geology	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	3	1	5
EASC10036 Geomagnetism	Geophysics	0	0	0	0	0	1	0	0	1	0	0	0	0	2	0	0	0	0	3	4	0	0	1	0	0	0	0	0	1	1	1	1	1	3
EASC08021 Geomaterials	Environmental Geoscience, Earth Sciences, Earth Science and Physical Geography	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	2	0	1	1	0	2	1	0	0	4	5	1	1	1	3
GEGR08002 Geomorphology	Earth Science and Physical Geography, Geology and Physical Geography, Geography	0	0	0	0	0	2	1	0	0	0	0	0	1	1	2	0	0	0	5	7	1	0	1	0	0	0	0	0	2	2	1	2	1	4
EASC08025 Geophysical Data Science	Geophysics and Geology, Geophysics and Meteorology	0	0	0	1	0	0	0	0	2	0	0	0	1	0	0	0	0	0	3	4	0	0	1	0	1	0	0	0	2	2	1	2	3	6
EASC10109 Geophysical Imaging and Inversion	Geophysics and Meteorology, Geophysics	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2	2	0	0	2	0	0	0	0	1	2	3	1	1	2	4
EASC10116 Geophysical Investigation of Earth Resources	-	0	0	0	0	0	1	0	0	1	0	1	0	3	1	0	0	0	0	5	7	0	0	2	0	0	0	0	0	1	2	1	2	1	4
EASC10110 Geophysical Measurement and Modelling	Geophysics and Geology, Geophysics and Meteorology, Geophysics.	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	3	3	0	0	2	0	0	0	0	0	1	2	1	2	1	4
EASC10111 Geophysics International Field Course	Geophysics and Geology, Geophysics and Meteorology, Geophysics	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2	2	0	0	0	0	1	0	0	0	1	1	1	3	1	5
EASC10122 Geophysics Professional Placement	-	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	2	3	0	0	1	1	0	0	0	0	2	2	1	3	1	5

Course Name	Compulsory Programme(s)	Mentions for Each SDG and the "Miscellaneous" Category																		Totals		Mentions for Each ESD Competency								Totals		CTP Elements			Total Score
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	M	SDGs	Men.	ST	FT	CT	SC	Co	PS	SA	NC	Comp.	Men.	CC	EC	EE	
EASC10065 Geophysics Project	Geophysics and Meteorology, Geophysics	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	1	1	3	1	5
GESC11014 Geophysics Project for Placement Students	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	3	1	0	1	0	0	3	5	1	3	1	5
EASC10087 Geoscience Outreach and Engagement	-	0	0	0	1	0	0	1	0	0	0	1	0	1	0	0	0	1	1	5	5	0	0	2	1	1	1	0	0	4	5	3	3	3	9
GESC11002 Geoscience Research Project	-	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0	0	3	3	1	3	1	5
GEGR10075 Glacial Processes and Geomorphology	-	0	0	0	0	0	1	0	0	0	0	0	0	3	1	0	0	0	0	3	5	0	0	1	0	0	0	0	0	1	1	1	1	2	4
GEGR08011 Global Change	Geography	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	4	4	0	0	1	1	0	1	0	1	4	4	1	1	2	4
EASC09056 Global Environmental Change - Foundations	Environmental Geoscience	0	0	0	0	0	1	0	1	1	1	1	0	2	3	0	0	0	0	7	10	0	0	2	0	0	0	1	0	2	3	1	2	2	5
EASC08020 Global Tectonics and the Rock Cycle	Geophysics, Geophysics and Geology, Earth Sciences, Earth Science and Physical Geography	0	0	0	0	0	2	0	1	0	0	1	2	1	2	1	0	0	0	7	10	0	0	1	0	0	0	0	0	1	1	1	1	1	3
GEGR08007 Human Geography	Geography	0	0	0	0	2	0	0	2	2	2	1	1	1	0	0	2	0	1	8	13	0	0	2	1	0	1	0	2	4	6	3	1	3	7
EASC10015 Hydrocarbon Reservoir Quality	-	1	0	1	1	0	2	0	1	0	0	0	1	3	1	0	0	0	0	8	11	0	1	1	1	0	1	0	0	4	4	1	1	1	3
