

# **Integrating Sustainability in Undergrad Programs Final Report**

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## 2. Executive Summary

University of Waterloo graduates will need core skills and discipline-specific knowledge of climate change and sustainability if they are to be global citizens prepared to thrive in an age of rapid, global sustainability change. While there is existing leadership across many faculties and programs, many students do not have these skills, knowledge, and values woven through their program of study. There have been champions across many parts of the campus leading discussions about how to integrate sustainability across their specific discipline(s), sometimes with strong successes, however, there has been limited institutional support, guidance, or coordination to date on how to do so. This project considers how curriculum offerings at the University of Waterloo could be adapted to allow all students to develop foundational and discipline-specific understanding of sustainability.

There are two phases of this work. In the first phase (W2023-W2024), the Sustainability Curriculum Integration Working Group (“the Working Group”) developed a flexible framework through which environmental sustainability knowledge, skills, and values can be integrated into any program of study as they are relevant. The Working Group also identified and began development of processes and tools to support program administrators, chairs, instructors, and central support units to utilize the framework. These outputs may be adaptable to support other institution-wide initiatives where the University of Waterloo recognizes a need for foundational understanding of global issues (e.g., Indigenization, anti-racism, etc.).

To understand the Canadian and global landscape and best practices for sustainability curriculum integration, research methods included a literature review and peer scan. Consultations on campus included interviews with faculty and staff across all six faculties and several academic support units and a student survey. This research strongly supported including flexibility in the framework and throughout the process of integrating sustainability across curriculum, to allow for different perspectives. Faculty expertise, burnout, time constraints, and already full programs were identified as barriers to overcome, and experiential learning, work experience or co-op, and communities of practice were identified as opportunities for this work. Consultations also saw case studies as a valuable resource to support integration efforts. This research revealed strong support for this work in departments already considering sustainability, areas of industry and professions already beginning to look for these skills, changing accreditation requirements, and student perspectives of sustainability affecting their careers. Students indicated a strong interest in learning about sustainability, particularly in applied and experiential learning opportunities as they believe it will be relevant to their careers. Lastly this research clearly demonstrated that this work will be ongoing, tools and resources to support faculty are critical, and an integrated approach will be most relevant for students, faculty, and future career paths.

Research informed the development of a five-step flexible framework through which environmental sustainability can be integrated into any program of study, iterated based on feedback from groups across campus. The 5 steps – understand, connect, integrate, evaluate, and adapt and grow – demonstrate and align with iterative, cyclical processes of curriculum development. As supported by groups across campus, the framework is non-prescriptive and allows departments to approach sustainability in their own discipline while offering support and guidance on how to approach the challenging topic. The framework has received very positive feedback across campus.

Phase 1 also saw the creation of 11 recommendations for phase 2 (S2024-S2025) and beyond, listed below, some of which are already underway. These recommendations cover the toolkit and support structure, community building, and executive and systems support. This includes several deliverables that are already committed to as part of phase 2, including the official launch of the toolkit of resources, creating a community of practice, and developing student engagement opportunities. Additional recommendations to consider for phase 2 include workshops, teaching awards, grants, and sustainability curriculum identification systems. Recommendations reaching beyond this project and phase 2 include reconsidering support for interdisciplinary work, incentives for faculty, and senior communications on sustainability in curriculum.

1. Develop and create a public toolkit of resources that are available to help departments and faculty members looking to integrate sustainability topics into curriculum.
2. Identify and build a support structure of Academic Support Units (ASUs) that can assist with the toolkit and support departments integrating sustainability into their program(s).
3. Expand financial resources to assist with departmental implementation.
4. Explore flexible co-curricular pathways for encouraging student participation.
5. Establish an ongoing community of practice to exchange peer support.
6. Pilot workshops and other activities within CoP during phase 2.
7. Consider ways to strengthen ongoing collaboration and relationship building between environmental sustainability and Indigenous Peoples.
8. Consider formal and informal incentives for faculty support of this work.
9. Identify opportunities to pilot interdisciplinary sharing of resources beyond course-level funding units.
10. Identify opportunities to increase the profile of and reinforce action toward sustainability curriculum integration.
11. Improve ways to identify existing sustainability-related course content.

## 3. Background

### 3.1 Brief Description

As global sustainability impacts and transitions unfold, graduates will need core skills and discipline-specific knowledge of climate change and sustainability if they are to be citizens prepared to thrive in an age of rapid change. Waterloo has numerous existing academic programs that include sustainability topics. There is important leadership in the Faculty of Environment addressing sustainability, and there are substantial efforts or consideration across many faculties and programs. However, many students do not have those skills, knowledge, and values components woven through their programs of study. The Sustainability Office's 2021 course audit for sustainability-focused or related courses found that only 14% of students graduated from a University of Waterloo program of study had a sustainability course as part of the program requirements. There are limitations to this course audit as faculty do not identify their own sustainability content and non-required sustainability courses may still be popular, however this is further seen in the Student Experience Survey with only 1/3 of students consistently self-reporting taking a course in the last 6 months that includes sustainability content. This is likely an overestimate as sustainability is not defined, thus likely broadly interpreted.

There have been pockets of discussions across many parts of the campus—from students to instructors to departmental chairs and program directors—about how to integrate sustainability across their specific discipline(s), sometimes with strong successes. For example, the School of Public Health Sciences has introduced a mandatory course covering ecological determinants of health, the School of Accounting and Finance and the School of Environment, Enterprise and Develop have developed the Sustainability and Financial Management program, and Software Engineering has updated program requirements to include an elective course on sustainability. To date, however, there has been limited institutional support, guidance, or coordination on how to do so. This project aims to accelerate these efforts across campus, considering how curriculum offerings could be adapted to allow all students to develop foundational and discipline-specific understanding of sustainability. The Working Group also envisions the processes, framework, and toolkit developed to have applicability beyond sustainability education, and could be a source of inspiration if the University of Waterloo chose to integrate or honour other foundational understanding of global topics such as Indigenization, anti-racism, etc.

To accomplish this, a Working Group of academic and Academic Support Unit leaders was created (Membership in Appendix 1 and Terms of Reference in Appendix 2), and the Working Group developed a flexible framework through which environmental sustainability knowledge, skills, and values, can be integrated into any program of study as they are relevant. With the Sustainability Curriculum Specialist leading most of the project research, development, and action based on guidance, the Working Group also identified processes and tools to support program administrators, chairs, instructors, and central support units to utilize the framework. This project is creating opportunities for collaboration, interdisciplinary work, and shared resources by reaching out to faculty, staff, and students to better understand the range of supports that programs may need to support this knowledge, skill, and values development.

There are two phases to the work. The first phase (W2023 – W2024) has defined the scope of what should be included in this environmental sustainability framework, collated best practices

from other post-secondary institutions, and translated and localized these into strategies for program-level integration. On the Working Group's recommendation, phase 1 also included consultations with leaders in nearly all academic departments for their feedback on strategies and input on their experiences. Additionally, a student survey to better understand University of Waterloo students' perspectives on sustainability was conducted.

In the second phase (S2024 – S2025), pilot projects will be launched with undergraduate program partners to test the recommended strategies. This will include developing a website (likely to be hosted by the Sustainability Office and supported by a coalition of groups on campus such as Centre for Teaching Excellence and Waterloo Climate Institute) with the framework, case study examples, and open-access resources for departments considering sustainability in their field and related changes to curriculum. Complimenting this, a co-curricular student certificate program on sustainability is proposed to be developed and shared with students. To support these initiatives, a staff member (the Sustainability Curriculum Specialist) will maintain and develop the collection of resources and provide support to departments undergoing this process.

### **3.2 Goals and Outcomes**

The following goals were identified in the Project Evaluation Plan, in April 2023.

1. Improve coordination across campus regarding sustainability curriculum collaborations.
2. Increase interest in and commitment to sustainability/climate integration across the undergrad curriculum.
3. Create a flexible framework to support departmental reflection and planning.
4. Develop supportive resources for implementation.

**Goal number 1, to improve coordination across campus regarding sustainability curriculum collaboration**, has begun to be addressed through the Working Group in phase 1. The project included extensive consultations across campus and discussion of the project in various committees and councils. Leading conversations on sustainability in curriculum provided opportunities for students, faculty, and staff to share similar localized or related initiatives, which then connected with this project. Examples of this are sharing of findings with the curriculum review project for sustainability in the Faculty of Engineering, sharing communication and resources with the curriculum initiatives from Waterloo Climate Institute, as well as ongoing work within Cooperative Education on Sustainable Development Goals (SDG) integration. This will continue to be an active effort in phase 2 of the project.

**Goal number 2, to increase interest in and commitment to sustainability/climate integration** across the undergraduate curriculum also started to be addressed, with further work anticipated in phase 2. During consultations across campus in Fall 2023, many departments identified a reignited interest in integrated sustainability. This interest will continue to need support, fostering, and ongoing conversations with departments across campus in phase 2 to maintain buy-in and interest.

**Goal number 3, to create a flexible framework** to support departmental reflection and planning was addressed directly in phase 1 of this project. The framework developed by the Working Group illustrates a 5-step process that will be cyclical and iterative in nature. [Section 7](#) outlines details of this framework.

**Goal number 4, to develop supportive resources for implementation**, was addressed by identifying processes and tools to support program administrators, chairs, instructors, and central support units to utilize the framework. This is collected in a toolkit of resources to be launched in Winter 2024. This toolkit will guide and assist faculty through each step of the framework. It will include links to relevant guides/templates for reflection and brainstorming, examples from across campus, preliminary lists of existing sustainability courses, links to relevant industry connections, lists of potential internal and external partnership opportunities, and other resources over time. It will also lay foundational work to begin development of some “systemic enablers” that underpin the entire framework, such as a community of practice and resources, as well as student engagement opportunities through alternative credentialing/badging, prizes, and awards.

### **3.3 Scope**

The project’s scope was defined to be undergraduate programs of study at the University of Waterloo, as identified in the original project plan. This does not include graduate programs, programs led by AFIWs, or lifelong learning and continuing education. However, programs such as Cooperative Education’s SDGs at Work activities and resources were also considered.

The scope of sustainability defined for this project is primarily rooted in environmental sustainability (i.e., to reduce adverse environmental impacts and to enhance and protect a natural environment both for its own sake and for human flourishing). This project respects and acknowledges numerous connections between environmental sustainability and the social and economic dimensions of sustainability. Many of these connections cannot be ignored, and the Working Group acknowledges that these topics are not separable but wanted to ensure that the focus of discussion was “anchored” on environmental aspects. For example, while there may be significant importance in learning about a topic such as poverty reduction, that is not an area *in and of itself* that would be focused on through this project; however the interrelationship between climate change, energy poverty, resource decline/scarcity, etc. could be many ways in which the intersection between environmental sustainability topics and poverty reduction could be a focus of the knowledge, skill, and values-building outcomes of the project. The focus on environmental sustainability provided a streamlined approach to the project, which aided in consultations and framework development by providing scoping the Working Group was familiar with.

It was also noted early on by the Working Group that there are other processes and initiatives already underway, and which may require materially different approaches and outcomes—for example on decolonization and equity-related activities—that can justify this scoping. This should not limit how departments choose to understand and scope sustainability, and the Working Group would encourage a more wholistic understanding where appropriate.