EASC10082 Hydrogeology 1: Applied Hydrogeology	-	0	0	0	0	0	2	1	0	0	0	0	0	0	1	1	0	0	0	4	5	0	1	2	0	0	1	1	0	4	5	1	1	1	3
EASC10126 Hydrogeology 2: Simulation of Groundwater Flow and Transport	-	0	0	0	0	0	3	1	0	2	0	0	0	0	2	0	1	0	1	5	9	0	1	2	0	0	0	0	1	3	4	1	1	1	3
GEGR10119 Ice and Climate	-	0	0	0	0	0	1	0	1	0	0	1	0	4	2	0	0	0	1	5	9	0	0	1	0	0	1	0	0	2	2	1	1	2	4
EASC10107 Igneous, Metamorphic, and Ore Processes	Earth Sciences	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1	0	3	3	1	1	1	3
ECSC08011 Introduction to Ecological and Environmental Sciences	Ecological and Environmental Sciences, Ecological and Environmental Sciences with Management	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	4	4	0	0	3	1	0	0	0	0	2	4	1	2	1	4
EASC08008 Introduction to Geophysics	Earth Sciences, Geophysics and Geology, Geophysics and Meteorology, Geophysics	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	2	4	0	0	2	0	0	0	0	0	1	2	1	1	1	3
ENVI11002 Introduction to Three Dimensional Climate Modelling	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2	2	0	0	2	0	1	0	0	0	2	3	1	1	2	4
GEGR09020 Key Methods in Human Geography	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	3	3	1	1	2	4

Course Name	Compulsory Programme(s)	Mentions for Each SDG and the "Miscellaneous" Category																		Totals		Mentions for Each ESD Competency								Totals		CTP Elements			Total Score
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	M	SDGs	Men.	ST	FT	CT	SC	Co	PS	SA	NC	Comp.	Men.	CC	EC	EE	
GEGR09018 Key Methods in Physical Geography	Geography	0	0	0	0	0	1	0	0	0	0	0	0	1	2	0	0	0	0	3	4	0	0	1	0	0	0	0	0	1	1	1	2	1	4
GEGR10125 Land and Landscape: Explorations in Society and Nature	-	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	2	1	2	5
EASC09054 Mathematical and computational methods in Geophysics	Geophysics and Geology, Geophysics and Meteorology, Geophysics	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	2	1	1	1	3
METE08001 Meteorology: Atmosphere and Environment	Geophysics and Meteorology	0	0	1	0	0	1	0	0	0	0	1	0	1	1	1	0	0	0	6	6	0	0	3	0	0	0	0	0	1	3	1	1	1	3
METE08002 Meteorology: Weather and Climate	Geophysics and Meteorology	0	0	0	0	0	0	1	0	0	0	0	0	3	2	1	0	0	0	4	7	0	1	0	0	0	0	0	0	1	1	1	2	1	4
EASC08011 Natural Hazards	-	2	0	2	0	0	2	0	2	1	1	3	1	2	3	1	1	0	0	12	21	0	1	1	0	0	0	0	0	2	2	2	1	3	6
ECSC09002 Natural Resource Management	-	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	2	4	0	0	1	0	0	0	0	0	1	1	2	1	2	5
EASC10119 Nuclear Waste Management: Principles, Policies and Practice	-	1	0	0	0	0	1	1	2	0	0	2	2	0	2	1	0	0	0	8	12	1	0	4	1	0	0	0	0	3	6	3	1	2	6
EASC08004 Oceanography	Environmental Geoscience	0	1	0	0	0	2	0	2	1	1	4	2	2	7	1	0	0	0	10	23	0	0	1	0	1	0	0	0	2	2	1	2	1	4
EASC10094 Ore Mineralogy, Petrology and Geochemistry	-	0	0	0	0	0	2	0	1	0	0	1	0	0	3	0	0	0	0	4	7	0	0	4	0	0	0	0	0	1	4	1	3	1	5
EASC10106 Paleontology and Sedimentology	Earth Sciences, Earth Science and Physical Geography	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	2	0	0	0	1	2	1	2	1	4