During phase 1 of the project, the Working Group further refined the scope of this work to be curriculum support, connection building, and resource collection and sharing. Work completed as part of phase 1 of the project did not include curriculum development.

### **3.4 Timeline**

The first phase of the project occurred from W23 to W24 terms, with Phase 2 initiating in W24 as outlined below in Table 1.



Table 1 Phase 1 Project Timeline

<b>Winter 2023</b>	<ul style="list-style-type: none"> <li>• <b>Project structure developed and Working Group established</b></li> <li>• <b>Sustainability curriculum specialist hired</b></li> <li>• <b>Preliminary course analysis on sustainability conducted</b></li> </ul>
<b>Spring 2023</b>	<ul style="list-style-type: none"> <li>• Peer scan of U15 schools and follow-up conversations with peer leaders</li> <li>• Developed first draft of framework</li> <li>• Working Group members consulted on the framework</li> <li>• Literature review of best practices and theory in the field</li> </ul>
<b>Fall 2023</b>	<ul style="list-style-type: none"> <li>• Consultations with students and academic support units</li> <li>• Widespread consultations on campus with chairs and associate chairs</li> <li>• Interim evaluation report drafted to confirm extension to phase 2</li> </ul>
<b>Winter 2024</b>	<ul style="list-style-type: none"> <li>• Draft report with recommendations for implementation</li> <li>• Follow up consultations with appropriate groups as necessary</li> <li>• Finalize initial toolkit and resource materials</li> </ul>
<b>Spring 2025- Winter 2026 (Phase 2)</b>	<ul style="list-style-type: none"> <li>• Launch and management of a toolkit of resources</li> <li>• Development of a community of practice</li> <li>• Manage support requests for faculty members and ASUs</li> <li>• Develop student-centred programs such as alternative credentials</li> <li>• Support pilot projects integrating sustainability</li> </ul>

Over the next year, in phase 2, there will be the official launch of the toolkit of resources and a key task following this will be ongoing maintenance and curation of resources. Additionally, development and encouragement of pilot projects will be another key priority. Other key activities for phase 2 are pending approval of project recommendations.

## 4. Understanding of Sustainability

### 4.1 Approach

Per the project scope, environmental sustainability is the central focus for this project, including resources and support. The University of Waterloo defined sustainability as follows in its 2017 Environmental Sustainability Strategy: “maintaining the integrated health of the environment, society, and economy for today and into the future.” It further defined environmental sustainability as referring to “strategies and activities that minimize adverse environmental impacts, enhance and protect the natural environment, and meet the needs of students, employees, alumni, the communities in which Waterloo operates, and other relevant stakeholders” (University of Waterloo, 2017). Given that this was scoped within the context of the institutional Environmental Sustainability Strategy, however, that should not limit or stop departments in their own process of understanding and defining sustainability.

As sustainability can be understood in different ways, an early priority of the Working Group was to provide clarity on what sustainability means within the context of this project. The literature review provided some context on how sustainability can be interpreted within academic contexts and best practices for understanding sustainability for curriculum integration work. The overwhelming majority of academic and grey literature reviewed on the topic encouraged not defining sustainability singularly for the full university and allowing departments to define sustainability for themselves within the context of their disciplines. This was further supported by conversations with peer institutions that have opted to leave specific

definitions of sustainability up to departments that can use their disciplinary expertise to craft meaningful definitions within the context of their work.

Within the University of Waterloo context, diverse understandings of sustainability already exist. Consultations with academic leaders identified a wide variety of sustainability mindsets and a strong conviction to allow departments to define sustainability in their own contexts. This was echoed by the Working Group, where there were similarly diverse understandings of sustainability. Anecdotally, students have historically pushed for diverse understandings of sustainability in their engagement with the Sustainability Office.

Supported by this research and the existing diverse experiences of sustainability on campus, the decision was made for the Working Group and this project to not define sustainability.

## 4.2 Models, Frameworks, and Sustainability Topics to Consider

In coming to this approach on understanding sustainability, the Working Group discussed several models. The intent of this project is not to adjudicate those or provide an academic list of definitions, but rather to give academic leaders thinking about integration of sustainability some broad ways to reflect on its potential meanings and connections.

There are many different and contested sustainability definitions, models, and frameworks, which are used in many different ways. Many modern and typically Western understandings of sustainability have roots in the 1987 Brundtland Report, which introduced the concept of sustainable development through a framework of intergenerational equity. This Brundtland Report concept of sustainable development as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” has value in its simplicity. There are many fields of natural and social science contributing theory and evidence that help form more detailed, accurate, and/or practically useful sustainability definitions and frameworks. However, Indigenous worldviews, while varying considerably themselves, have often embedded intergenerational equity and sustainability concepts for far longer than the comparatively recent focus in Western scholarship.

As such, definitions, models, and frameworks for sustainability are constantly expanding and are often contested across and within disciplines. These can include critiques and criticisms for perpetuating the systems and ways of thinking that created these problems. Some of these models can be characterized by looking at different pieces of sustainability, whereas others focus more on the systems in which different aspects of sustainability connect. The following are therefore provided as a heuristic tool to think about the landscape of approaches through which sustainability could be understood. It is not intended to be prescriptive or holistic, but could include:

### **Sustainability Pillars or Siloes**

At the most basic, this collection of approaches and frameworks articulate different components of what sustainability means. They often span topics and issues, presenting them as various aspects of the concept of sustainability. Examples include:

- **3 Pillars:** Environmental, social, and economic are the three most commonly referenced pillars of sustainability. Environmental sustainability considers the natural world and preservation of natural resources. Social sustainability considers human needs and supporting people and society. Economical sustainability considers financial

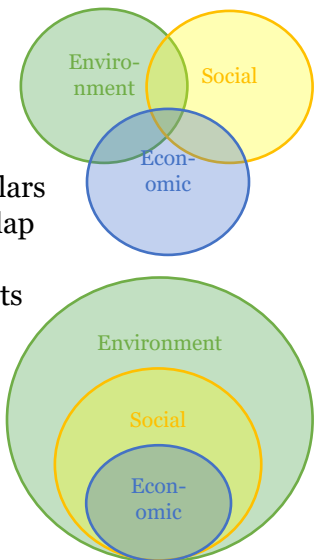
concerns and maintaining financial resources to support now and into the future. This is similar to the triple bottom line understanding of sustainability (Safdie, 2023). Sometimes a fourth pillar of “cultural” is included.

- **ESG:** An acronym for Environment, Social, and Governance, ESG is a set of metrics and practices within an organization on the topic of sustainability as it relates to each of these areas. These are used to evaluate a company beyond financial performance. (BDC, 2024). This approach is more commonly used within the business and finance community, and is often considered synonymous with corporate sustainability, though there are meaningful differences.
- **Sustainable Development Goals (SDGs):** The SDGs are an international call to action to end poverty, protect the planet and natural world, and foster peace and prosperity. The goals are inherently integrated, as action in one area naturally will affect another (UNDP, n.d.) They span 17 different goals, broadly falling under the above three pillars but with more specific objectives and targets.

## Sustainability Systems

These frameworks and approaches build on the pillars but begin to show the interactivity and dependencies between different sustainability aspects through various system lenses. These introduce additional complexity but also connections to scientific quantification of sustainability.

- **3 Overlapping Circles:** Often visualized as a Venn diagram, the 3 Overlapping Circles considers the environmental, social, and economic factors of sustainability and acknowledges the intersection between them (Willard, 2010). This draws on the 3 pillars above, but begins to explore interconnections, trade-offs, and overlap between them.
- **3 Nested Dependences:** The 3 Nested Dependency model reflects the dependent reality of environmental, social, and economic factors of sustainability. It includes the economy as a subsidiary of society, and society as a subsidiary of the environment (Willard, 2010). Rather than a Venn diagram, these consist of three concentric circles, which begin drawing much more clarity on the relationships between different human and ecological systems.
- **Planetary Boundaries:** The Planetary Boundaries framework encompasses 9 boundaries within which humans can continue to develop and thrive (Ernstberger, 2023). This is a more scientific extension of the natural dependencies, introducing the context of ecological limits within which human social and economic activity can take place.
- **Safe and Just Ecosystem Boundaries:** A set of Earth System Boundaries to ensure the stability of the planet and safety for humans (Rockstrom et al., 2023). This builds off the Planetary Boundaries framework, while also emphasizing equity in access to resources within planetary limits, and justice in distribution of impacts when limits are breached.



## Sustainability Mindsets

Finally, there are approaches to sustainability that focus on worldviews and ways of thinking. They can span across many aspects and systems but centre on reflection of humanity's understanding of its place in the biosphere, often emphasizing human-ecological relationships.

- **Deep Sustainability:** Deep sustainability refers to the integration of humans into the biosphere in all aspects of life. It considers earth's systems and the place of humans within them, desiring for them to be reciprocal (Martin, 2022). This can include ecocentric versus anthropocentric worldviews.
- **Indigenous Peoples and Sustainability Mindsets:** Many Indigenous scholars recognize the complex proposition of sustainability as not limited to a technical or rational problem, but also consider our approach as a relational problem. This mindset considers the interconnectedness of humans and the natural world rather than breaking the content of sustainability into compartmentalized or discreet parts for examination and analysis

## 5. Environment Scan

### 5.1 Literature Review

A literature review was conducted to inform recommendations on best practices, common challenges and opportunities, and motivators to consider. Research questions around defining sustainability, barriers, best practices, mechanisms, motivators, industry impacts, and resources were made to guide literature review. Academic materials were collected through the Association for the Advancement of Sustainability in Higher Education (AASHE), the University of Waterloo Library, and communities of practice. These materials were reviewed for their information on the presented research questions, as well as geographic representation, scope of research, and relevance. Research questions were then reviewed again to identify any gaps in research, where further materials were then collected and reviewed. Summaries of findings from the literature review were then formed around the research questions. These notes have been put into point form and summarized for ease of review of key findings.

#### 5.1.1 Definition

Given that much conversation comes up on sustainability definitions, it was important to understand what literary perspectives said on the topic. Ultimately, the findings suggested that sustainability is a potentially vague, broad, evolving term and it is best to allow the discipline/department to identify what sustainability means to them, but to also provide resources to help form a definition of sustainability that resonates.

- The application of sustainability in disciplines is far more valuable than the definition, so leaving flexibility for a definition centred around the discipline is more important than a universal definition, particularly as a universal definition is often vague and broad (Owens et al., 2015) (Urdan et al., 2020)
- A broad definition allows for understanding of sustainability to naturally evolve (Hamiti et al., 2014) (Owens et al., 2015)

#### 5.1.2 Barriers to Curriculum Integration

The Working Group wanted to understand the barriers to sustainability integration, and what has caused them, from those who have researched the systems of curriculum change for

sustainability. There seem to be some common barriers identified in the literature that most schools will encounter and need to manage, including expertise, relevance, capacity of courses and faculty, and underlying values.

- Sustainability can sometimes be seen as irrelevant, lack connection to the content of a discipline, or not needed in industry (Leal Filho et al., 2015) (Ralph et al., 2014) (UK Universities Climate Network, 2021) (Knibb, 2016) (Thürer, 2018)
- Faculty can often feel overwhelmed or that they lack expertise in regard to sustainability as they are not experts trained in it (Leal Filho et al., 2015) (UK Universities Climate Network, 2021) (Doh, 2014) (Wood et al., 2016) (Nhamo et al., 2020) (Ralph et al., 2014) (Rieckmann et al., 2017)
- Faculty workload is already significant, and sustainability work presents new demands that may not currently be supported e.g., time to manage bureaucratic barriers to change and time to develop new content (UK Universities Climate Network, 2021) (Doh, 2014) (Dmochowski et al., 2016) (Nhamo et al., 2020) (Leal Filho et al., 2017) (Wood et al., 2016)
- Universities are not traditionally structured to support interdisciplinary work or the rate of change at which sustainability topics develop (UK Universities Climate Network, 2021) (Albertine et al., 2010) (Leal Filho et al., 2015) (Leal Filho et al., 2017) (Wood et al., 2016) (Hamiti et al., 2014) (Blanko-Portela, 2018) (Doh, 2014) (Thürer, 2018) (Ralph et al., 2014)
- Curriculum is already crowded and leaves limited space for “additional” content (Leal Filho et al., 2015) (Wood et al., 2016)

### 5.1.3 Best Practices

Wanting to learn from successes in sustainability curriculum integration, the Working Group researched some of the best practices for sustainability curriculum integration that have engaged students, overcome barriers, and created future-ready talent. Literature found best practices address both the content and the values for students, centre the student in the learning experience, and utilize experiential, holistic, and interdisciplinary approaches.

- Curriculum integration can be more effective when it prepares students to incorporate sustainability in their personal, professional, and academic lives in both thoughts and actions, reflecting on implications of sustainability topics for themselves (Albertine et al., 2010) (Nhamo et al., 2020) (UK Universities Climate Network, 2021) (Leal Filho et al., 2015) (Howlett et al., 2016)
- Universities should engage in a paradigm shifts that values sustainability in all university practices; e.g., Hiring language, senior communication, organizational goals, learning priority in all programs (Leal Filho et al., 2015) (UK Universities Climate Network, 2021) (Albertine et al., 2010) (Knibb, 2016) (Ralph et al., 2014) (USI Teaching and Learning Office, 2013) (Gunina, 2021)
- When learning sustainability content, students should develop systems thinking, critical thinking, future thinking, wholistic thinking, and interdisciplinary learning (Knibb, 2016) (Gunina, 2021) (Wood et al., 2016) (Rieckmann et al., 2017) (Wissinger et al., 2021) (Krah et al., 2021) (Lukman et al., 2021) (Howlett et al., 2016)
- While every student should develop an idea of how their discipline impacts sustainability issues, the depth which these are covered should be aligned with the needs of the discipline and learning objectives (Gunina, 2021) (Watson, 2013) (Leal Filho et al., 2015)

(Rieckmann, 2017) (Natkin et al., 2020) (Gunawardana et al., 2020) (UK Universities Climate Network, 2021) (Ralph et al., 2014) (Nhamo et al., 2020) (Thürer, 2018) (Rusinko, 2010)

- As part of sustainability content, faculty should offer applied learning opportunities for students, that solve sustainability problems (Owens, 2015) (Leal Filho et al., 2015) (Wood et al., 2016) (Thürer, 2018)
- Collaboration across departments, schools, and communities can develop stronger sustainability curriculum (Leal Filho et al., 2015) (Hamiti et al., 2014) (Nhamo et al., 2020)

#### **5.1.4 Mechanisms for Integrating Sustainability**

Researchers have investigated different tools to integrate sustainability into curriculum, where they are best suited, considerations for their application, and the impacts they have on curriculum. The Working Group wanted to learn from this research to understand what to best pursue. Literature found a combination of curricular and co-curricular approaches can be adopted to integrate sustainability learning, and there are a variety of different strategies that will be more or less effective depending on the context of the discipline, department, and goals.

- Tools for integration include co-curricular activities such as training, volunteering, community engagement, career services, etc. (UK Universities Climate Network, 2021) (Leal Filho et al., 2015)
- Faculty and students can work together in a co-design model, to redesign or design new courses or modules (Dmochowski, 2016) (Leal Filho et al., 2015) (Krah et al., 2021)
- Experiential learning is a strong tool for integrating sustainability and supports complex thinking, systems thinking, and stakeholder engagement. It can include a project over a semester, real world problems, role plays, field courses, community projects, field trips, and internships (Leal Filho et al., 2015) (UK Universities Climate Network, 2021) (Krah et al., 2021) (Wood et al., 2016)
- Hidden curriculum, content not explicitly taught but used in examples and projects, works particularly well where there may not be a direct link to sustainability (Leal Filho et al., 2015) (UK Universities Climate Network, 2021) (Gunina et al., 2021)
- Connections with industry can provide context for sustainability content, such as guest lectures, co-creation of resources, field trips, hackathons, living labs, etc. (UK Universities Climate Network, 2021)
- Independent study allows students to go in depth into connections where faculty may not feel they have expertise (Leal Filho et al., 2015)
- Standardized sustainability literacy tests can provide a baseline, track progress on learning, compare against other schools and peers, and identify strengths and weaknesses (Albertine et al., 2010) (Rieckmann et al., 2017) (Nhamo et al., 2020)
- Modules work as an entry point and to cover topics briefly, where sustainability content later goes deeper, or to fill gaps for students (Leal Filho et al., 2015) (Rusinko, 2010)

#### **5.1.5 Motivators for Integration**

Given the complexities of motivation for any task, the Working Group wanted to understand what has been effective at gaining buy-in from instructors and program administrators for integrating sustainability--what has been effective, and what would be anticipated to be effective. The literature highlighted intrinsic motivators such as improving the world or

providing better teaching, in addition to extrinsic motivators such as recognition, stipends, requirements, and student asks.

- Drivers of curriculum change can be catalyzed by changes or developments within disciplines, professions, industry, and society (Leal Filho et al., 2015)
- Champions lead and inspire sustainability integration efforts within a university (Ralph et al., 2014) (Leal Filho et al., 2015) (Wood et al., 2015)
- Faculty may have a desire to create positive change and impact, provide good for the world, which motivates them (Leal Filho et al., 2015) (Owens et al., 2016) (Ralph et al., 2014) (Wissinger et al., 2021)
- Faculty may be driven to provide quality education and to prepare students for their careers, with awareness of present and future challenges (Wood et al., 2015) (Albertine et al., 2010) (Leal Filho et al., 2015) (Leal Filho et al., 2017) (Tasdemir et al., 2010) (Baty, 2022) (Ralph et al., 2014) (Rieckmann, 2017) (Dmochowski et al., 2016) (USI Teaching and Learning Office, 2013)
- Recognition of or funding for faculty members and departments integrating sustainability content inspires and motivates both recognized and peer departments (Albertine et al., 2010) (Leal Filho et al., 2015) (Blanco-Portela et al., 2018) (Ralph et al., 2014) (Dmochowski et al., 2016) (Nhamo et al., 2020)
- Senior or governing requirements, or encouragement, to consider sustainability drive change can quickly initiate and accelerate sustainability integration efforts (Albertine et al., 2010) (UK Universities Climate Network, 2021) (Doh et al., 2014) (Leal Filho et al., 2015) (Ralph et al., 2014)
- Student may have expectations for and interest in sustainability as part of their studies, causing faculty to consider how they deliver on this (Ralph et al., 2014) (Baty, 2022) (Leal Filho et al., 2015)

### **5.1.6 Integrated Topics in Industry**

Given the close relationship between industry needs and curriculum, particularly as it relates to sustainability, the Working Group wanted to see how industry approaches sustainability in different fields of work, and what the current and projected needs for sustainability expertise across disciplines will be. Literature largely suggests there is an increasingly broad expectation for sustainability knowledge and transversal skills in the workforce, in more fields and professions.

- All sectors need to transition to integrate sustainability practices, and many have already begun to do so. This creates demand for sustainability skills, knowledge, and education in all sectors (Knibb, 2016) (Leal Filho et al., 2015) (Tasdemir et al., 2010) (UK Universities Climate Network, 2021) (Rusinko, 2010)
- Transversal skills, such as leadership, adaptability, environmental awareness, holistic and interdisciplinary approaches, systems and risk analysis, entrepreneurial and innovations skills, etc., are considered of similar importance to specific skills in the green economy (Knibb, 2016)
- Students have indicated they believe sustainability knowledge will impact their career prospects (UK Universities Climate Network, 2021) (Baty, 2022)

### **5.1.7 Resources**

Resources can be very diverse in the needs they support, and the costs associated with them. To support responsible use of resources and identify tools that have been proven valuable, the Working Group looked to understand what resources and supports have been effective elsewhere and why. This indicated that resources such as training, team teaching, examples, experts, and modules can address many barriers such as expertise and time constraints, and literature review found communities within the school and across institutions to be a very valuable resource for sharing ideas, resources, and moving integration ahead.

- Faculty learning communities can facilitate collaboration, peer connection, group learning, and resource sharing to support this work (Albertine et al., 2010) (Leal Filho et al., 2015) (Natkin et al., 2020) (Knibb, 2016) (UK Universities Climate Network, 2021) (Wood et al., 2016)
- Faculty development can be facilitated through paid training time, hired speakers, workshops, conferences, and training supported in other ways as relevant (Rieckmann et al., 2017) (Leal Filho et al., 2015) (UK Universities Climate Network, 2021) (Nhamo et al., 2020)
- Workshops, such as Piedmont/Ponderosa model where faculty dive deeper into sustainability in their curriculum, learn about sustainability and integration from leaders, and/or work with a cohort of faculty and leaders to integrate sustainability in courses have been proven to be an effective resource (Natkin et al., 2020) (Nhamo et al., 2020) (Albertine et al., 2010) (Leal Filho et al., 2015) (Dmochowski et al., 2016) (Hamiti et al., 2014) (Natkin et al., 2020)
- Networks of communication between universities to share experiences, learnings, and resources offer valuable connections and efficiencies (Albertine et al., 2010) (Leal Filho et al., 2015)
- Staff, education experts, and community partners are also very helpful collaborators (Albertine et al., 2010) (Leal Filho et al., 2015) (UK Universities Climate Network, 2021)
- A web-based collection of resources and case studies can be helpful. This may include texts, rubrics, assessments, activities, and other resources (Albertine et al., 2010) (Leal Filho et al., 2015)
- Real examples from other departments doing this, or outside of school, real life examples within their discipline can act as models to follow (Leal Filho et al., 2015)
- Senior vision and support on sustainability within the school, identifying this work as a priority and providing consistency in messaging, is crucial to generate buy in and support for sustainability integration (UK Universities Climate Network, 2021) (Leal Filho et al., 2015) (Hamiti et al., 2014) (Blanco-Portela et al., 2018)

## 5.2 Peer Review

To better understand peer initiatives and efforts to integrate sustainability, in Spring 2023, the Working Group reviewed U15 institutions. Their websites and AASHE STARS reports were reviewed to understand what projects each university has pursued to integrate sustainability across disciplines, and what, if any, presence sustainability had in their teaching and research priorities. Additionally, communities of practice in Canada and globally were engaged to better understand the process peers took to develop these initiatives, opportunities and barriers, and experiences. The University of Waterloo, with this initiative to consider how sustainability can be integrated into the curriculum, would be in a similar position to many U15 peers for sustainability curriculum integration, if not leading in some ways by undertaking this project.