GEGR10107 People, landscape change and settlement: the last 15,000 years	-	0	0	1	0	0	0	0	2	0	0	2	0	0	1	2	0	0	1	5	8	0	0	0	0	0	0	0	0	0	0	1	1	2	4
EASC10108 Petroleum Systems	Earth Sciences, Geophysics and Geology, Geophysics	1	0	0	0	0	1	3	0	2	1	2	2	4	1	0	0	0	1	9	17	0	1	2	0	0	0	0	0	2	3	1	3	1	5
GEGR08010 Physical Geography	Earth Science and Physical Geography, Geography	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	2	2	0	0	3	0	0	0	0	0	1	3	1	1	1	3
GEGR10072 Physical Geography Fieldwork: Iceland	Geography	0	0	0	0	0	2	1	1	2	0	2	0	1	1	1	0	0	0	8	11	0	0	1	1	1	0	0	0	3	3	1	3	1	5
GEGR09019 Physical Geography Year 3 Field Course (Spain)	Geography	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	1	0	3	4	0	0	2	1	0	0	0	0	2	3	1	3	1	5
METE10003 Physics of Climate	Geophysics and Meteorology	0	0	0	0	0	0	2	0	0	0	0	0	4	2	0	0	0	0	3	8	0	1	0	0	0	0	0	0	1	1	1	1	1	3
EASC08016 Physics of the Earth	Geophysics and Geology, Geophysics and Meteorology, Geophysics	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	2	0	0	2	0	0	0	0	0	1	2	1	2	1	4

Course Name	Compulsory Programme(s)	Mentions for Each SDG and the "Miscellaneous" Category																		Totals		Mentions for Each ESD Competency								Totals		CTP Elements			Total Score
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	M	SDGs	Men.	ST	FT	CT	SC	Co	PS	SA	NC	Comp.	Men.	CC	EC	EE	
EASC10115 Planetary Interiors	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	2	2	1	2	3	6
EASC10128 Planetary Science	-	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	2	0	0	2	1	0	0	0	0	2	3	1	2	3	6
ECSC10039 Plant Physiological Ecology	-	0	2	0	0	0	1	0	1	0	0	0	0	1	1	3	0	0	0	6	9	0	0	0	0	0	0	0	0	0	0	1	1	2	4
EASC10103 Practical Geochemistry and Data Analysis	Environmental Geoscience, Earth Sciences	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2	2	0	0	1	1	0	0	0	0	2	2	1	3	1	5
ECSC08012 Principles of Ecology	Ecological and Environmental Sciences, Ecological and Environmental Sciences with Management	0	0	0	0	0	0	0	0	0	0	1	0	0	1	5	0	0	0	3	7	0	0	2	2	0	0	0	0	2	4	1	1	1	3
GEGR10137 Principles of Geographical Information Science	-	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	5	5	0	0	1	1	1	1	0	0	4	4	2	1	2	5
GEGR10142 Problematising Environment and Society	-	0	0	0	0	2	0	0	1	3	2	2	3	0	0	0	1	0	1	7	14	0	0	3	0	0	0	0	1	2	4	2	1	3	6
ECSC10032 Professional Skills in Ecological and Environmental Sciences	Ecological and Environmental Sciences, Ecological and Environmental Sciences with Management	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2	2	0	0	3	1	0	0	0	1	3	5	1	1	2	4
GESC11001 Project Design and Literature Analysis	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	3
GEGR10141 Queer Geographies: Spatialising Sexuality and Gender	-	0	0	0	0	6	0	0	0	0	1	0	1	0	0	0	2	0	0	4	10	0	0	3	0	0	0	1	0	2	4	2	1	3	6
GEGR10144 Religion, Place and Politics	-	0	0	0	1	4	0	0	1	0	4	1	1	0	0	1	3	1	0	9	17	0	0	1	1	0	0	1	0	3	3	2	1	3	6
GEGR10131 Research Design for Physical Geography	Earth Science and Physical Geography, Geography	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	2	2	1	0	0	1	4	6	1	2	1	4
GESC11005 Research Methods and Transferable Skills	-	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	2	2	0	0	0	1	0	1	0	0	2	2	1	2	2	5