Many have identified sustainability courses publicly, or created programs around SDGs, however in conversation it became clear that true sustainability integration is an ongoing effort across Canadian and North American peers.

From this, four programs of note were identified for further review. Western University, University of Toronto, Queens University, and University of British Columbia each presented unique and notable initiatives and models to include sustainability in curriculum. Representatives from the Working Group met with them to understand these initiatives in more depth. These conversations, along with public information, informed the summaries below. Specifically, they included:

- Representative from Sustainability at Western, Western University
- Representatives from the Committee on the Environment, Climate Change, and Sustainability, University of Toronto
- Former Chair, current member, Sustainability in the Curriculum Sub-Group, Sustainable Queens, Queens University and, separately, the special Advisor to the Principal on UN SDGs, Queens University
- Representatives from the Sustainability Hub, University of British Columbia

### **5.2.1 Definition and Frameworks**

Given the challenges in defining sustainability and selecting a common understanding, the Working Group was interested in how peer institutions defined the term. Many peer institutions use the UN SDGs as a framework for sustainability but find further definition slows down action and movement.

- Some leading universities have left it for instructors and departments to define sustainability in their own contexts, as they understand sustainability differently
- The United Nations Sustainable Development Goals are widely used as a primary framework for sustainability at many institutions (including U of T, Queens, and Western), as they also serve as the basis for Times Higher Education sustainability rankings (*Impact Rankings 2023, 2023*) (CECCS) (*Sustainability in the Curriculum*) (*UN Sustainable Development Goals, 2023*)
  - As a broad framework, SDGs serve as an easy access point for many departments, although some representatives expressed that they might be too diluted as a result
  - Ultimately there are mixed feelings about using the SDGs as the governing framework
  - SDGs focus on impact which resonated at some schools, while other representatives felt priorities such as Indigenization<sup>1</sup> were not adequately represented in this framework

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<sup>1</sup> Indigenization (1) is an intentional, culturally sensitive and appropriate approach to adding Indigenous ideas, concepts, and practices into curricula; (2) is a strategic set of changes to policies, procedures, and practices that increase inclusivity, break down barriers, and realign institutional outcomes for Indigenous students, staff, and faculty; (3) engages in critical reflection of the colonial history and its systemic effects on Indigenous and non-Indigenous peoples, including Treaty relationships and Metis and Inuit land rights; and (4) promotes and supports Indigenous visions and aspirations for self-determination through transformative education for Indigenous well-being, growth, and prosperity.

- Teaching through the SDGs is widely adopted at some schools, though not mandated
- Many peers have also considered or chosen areas of sustainability to focus more attention on, such as environmental causes, harm reduction, and well-being
- None of the institutions interviewed have set a singular definition of sustainability for their institutions; most peers found the conversation on definition to ultimately slow down any action and movement

### 5.2.2 Initiatives

To better understand what is both possible and effective in a Canadian university, the Working Group wanted to learn about the unique initiatives that identified leaders in sustainability curriculum integration in Canada were working on, and the experience developing and managing these projects. Course audits are a common approach as an early step, but most significant integration seems to require substantial bottom-up support, and resources to simplify integration are important.

- Course audits for sustainability content, using SDGs as a framework, are common initiatives and have been completed at Western, Queens, UBC, and University of Toronto, among many other peers that were reviewed in U15 scan (*Sustainability in the Curriculum*) (Ariga et al., 2023) (*Sustainability course inventory*) (Sustainability Hub, 2023c)
  - Courses are tagged by which, if any, of the SDGs are covered in the course content, and this has been shared publicly for students in many cases
  - At some institutions, such as Western, identification of sustainability content has been integrated into existing systems for faculty and departments to flag their own courses
  - Elsewhere this audit serves to identify gaps in content coverage, flag opportunities to organize content around SDG themes, and/or track growth in offerings
- Western has incorporated sustainability into its Western Degree Outcomes (WDOs), used similarly to Undergraduate Degree-Level Expectations (UDLEs), that graduates shall “interact ethically and compassionately with others and with the natural and social world” and “to understand and to exercise social, political and environmental responsibility both at home and abroad.” (Doerksen et al., 2016)
  - This guides course development to some extent, but it was noted that this is not the primary driver of curriculum integration
  - This, alongside strategic planning documents, provided a basis of senior support for sustainability in curriculum at Western
- UBC Sustainability Hub supports research and teaching related to sustainability with specialized expertise on staff (Sustainability Hub, 2024)
  - The Hub offers programs to facilitate sustainability integration into courses including the Climate Teaching Connector for free guest lecturers on climate change, the Fellows program bringing faculty from diverse disciplines together to (re) design courses, Climate Grants, Living Labs, and much more (Sustainability Hub, 2024)
  - The Hub considers how sustainability in all curricula at the school has and has not worked, and develops, supports, and leads projects for further integration (Sustainability Hub, 2024)

- U of T has developed a Pathways program--a cluster of courses and co-curricular activities with a common theme of sustainability. It is open to all students, allowing them to consider sustainability from different perspectives (CECCS, 2023a)
  - There are three steps to this process; Sustainability Scholar, a minor or certificate in sustainability that will appear on transcripts; Sustainability Citizen, recognition of sustainability-related extra-curricular activities; and Sustainability Leader, an additional capstone related to sustainability (CECCS, 2023a)
- Many peers considered a universal class on sustainability across all faculties to be too complicated to be worthwhile. They instead consider a more specialized approach to make sense

### 5.2.3 Goals

As peers continue to work on sustainability curriculum integration, the Working Group was interested in their goals for this work and their intended directions. For all interviewed peers, this will continue to be ongoing work, and most peers are looking for different paths for sustainability in curriculum.

- Many peer institutions would like to develop more curriculum supports in the future
  - One model of this is a dedicated advisor role in the Teaching and Learning support unit for sustainability curriculum integration, similar to roles designed to build relationships with Indigenous Knowledges, reconciliation principles<sup>2</sup>, and decolonizing<sup>3</sup> efforts more broadly.
- Some peers are considering developing an interdisciplinary certificate program on sustainability
- Peers with the most developed programs to support sustainability integration have communicated goals to integrate sustainability into every program's curriculum and preliminary strategies for doing so

### 5.2.4 Structures

In considering best governance practices, the Working Group looked at how peer institutions have overseen this work and the successes or weaknesses of these models. Peers tend to have dedicated working groups, committees, or structures working on curriculum integration.

- Many peers also have a President's Advisory Committee on Environmental Sustainability, or equivalent
  - At Western, U of T, and Queens, among others, there is a subgroup (subcommittee) dedicated to academics (*Sustainability in the Curriculum*) (CECCS, 2023b) (Sustainability at Western)

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<sup>2</sup> For reconciliation principles consider: (1) understanding one's own relationship to Indigenous people and the impacts of colonization; (2) understanding the principle: "nothing about us without us" when including Indigenous voices; (3) creating meaningful relationships and working toward understanding with Indigenous peoples, and (4) operationalizing the TRC Calls to Action.

<sup>3</sup> For a definition of decolonization, please consider: Decolonization confronts the systemic inequalities that privilege non-Indigenous people while simultaneously disadvantaging Indigenous Peoples. Decolonization begins at the level of the individual, whereby people gain awareness of how their actions and lives benefit from an/or contribute to the perpetration of colonial relations and the disenfranchisement of Indigenous Peoples. Decolonization is the act of gaining such awareness and shifting one's behaviour to challenge such relations.

- This provides senior leadership support to these initiatives
- UBC Sustainability Hub, under the Provost’s Office, focuses on student and faculty engagement, specifically research and teaching (Sustainability Hub, 2023a)

## 6. Campus Review

### 6.1 Departmental Consultations

In Spring 2023 and throughout Fall 2023, the Working Group conducted consultations with Associate Chairs, Undergraduate Studies and Associate Directors, Undergraduate Studies, for departments and schools across campus, respectively, and Graduate Attributes Lecturers in the Faculty of Engineering. These consultations were primarily 1-on-1 with the Sustainability Curriculum Specialist, with some in small groups with other members of the Working Group, and peer faculty members. Feedback and responses to a standard series of questions (Appendix 3) formed notes in each consultations regarding the existing presence of sustainability in the curriculum, opportunities and barriers for further integration, the presented framework, and opportunities or barriers related to specific tools or methods of integration. The Working Group reviewed these notes to form recommendations. The summary shared in this report represents trends in feedback. All identifying information was removed from the summary.

Of the 6 faculties, in 4 of them, the Sustainability Curriculum Specialist was able to meet with a representative from every department. Similar departments that share courses or related content were included in consultations where representatives were not interested or did not respond. Engagement in consultations, broken out by faculty, is shared below in Table 2.

Table 2: Consultation Engagement Table

Faculty	Completed	Not Interested	No Response
Engineering	8/8	0/8	0/8
Arts	13/21	2/21	6/21
Environment	5/5	0/5	0/5
Health	3/3	0/3	0/3
Math	5/6	1/6	0/5
Science	6/6	0/6	0/6

#### 6.1.1 Existing Presence of Sustainability in Curriculum

To get a baseline understanding of current sustainability content offerings across campus, facilitators asked faculty members about the current presence of sustainability within the teaching of the department, its programs and courses, as well as how faculty have engaged with sustainability topics. In summary, there are very different methods and levels of integration of sustainability across and within faculties, however there is reason to believe presence is increasing due to growing interest in sustainability and changing accreditation requirements.

- Presence of sustainability in curriculum varies greatly across departments and faculties
  - Engineering: Many felt sustainability is inherently part of engineering, but about half do not discuss this explicitly due to curriculum constraints. Easiest entry point was life cycle analysis as this is already in content
  - Math: Most departments do not cover sustainability in their courses due to the nature of these programs. The overwhelming consensus of faculty members consulted favoured a degree add-on

- Science and Health: Both faculties are inconsistent between departments for coverage and depth of sustainability content, ranging from deeply integrated, implied connections, and no content. However, all departments saw how it could be connected and taught in the department
- Environment: Departments deeply cover sustainability fundamentals as well as application to disciplines, often supporting this learning in other faculties as well
- Arts: Sustainability content varied greatly depending on the presence of a sustainability expert in the field working at the university, however, there often was some integration
- Many accreditation programs, such as CPA for accounting, CEAB for Engineering, CEPH for public health, and CASWE for social work, are beginning to require some amount of (environmental) sustainability education
- Integration models often use practical application of theory and considering implications of decisions. Existing integration models on campus include implicit connections, brief coverage, dedicated courses, course assignments, Living Lab projects, capstone criteria and awards, and integration throughout the program
- There is a presence of champions, leading integration efforts and content development, in most departments—in some departments this is staff, both administrative and academic support
- Individual faculty members can significantly impact integration of sustainability within their realm of influence, for example within individual courses for instructors or within departments as chairs
- Some challenges departments experience includes little to no collaboration between faculty and limited identified connection to sustainability, due to lack of awareness or applied learning
- Sustainability integration is seen as an ongoing journey for many departments, but progress can still often be a point of pride
- Variety of models for understanding sustainability; SDGs are most common, and many see sustainability as integrated with social factors as well as environmental

### 6.1.2 Opportunities

Faculty members have firsthand knowledge of experiences in a department and curriculum committee, including opportunities to update curriculum, ideal supports for each step of sustainability integration, and processes that have been previously successful. Faculty were asked about the opportunities they saw for curriculum integration processes, tools, and supports, as well as other initiatives that have been successful previously. Opportunities for integration vary based on the nature of the discipline, but the majority of departments recognize the significance of integrating sustainability. Faculty can be motivated with internal or external factors including awards and student support, and existing expertise on campus can support this work. Community to learn from and connect with peers is highly valuable as peer leaders can catalyze this work.

- There is **perceived support for integrating sustainability** into curriculum from student interests, industry trends, peer leadership, accreditation requirements, research, and discipline-based trends. This fosters openness, engagement, and motivation
- Leading in **sustainability research and teaching creates a point of pride** and competitive advantage that motivates departments to begin and further integration efforts, particularly when there is recognition of such

- Many departments expressed **interest in cross disciplinary connections** and teachings, sharing either ideas or teaching (course-based or program-based) across disciplines to exposure students to interdisciplinary perspectives on sustainability, learn from peer faculty, share some of the work, and share ideas
- Faculty members expressed **strong interest in trying new methods** to integrate sustainability content into courses including integrating sustainability into the hidden curriculum of courses and supporting research projects relating to sustainability
- Many faculty members expressed **interest in already successful sustainability integration methods** including awards and competitions, Living Labs projects, and opportunities in Co-op
- **Program reviews offer intentional opportunities** to integrate sustainability throughout the curriculum and regularly review it, and some departments have found reviewing and reprioritizing content in this process identified new opportunities for sustainability content
- **Sustainability workshops**, both academic and PD, were credited across most faculties as a catalyst for someone to consider sustainability in their work, teaching, and personal lives
- **Hubs and leaders on campus**, like Sustainable Development Solutions Network Canada and Waterloo Climate Institute, provide energy, leadership, and expertise

### 6.1.3 Barriers

Similar to opportunities, faculty have firsthand knowledge of what can limit, impede, and block curriculum integration within a department. Wanting to learn more about what these factors are and how to address them, consultations asked faculty members what barriers they would foresee, anticipate, or have already experienced as it related to sustainability curriculum integration and supportive tools, as well as avenues to address these barriers. Primary barriers include a lack of sustainability expertise, time constraints, competing priorities, and burnout. The process of integration can also create barriers, particularly regarding accessibility of resources and differences of opinion on definition.

- **Time constraints, competing priorities, and being spread too thin** are common barriers, that many faculty already experience post-pandemic, which have led to burn out. This is particularly a barrier as sustainability curriculum development is considered time intensive, and quickly evolving
- There are **administrative time barriers** for some departments including the time to support experiential learning opportunities and the time required for a program curriculum review
- **Full courses, and extensive required courses** limit ability to add sustainability content to programs in the form of new courses
- Many departments felt they **lacked internal expertise** and teaching resources which would be needed to properly address sustainability in the discipline, and found most external supports and resources culturally distant and lacked necessary depth and relevance to the discipline
- Sustainability can be a **difficult topic to broach** for some due to fear of stepping into Faculty of Environment content, political concerns with students' personal beliefs, and emotional burden of sustainability content
- **Limited or disjointed integration efforts** in departments without centralized conversation on sustainability, or without a common understanding of it,

- Some departments and faculty members felt they **did not see benefits, or motivation**, to integrate sustainability, particularly in the few theoretical or skill-specific program that also did not see a clear connection to sustainability
- There is **desire to act sustainably in operational practices** within the department and institution if they are to teach it, which creates barriers from current practices

#### 6.1.4 Framework Feedback

As future primary users of the framework, faculty members offer a valuable perspective on how the framework can be used, applied, and modified to support their needs. Associate Chairs, Associate Directors, and Graduate Attributes Leaders were asked about the framework to identify what tools or resources would be helpful for each stage, how the steps resonate with them or not, and if there were any modifications that would improve the adoption and usefulness of the framework within their department. There was strong support for the flexibility, broad applicability, and cyclical nature of the framework. Each step will have its unique challenges, however examples, resources, and support mechanisms will be highly valuable for success.

- Across disciplines there is **broad support for the framework's applicability, depth, and flexibility**, particularly the cyclical structure as it emphasizes an iterative process
- Suggestions for the framework included **maintaining the simplicity** of it, clarifying that it may be common to go back to previous steps in the process before moving forward, and providing examples of how to work through the process
- Many consultations noted that there would be need to consider **how to engage people to start thinking about sustainability** more deeply and bring them into the framework

A flexible framework to support departmental reflection and planning was developed by the Working Group. This illustrates a 5-step process that will be cyclical and iterative in nature. [Section 7](#) outlines details of this framework. As it relates to specific steps within the framework, the following feedback was received:

- Understand
  - Consensus on sustainability understanding within departments can be challenging, and it will need to be specific to the discipline
  - Suggested resources from consultations include models and examples supporting a broad range of understandings and potential parameters such as limiting to environmental sustainability
  - Most departments saw this as the natural starting point
- Connect
  - Majority of departments saw this step as requiring some discipline-specific expertise as connections will look different across disciplines and present unique challenges
  - Some felt a need for clarity that this stage is looking at theoretical and concept connections, action is in integration, and social connections can be made as relevant throughout the process
  - Some departments saw this step as the motivator for the process
  - Potential resources identified in consultations include examples and student perspectives

- For some departments this could be a selling point for the process
- Integrate
  - Many departments felt integration will face the most barriers of all the steps
  - Some departments felt this step has the potential to largely fall on curriculum committees
  - Resources identified as helpful include a staff member available to support and examples
- Evaluate
  - Clarification on this step and the role it plays in the process will be needed
  - Some faculty members felt assessing will be more meaningful when there is something to hold people accountable, such as a formal review or opportunities for recognition
  - Identified tools include data from co-op and post-graduate employment, on-campus program review expertise, and resources for personal reflection
- Adapt and Enhance
  - Many consultations suggested growth was dependent on money and finances, so this step should be approached as enhance to support different forms of development
  - This step will include more connections, both in theory and people connections
  - For those with strong existing integration, this serves similar to a new entry point, so should be managed with the same incentives as new entry points
  - A potential resource would be supports for a gap analysis to review what needs to be added or changed

### 6.1.5 Resources Feedback

Resources will be primarily used by faculty members, thus their input on what resources would be useful and valuable is highly important to outcomes of the project. Faculty were asked what resources they would find useful to integrate sustainability across their programs, which ones they would personally use, and what differentiates resources to be effective and easier to implement. The majority of feedback highlighted examples and case studies of successes, and peer support networks as valuable resources and supports. A toolkit of easily-deployable materials to assist in each stage of the process and specifically offer quick wins in integration could be very useful to manage workload as well.

- Many departments expressed a **need for examples** of sustainability integration, including general process, specific stages, integrated courses (theory based and applied), and tools being used, particularly in similar disciplines or the same faculty
- **Easily deployable resources** such as guest lectures, prepared modules, as well as vetted sustainability cases, datasets, problems, and models that can be used could be very helpful, particularly as an entry point to reliably cover basics
- Many faculty members emphasized that resources should be **integrated into existing tools** and as easy to find, access, and use
- Opportunities for **students to independently pursue sustainability** in their studies including a co-curricular add-on, such as a micro-credential offered by the SO, the sustainability diploma, campus involvement and engagement, and community experience are/would be well received
- Faculty expressed a need for **tools for and guidance on assessment** for sustainability as it may be a different type of assessment (e.g., quantitative to qualitative)



- Many departments felt there was **need for resources** to create capacity for course development and adaptations such as a course release, hiring a co-op student, Centre for Teaching Excellence (CTE) support, or funds to hire lecturers
- **Significant support exists** to create sustainability teaching communities across and/or internal to different disciplines and faculties, which may serve to hold people to account to an extent and can be fostered organically in workshops, lunch and learns, and speaker series
- Some departments expressed a **need for discipline-specific expertise supports** to provide cohesiveness and guide sustainability integration work in meetings and workshops
- **Communication on resources needs to be clear and intentional**, ideally with central repository of events on campus and proactive engagement with departments
- There are existing **strong courses on and expertise in sustainability within the Faculty of Environment** that could support other programs as a first step

## 6.2 Student Consultations

In Fall 2023 the Working Group shared a survey with students across campus. The Sustainability Office sent the survey to WUSA and each of the faculty student associations. The Working Group collected the majority of responses by intercept surveying undergraduate students in the SLC over the lunch hour. There were 386 validated responses from undergraduate students, with 68 from the Faculty of Arts, 83 from the Faculty of Engineering, 39 from the Faculty of Environment, 43 from the Faculty of Health, 58 from the Faculty of Math, and 95 from the Faculty of Science.

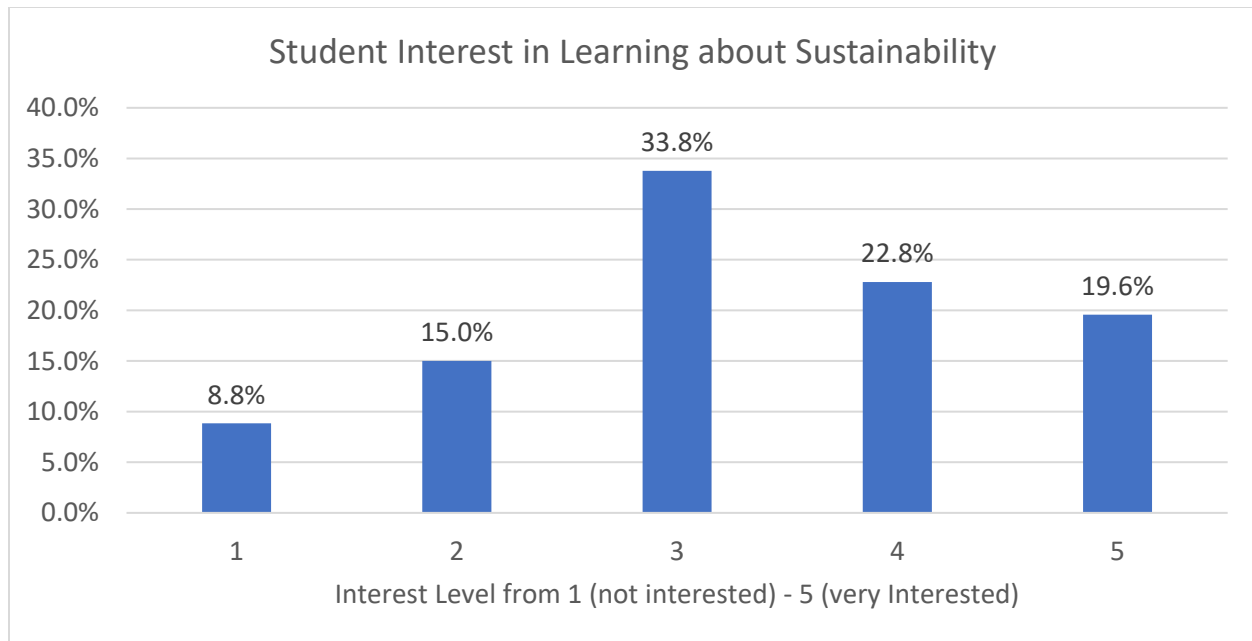
Findings from the survey, outlined in the following sections, covered student interest in learning about sustainability, perceived relevance to students' careers, preferred methods for learning about sustainability, and barriers experienced to sustainability courses. Results were reviewed for trends across faculties and for students as a whole. Summary findings are presented broken out by faculty in the appendices.