GEGR08012 Research Skills in Physical Geography	Geography	0	0	0	0	0	2	0	0	0	0	0	0	0	1	2	0	1	0	4	6	0	0	2	1	2	2	0	0	4	7	1	3	2	6
EASC09055 Research Training for Geophysics	Geophysics and Geology, Geophysics and Meteorology, Geophysics	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	4	4	0	0	1	0	3	0	0	1	3	5	1	1	2	4
GEGR10134 Researching with Media	-	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	2	2	0	0	1	2	1	0	1	1	5	6	1	1	2	4
EASC11005 Scientific Computing Skills	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	2	3	1	3	2	6
GESC10001 Self-Designed Learning (10 credits; SCQF level 10; GeoSciences)	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	2	1	2	2	5

Course Name	Compulsory Programme(s)	Mentions for Each SDG and the "Miscellaneous" Category																		Totals		Mentions for Each ESD Competency								Totals		CTP Elements			Total Score
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	M	SDGs	Men.	ST	FT	CT	SC	Co	PS	SA	NC	Comp.	Men.	CC	EC	EE	
GEGR08004 Social and Cultural Geography	-	0	0	0	1	0	0	0	1	0	2	1	0	0	0	0	0	1	1	5	6	0	0	1	1	1	2	1	1	6	7	3	1	3	7
ECSC08003 Soil, Water and Atmospheric Processes	Ecological and Environmental Sciences, Ecological and Environmental Sciences with Management	0	0	0	0	0	4	1	0	0	0	0	0	1	1	3	0	0	0	5	10	0	1	1	0	0	0	0	0	2	2	1	1	1	3
GEGR10116 Space, Place and Sensory Perception	-	0	0	0	3	0	0	0	1	0	0	1	0	0	0	0	0	1	1	4	6	0	0	2	1	1	0	0	0	3	4	3	3	3	9
EASC09052 Structural Analysis of Rocks and Regions (SARR)	Earth Sciences, Earth Science and Physical Geography, Geophysics and Geology, Geophysics	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	2	0	0	2	0	0	0	1	0	2	3	1	2	1	4
ECSC08010 Sustainability, Society and Environment	-	0	1	3	1	0	1	3	2	2	1	4	3	1	1	2	0	0	1	13	25	0	0	1	0	0	1	1	1	4	4	3	1	3	7
GEGR10132 The Art of Listening: Advanced Qualitative Research	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	1	0	3	5	1	2	2	5
GEGR10128 The Blue Humanities: Studying the Sea	-	0	0	0	0	0	0	0	2	1	0	2	0	0	5	1	0	0	1	5	11	0	0	2	0	1	1	1	2	5	7	1	3	2	6
GESC08003 The Dynamic Earth	Earth Sciences, Earth Science and Physical Geography, Geophysics and Geology, Geophysics, Geophysics and Meteorology, Environmental Geoscience	0	0	0	0	0	0	0	0	1	0	0	0	2	1	0	0	1	0	4	5	2	0	0	1	3	1	0	0	4	7	1	1	1	3
GEGR10138 The Geography of Health	-	1	0	4	1	0	0	0	1	0	1	0	0	0	1	1	1	0	0	8	11	0	0	1	0	1	0	0	0	2	2	3	1	3	7
GEGR09012 The Nature of Geographical Knowledge	Geography	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	2	2	0	0	1	1	0	0	0	0	2	2	2	1	3	6
ENVI10001 Topics in Global Change	Environmental Geoscience	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	1	5	0	1	2	0	0	0	0	0	2	3	3	1	3	7
EASC10100 Topics in Palaeobiology and Evolution	-	0	1	0	1	0	1	0	0	0	1	0	0	0	2	2	1	0	0	7	9	0	0	3	0	0	0	0	0	1	3	1	2	1	4
GEGR10139 Volcanoes, Environment and People	-	0	0	0	0	0	1	1	1	0	0	2	1	3	1	3	0	0	0	8	13	0	0	2	0	0	1	0	0	2	3	1	3	2	6
GEGR10118 Writing Landscape	-	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	2	2	0	0	1	0	0	0	0	0	1	1	1	2	3	6