### 6.2.1 Student Interest

One of the motivators identified in the literature review and consultations was the perceived, yet unconfirmed, interest of students in learning about sustainability. This was one area the Working Group was hoping for clarity on in the student survey. This was also of interest because students are a primary stakeholder in sustainability integration, so their support and buy-in will be crucial to success.

The results are below in Figure 1. Detailed results broken out by faculty are in [appendix 4](#). The question posed to students was:

How interested are you in learning about sustainability in courses or co-curricular activities while studying at the University of Waterloo? (Scale 1-5, 1 is not interested, 5 is very interested)



*Figure 1 Student interest in learning about sustainability*

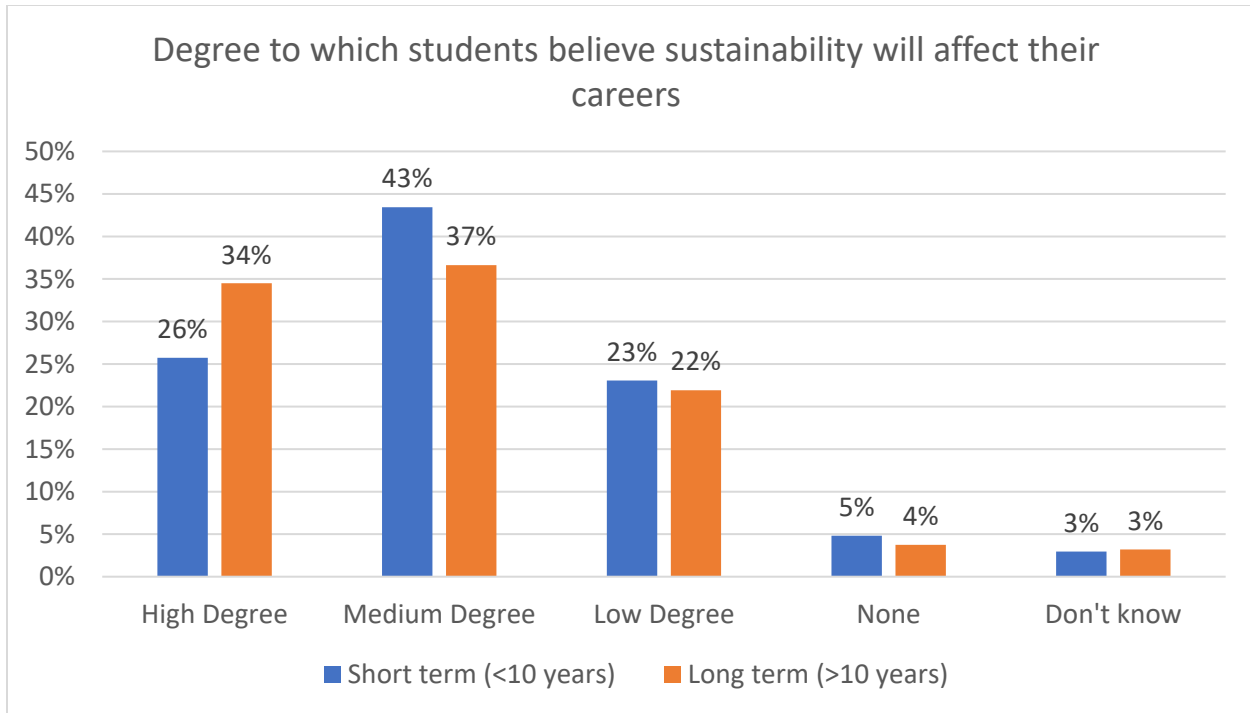
The data signifies that over 40% of students responded with a 4 or a 5, indicating high interest in learning about sustainability, and an additional third would likely have some interest in learning about sustainability, as indicated by a 3. This means that over 75% of students surveyed would have some interest in learning about sustainability, confirming there would be considerable interest in and support for sustainability teachings from a student perspective.

### **6.2.2 Perceived Career Impacts**

As indicated within the literature review, and from changes to accreditation requirements, sustainability factors are anticipated to affect students' careers in the short and long term. How students perceive their careers to change as a result of sustainability challenges was of interest to understand the importance to students, as well as student interest and support. This was another indication of buy-in for sustainability curriculum integration from students, a key stakeholder.

The results are below in Figure 2. Detailed results broken out by faculty are in [appendix 5](#). The questions posed to students were:

- To what degree do you think sustainability issues and topics will impact your career, specifically impact the field in which you wish to work, in the **short term** (i.e., within 10 years of graduating)?
- To what degree do you think sustainability issues and topics will impact your career, specifically impact the field in which you wish to work, in the **long term** (i.e. more than 10 years after graduating)?



*Figure 2 Degree to which students believe sustainability will affect their careers*

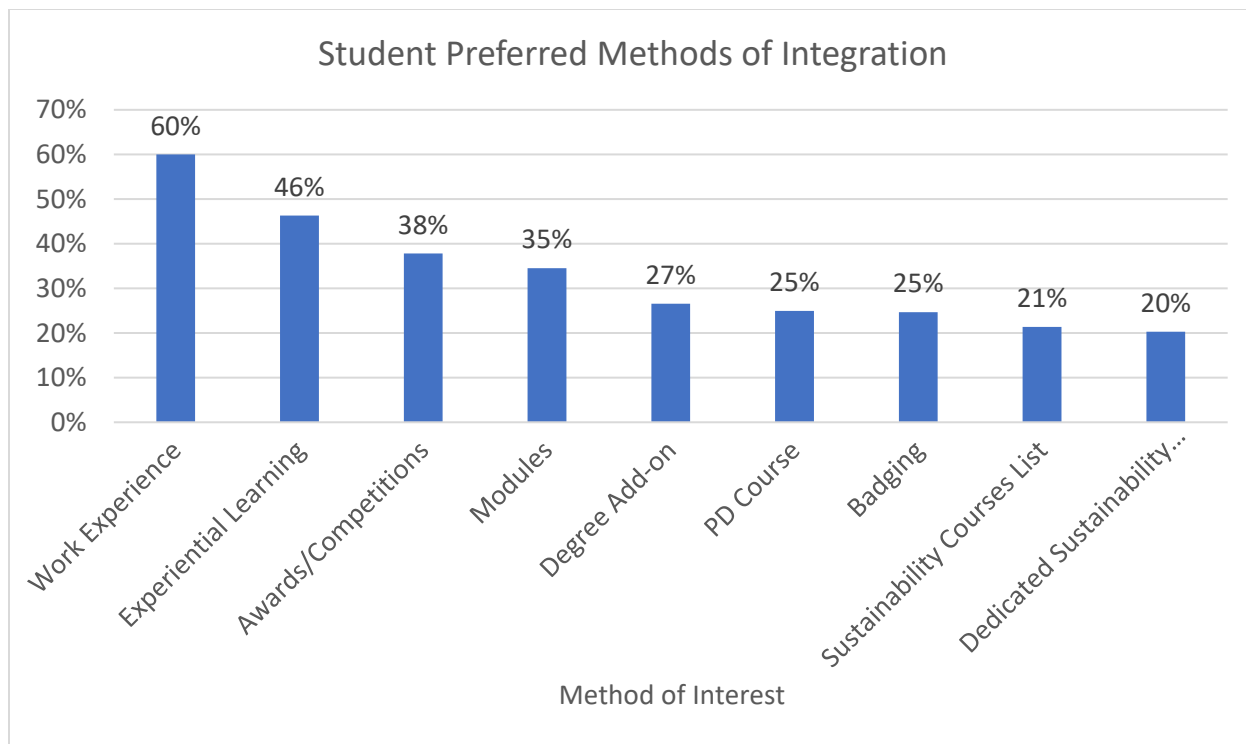
The data signifies that 92% and 93% of students believe sustainability will affect their career to some extent in the short and long term, respectively. There are also more students who believe sustainability will affect their career to a high degree in the long term than the short term. This indicates that students do believe sustainability will affect their careers, particularly in the long term, but already in the short term. This indicates that students would likely strongly support sustainability teaching.

### **6.2.3 Methods of Integration**

To understand ideal methods of integrating sustainability into curriculum, the Working Group wanted to know how students would like to engage with this content. This could drive some resources and supports to be geared toward student preferences. This also provides context for some best practices to engage students.

The results are below in Figure 3. Detailed results broken out by faculty, as well as descriptions of methods as described in the survey, are in [appendix 6](#). The question posed to students was:

Which of the following, if any, would be of interest to you as a way to integrate sustainability into your undergraduate experience? Select all that apply.



*Figure 3 Students' preferred methods of integration into undergraduate experience*

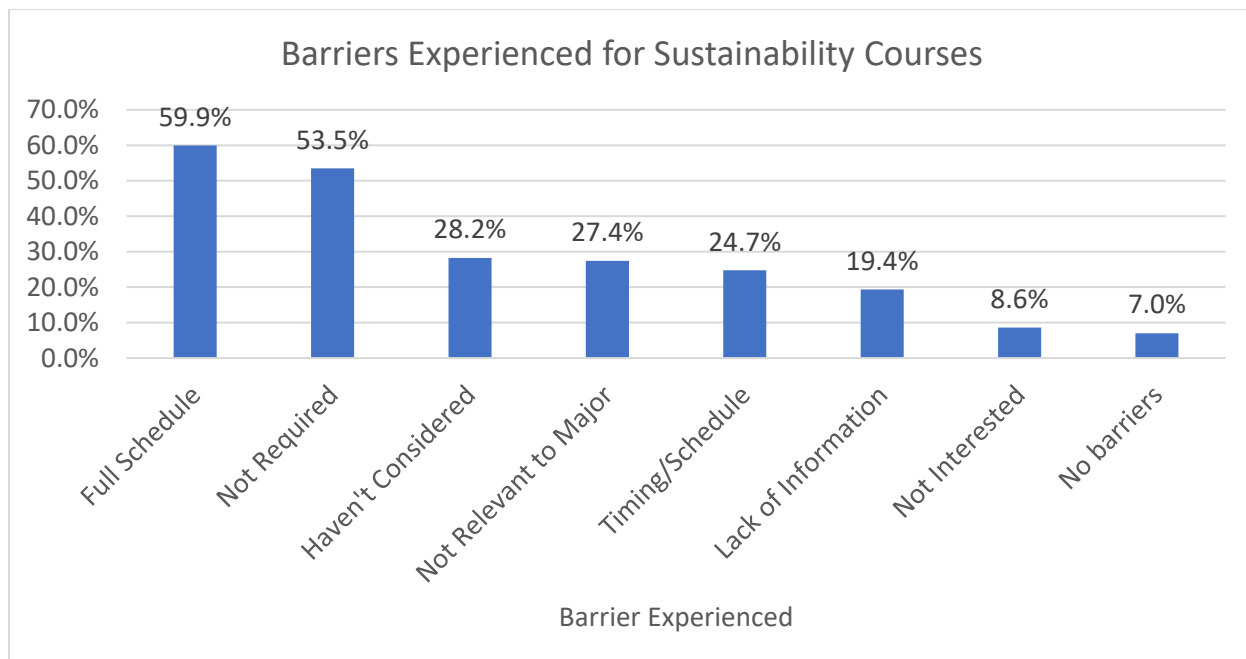
The data signifies that the majority of students prefer integrated methods to receive sustainability content through programs they are already pursuing, especially with applied and experiential connections. The three most popular responses, with support of 60%, 46%, and 38%, respectively, are all integrated, experiential learning opportunities. Conversely, a minority of students identified interest in standalone sustainability content such as dedicated sustainability courses and sustainability badging, as these were the least popular options with only 25% of students identifying interest in these methods, and a dedicated sustainability course as the least popular option at 20% of students interested in this method. This feedback indicates that students are more likely to engage with integrated methods of learning about sustainability.

#### **6.2.4 Barriers Experienced**

In consideration of opportunities for greater sustainability integration, it is valuable to understand current student experiences and where there have been historic barriers. This suggests approaches that may be less effective and considerations when implementing.

The results are below in Figure 4. Detailed results broken out by faculty are in [appendix 7](#). The question posed to students was:

Which of the following challenges have you experienced (if any) that could prevent you from taking a course focused on or related to sustainability? Select all that apply.



*Figure 4 Barriers students have faced preventing enrolling in sustainability courses*

The data signifies that the majority of students do not take a sustainability course because their schedules are full and/or it is not required. This indicates that additional courses, particularly when not required by a major, are not an effective way to deliver sustainability content to students. This also indicates that standalone sustainability content is not an effective way to reach students and suggests that sustainability content needs to be integrated into existing, required courses and content. Additionally, as less than 10% of students indicated that they have not taken a sustainability course because they weren't interested in it, the data suggests that the vast majority of students have interest in sustainability and are limited in other ways.

## 7. Framework

One of the primary outcomes of phase 1 of this project is the development of a flexible framework through which environmental sustainability knowledge, skills, and values can be integrated into any program of study as relevant. This framework will encourage faculty to understand sustainability in the context of their discipline, translate this into discipline-relevant competencies, identify models for integrating in the curriculum, evaluate the level of integration, and promote continuous enhancement.

The Working Group intentionally designed the framework to be cyclical to emphasize a need for continuous improvement. As noted in the definitions covered in literature review, understandings of sustainability, broadly and within disciplines, will continue to grow and evolve over time. It is important to be able to revisit this work and enhance it for new or deeper understanding. This cyclical process also aligns with iterative, cyclical processes of curriculum development.

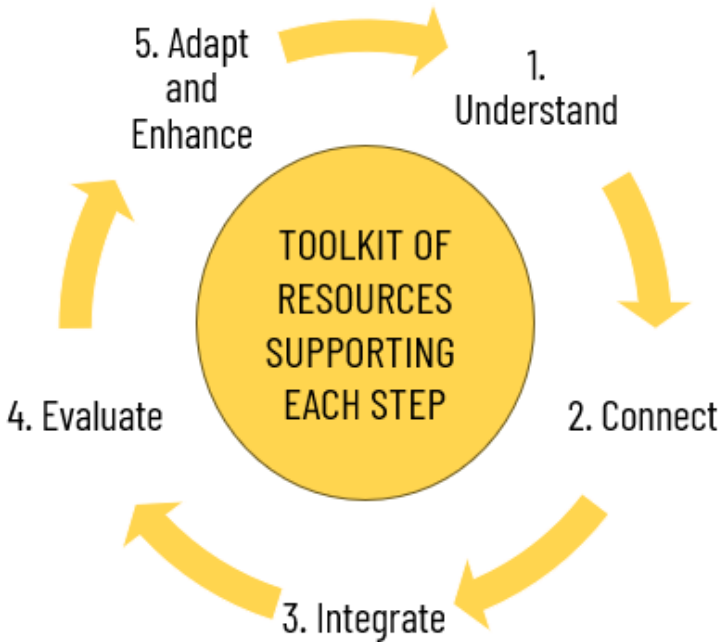
As noted in the peer scan, there are various models for integration. Many peers have developed a record of sustainability courses for students to review with varied success, others have developed minors and certificates in sustainability students can pursue, and, with the greatest

engagement and integration, some have developed programs to support faculty integrating sustainability and toolkits of resources for this work. Some examples of these are York (Bhoola & Bhatia, 2023), University of Montreal (Université de Montréal, n.d.), and UBC (Sustainability Hub, 2024).

Much of the literature reviewed and campus consultations supports the approach to integrate sustainability into existing curriculum, rather than create new. Literature identified this as a best practice, specifically when aided by a toolkit of resources and supports. The Working Group also strongly supported this approach, noting significant barriers identified in consultations and the student survey of already full schedules and a need for discipline-specific competencies. Literature review and consultations also identified a need for flexibility in the framework to support varied perspectives, and a need for a community of faculty to support this work. Feedback from consultations with faculty and the Working Group on the framework iterated upon the model to enable this flexibility. Additionally, a recommended support for the framework is a community of practice, which will be a priority in phase 2 of this project. Lastly, consultations emphasized a need for examples of how to integrate sustainability, which has led to the development of case studies to also support this framework.

Two important takeaways and clarification points from this work so far, and consistent with significant literature reviewed to date as well as internal and peer consultations, are that:

- a. **The integration of sustainability does not necessarily require “a new course,” though some programs have chosen to do so and could continue to do so with success.** Models of integration can and should vary significantly across departments and programs, but can include (though are certainly not limited to) new overview courses, overview concepts of sustainability in existing introductory courses (e.g., X in Society, ethics, professional responsibility, and other similar courses), modules in courses on topics connected to sustainability, discipline-specific skills/competencies, opportunities for application of skills on sustainability problems in assignments, criteria in capstone projects, Sustainability Living Lab projects, and more. Section 7.3 expands more on these models.
- b. **The framework does not prescribe what needs to be taught or what definitions/ sustainability frameworks to use.** Connection the discipline forms with sustainability, in ways that are meaningful for the discipline and its students drive these decisions. This process is self-guided within departments, faculties, programs, and courses. The identified resources and supports in the toolkit will exist to assist the discipline in these connections through each stage of the framework, and none of these are required or prescriptive. Literature review and consultations strongly support this approach, each encouraging disciplines to lead this work in their own departments.



### 7.1 Understand

The purpose of the understand step of the framework is to build a general foundation of what sustainability means in the context of the department and the discipline. Departments conduct conversations to discern how faculty members interpret sustainability for themselves, their research, and ultimately the department.

Resources to support this step include common frameworks, models, and approaches to defining sustainability. These will include connections to Indigenous understandings of sustainability. A department may decide to draft a formal definition of sustainability to guide teaching in the department and build competencies from, or they may simply provide guidance for individual faculty members in the department. Ultimately, understandings of sustainability will need to be revisited over time as the field advances and integration grows deeper.

### 7.2 Connect

The purpose of the connect step of the framework is to determine how sustainability specifically relates to the discipline and what skills, knowledge, or values related to sustainability a student may need to know. This step will review what content students already learn, sustainability's relevance, and what students may need in the future. Departments will review what existing learning objectives need to be updated to include a sustainable perspective and what new content needs to be created to remain current in the field and create future-ready graduates.

Resources available to support this connection-building will include industry associations and relevant academic research. Additionally, reflection guides will be available to guide discussions within the department. There will be supports available in the Centre for Teaching Excellence (CTE), the Sustainability Office, and other groups on campus to aid in initial conversations. Departments will ideally identify key skills, competencies, and values students will need related to sustainability, and formulate appropriate learning objectives.

### 7.3 Integrate

The purpose of the integrate step is to take action on the insights of the connect step and deliver content on the skills, knowledge, and values identified as being relevant to students studying in the department. Where relevant, appropriate, and feasible, faculty will integrate sustainability content into their teaching to meet these needs. Ideally this is done on a program-wide basis to intentionally build on knowledge of sustainability through courses, similar to how understanding of other skills is built upon throughout a degree program, and to avoid overlap or duplication risks.

The nature of integrations is naturally going to vary greatly depending on the discipline and the needs of the department. Table 3, Integration Methods, illustrates many of the different approaches for integration that could be utilized, based on existing work on campus, with peers, and through literature review. These are not exhaustive, nor are they mutually exclusive—often more than one integration method could be necessary to translate the skills and competencies that were identified in the “Connect” step into learning outcomes. The toolkit will include supports available through the Sustainability Office, faculty members, peer connections, and ASUs. Additionally, a later version of the toolkit could include resources that support quick integration such as modules and records of available guest lecturers.



### 7.3.1 Table 1: Integration Methods

Table 3: Integration Methods

	Extra/ Specific Course	Community Experience	Degree Add- On	Modules in Courses	PD Course	Applied Projects	Community of Practice	Higher Competency Level
<b>External Examples</b>	<p>Uni. Of Barcelona (campus-wide)</p> <p>Uni. Of California San Diego (list of courses)</p>	<p><a href="#">UofT Community Engaged Learning</a></p> <p><a href="#">UBC Sustainability Scholars</a></p>	<p><a href="#">USask Certificate</a></p> <p><a href="#">U of T Faculty of Arts and Science Certificate</a></p>	<p><a href="#">UBC Climate Teaching Connector</a></p>		<p>Sustainability Living Lab examples</p> <p><a href="#">UBC SEEDS program</a></p>	<p><a href="#">York U Teaching SDGs CoP</a></p> <p><a href="#">UBC Sustainability Fellows</a></p>	<p>UBC Sustainability Attributes</p> <p>External requirement (ENG, SAF, SPHS, etc.)</p>
<b>UW Examples</b>	<p>Software Engineering</p> <p>Civil and Environmental Engineering</p> <p>Theatre and Performing Arts</p> <p>Public Health</p>	<p>ENBUS capstones</p>	<p>Sustainability Diploma</p>	<p>Connect in relevant ethics courses</p> <p>“X in society” or STV courses</p> <p>Discipline-specific sustainability skills</p>	<p>PD1 SDG integration</p> <p>CEE SDGs at work <a href="#">activity</a></p>	<p><a href="#">Sustainability Living Labs</a></p> <p><a href="#">Capstone award</a></p> <p>NE100 problem analysis project</p> <p>MSCI 100</p>	<p><a href="#">Teaching SDG CoP</a> at UW</p>	
<b>Tools</b>	<p>List of courses, such as ERS 100</p>	<p>List of community groups /partners</p> <p><a href="#">Community Sustainability Lab - SWR</a></p>		<p>List of topic-specific experts</p> <p>Open-access curated content</p>		<p>Sustainability Living Lab Database &amp; UW data points</p> <p>Capstone award criteria &amp; supports</p>	<p>Networking tools</p>	
<b>Consider- ations</b>	<p>Limited depth</p> <p>May not connect discipline</p>	<p>Complexity of relationship with external clients</p>	<p>May not connect discipline</p> <p>Student schedules</p>	<p>Incentives/ process to transfer modules</p>			<p>How to “reach beyond the choir”</p>	<p>Depth of action and reflection can be large depending on the program</p>

## 7.4 Evaluate

The purpose of the evaluate step is to review the integration work previously identified and determine if it has accomplished the desired outcomes identified in the connect phase of the framework. This may include assessment of students to determine their understandings and meeting with faculty to determine how they managed the updates. Departments will ideally identify if any gaps exist and if so, what barriers or challenges led to these.

This stage will naturally look different in every department depending on the relevant connections made and the integrations pursued. Support for departments reviewing their processes is available with CTE, peers across campus, and the Sustainability Office. Later versions of the toolkit will also include materials to guide reflection. It may also include some examples for evaluating student understanding such as assessment questions or project criteria. Literacy assessments may also be available through supports, though are not relevant for all integrations.

## 7.5 Adapt and Enhance

The purpose of the adapt and enhance step is to improve and deepen the integration formed within the department. Departments will reflect on the full process from understanding to evaluating and identify any opportunities for improvements. This may include closing gaps identified in the evaluate stage, addressing challenges and barriers in the process, or deepening understanding of or connection to sustainability in the discipline, especially as broader sustainability issues, topics, and concepts change over time. Any identified change in the process may have implications for other steps. For example, a new, deeper understanding of sustainability may change the nature of connections to sustainability within the discipline, with implications for integration and evaluation. Alternatively, feedback from evaluation may identify other opportunities for connection and integration. This will lead to reviewing and iterating on the full process, as sustainability continues to grow and evolve.

The nature of the adapt and enhance stage is going to be very different for every department. There will be available resources in the toolkit to guide some of this reflection, as well as supports in the CTE, with peers, and in the Sustainability Office. Resources from previous stages may also be helpful when looking to strengthen the integration and address barriers experienced.

# 8. Implementation

## 8.1 Implementation Recommendations

Recommendation	Lead	Engaged	Resources	Timeline
<b>Toolkit and Support Structure</b>				
<b>1. Develop and Create a Public Toolkit</b>	Sustainability Office	Phase 1 Working Group, Advisory Group, CTE, CEE, CEL, and WCI	Low – Sustainability Office staff capacity	Beta toolkit to be launched May 2024, followed by ongoing maintenance and curation
<b>2. Identify and build a support</b>	Sustainability Office	Phase 1 Working Group,	Low – Sustainability	Initial set of supports

<b>structure of ASUs that can assist with the toolkit</b>		Advisory Group, CTE, CEE, CEL, and WCI	Office staff capacity, partner ASU staff capacity	included in Beta Toolkit May 2024, ongoing support thereafter
<b>3. Expand resources to assist with departmental implementation (i.e. LITE grant equiv.)</b>	Sustainability Office	President's Advisory Committee on Environmental Sustainability, Advisory Group, Faculty across campus	Medium/High – Sustainability Office Staff Capacity, Advisory Committee, budget of \$22,500/year	First grant applications due Fall 2024, first project takes place Winter 2025, review of program in Spring 2025
<b>4. Explore other flexible pathways for encouraging student participation</b>	Sustainability Office and Waterloo Climate Institute	Students across all faculties	Low – Sustainability Office and Waterloo Climate Institute staff capacity, budget of \$3,000/year for student projects	Alternative credential program available Fall 2024, capstone awards for sustainability in all faculties Winter 2025
<b>Community Building</b>				
<b>5. Establish an ongoing community of practice to exchange peer support</b>	Sustainability Office	Faculty and Academic Support Units	Low – Sustainability Office staff capacity to manage ongoing support	Community of Practice to be formally established in fall 2024
<b>6. Pilot workshops within CoP during phase 2</b>	Sustainability Office	Faculty and Academic Support Units including CEE, CTE, WCI	Low/Medium – Sustainability Office staff capacity, budget of under \$1,000	First workshops to be hosted in Spring 2024
<b>Executive and Systems Support</b>				
<b>7. Consider ways to strengthen ongoing collaboration and relationship building between environmental sustainability and Indigenous Peoples.</b>	Office of Indigenous Relations, CTE Indigenous Knowledges and Anti-Racism Team, Team,	Indigenous colleagues on campus, colleagues working in sustainability, land restoration, and curriculum development	Low – staff capacity from leads to engage meaningfully in discussions and relationship	Conversations and relationship building already underway, this is anticipated to continue throughout phase 2

	Sustainability Office			
<b>8. Consider formal and informal incentives for faculty support of this work</b>	TBC	TBC	Varying depending on recommendations	Process to review incentives identified in 2024.
<b>9. Identify opportunities to pilot interdisciplinary sharing of resources beyond course-level funding units</b>	TBC	Teaching Innovation Incubator, Academic Support Units, faculty members in all faculties, student representatives	Varying depending on initiative, with a goal to ultimately share and save on resources	Methods for resource sharing identified Spring 2024, piloted beginning Fall 2024
<b>10. Increase profile of sustainability curriculum integration efforts</b>	TBC	Central Communications, Senior Administration, Sustainability Office	Low – Staff capacity from representatives of all engaged offices	Recommendations to increase the profile of this work identified Spring 2024
<b>11. Improve ways to identify existing sustainability-related course content</b>	Registrar’s Office and Sustainability Office	Faculty members, prominent offices on campus	Medium – Sustainability Office staff capacity, Registrar’s Office staff capacity	Stakeholder consultations Spring 2024, system updates Fall 2024, beta tests Winter 2025

**8.1.1 Toolkit and Support Structure**

**Recommendation 1: Develop and create a public toolkit of resources that are available to help departments and faculty members looking to integrate sustainability into curriculum.**

Rationale: This toolkit, available on a website, is strongly supported by faculty consultations which identified the need for a central resource for sustainability in curriculum information, aids, and supports. It is also supported by the resources discussed in the literature review, which identified online, central resources of sustainability content as helpful in reducing barriers and supporting this work. Lastly, this model is similar to successful models at peer institutions with high success, such as York’s guide to teaching the SDGs (Bhoola & Bhatia, 2023).

**Description:** A website, hosted by University of Waterloo, will be developed, and will host a toolkit of resources to assist departments and faculty looking to integrate sustainability into undergraduate studies, including modules, industry connections, case studies, and literature to better understand sustainability. The website will also host information about the framework for sustainability curriculum integration, guides to work through the framework, and how to connect with various supports on campus. This would not duplicate other resources available

across campus but would make them linked/navigable in a single space. Maintenance to keep resources relevant will include continuous learning from peer organizations and sustainability curriculum progress internationally. This will also include continued engagement with the CTE on how to incorporate other aspects of curriculum work such as values, vision, curriculum mapping, and program structure. CEE and industry partners will be engaged to ensure that the toolkit continues to represent industry perspectives, including offering opportunities to connect with and learn from examples and leaders in industry.

**Lead:** Sustainability Office

**Engaged:** The Working Group for phase 1 has already been involved. A future advisory group for phase 2, partners across campus including the Centre for Teaching Excellence (CTE), Co-operative and Experiential Education (CEE), Centre for Extended Learning (CEL), Waterloo Climate Institute (WCI), and other ASUs as appropriate will also be engaged.

**Resources:** Staff Capacity will be provided from the Sustainability Office, primarily through the Sustainability Curriculum Specialist, to lead the curation and management of this toolkit. There will also be minor capacity requirements from partner ASUs to review and update materials as necessary.

**Timeline:**

- Winter 2024: Website development, user experience testing, resource curation and collection
- Spring 2024 – Winter 2025: Launch the beta toolkit and continued development of the toolkit through collection and creation of resources as recommended by stakeholders, distribution of and communication about the resources

**Recommendation 2: Identify and build a support structure of Academic Support Units (ASUs) that can assist with the toolkit and support departments integrating sustainability into their program(s).**

**Rationale:** Faculty consultations emphasized a need for support in this work, both for the expertise and the capacity that these supports will help address. This was further confirmed in literature that identified barriers in expertise and capacity, and valuable resources in collaborators on campus in peers and academic support units.

**Description:** Support will be available for departments and instructors looking to integrate sustainability within their programs and courses. The Sustainability Office will help identify and support these pilot projects, which in turn will help build bottom-up support for sustainability curriculum integration. In addition to this active effort identifying pilot projects, the toolkit website will include a page covering information about available supports on campus, including ASUs and potential peer connections. There will be contact information for ASUs, and faculty connections will be directed to the Sustainability Office, where requests are forwarded to appropriate faculty members as available. Individuals as a part of the support structure can assist in both content development and other important aspects of curriculum work such as ongoing engagement around values, vision, curriculum mapping, program structure, data sharing, etc.

**Lead:** Sustainability Office

**Engaged:** The Working Group for phase 1, a future advisory group for phase 2, partners across campus including the Office of Indigenous Relations (OIR), CTE, CEE, CEL, WCI, and other ASUs as appropriate will be engaged.

**Resources:** Staff Capacity will be provided from the Sustainability Office, primarily through the Sustainability Curriculum Specialist, to lead the identification and management of these

supports. There will also be some capacity requests from partner ASUs for support.

**Timeline:**

- Winter 2024: Meeting with ASUs to confirm support and areas of expertise, website content drafting to appropriately direct users, user experience testing
- Spring 2024 – Winter 2025: Sustainability Office directs requests for faculty member support appropriately based on needs and continues to curate available faculty and ASU supports
- Winter 2025: Key stakeholders meet to assess this system and form recommendations moving forward

**Recommendation 3: Expand financial resources to assist with departmental implementation.**

**Rationale:** Peer institutions, such as UBC, have found success using grants of a similar size (Sustainability Hub, 2023b). Similarly, consultations with faculty highlighted a financial need in some cases to work on unique projects, or those with capacity issues.

**Description:** Similar to LITE grants, small, one-year grants of \$7,500 should be offered on a term basis to support sustainability integration in curriculum. This could include funding for instructor course release, hiring a research assistant to conduct curriculum scans, workshops with faculty, or other supportive measures. Projects will be supported by the Sustainability Curriculum Specialist and the Sustainability Office, where possible, with an anticipated deliverable at the end of the project that can be shared with the campus community. The Sustainability Office will also explore whether this makes sense to develop as a new funding proposal, or whether it could be a more focused part of an existing funding program, such as the Sustainability Action Fund.

**Lead:** Sustainability Office

**Engaged:** Phase 2 advisory group, the President’s Advisory Committee on Environmental Sustainability, and faculty members across campus will be engaged. Additionally, the CTE will be consulted on the process used for LITE grants to inform.

**Resources:** Staff Capacity will be provided from the Sustainability Office, primarily through the Sustainability Curriculum Specialist, to promote the opportunity and collect submissions. The advisory committee in phase 2 will help determine requirements and expectations for the funding, as well as review applications. As an initial proposal, it is suggested that there could be up to 3 grants of \$7,500 each for the pilot period.

**Timeline:**

- Winter 2024-Spring 2024: Funding for the grants is sought. Advisory committee formed to identify criteria, name, expectations, and other logistical pieces required for the grants, appropriate review and approval process for recommendations, advertising of the grants to faculty members
- Fall 2024: First deadline for grants due, for projects in Winter 2025, Advisory committee reviews applications and select the first recipient
- Winter 2025 – Spring 2025: Applications due, reviewed, and project implementation process is repeated for remaining grants in year 1, completed projects are highlighted within Sustainability Office communications
- Spring 2025: Advisory committee and recipients meet to discuss the process and form recommendations moving forward

**Recommendation 4: Explore flexible co-curricular pathways for encouraging student participation.**

**Rationale:** In the student survey, 38% of students, across all faculties, identified awards and competitions and 27% of students, across all faculties, identified degree add-ons as avenues they would be interested in to integrate sustainability in their studies. Consultations with faculty identified competitions as an easy entry point to integrate sustainability into their teaching and as motivational because they engage students. Consultations also identified alternative extra-curricular programs as ideal opportunities for departments that may struggle to identify relevance of sustainability to undergraduate teaching. These also reinforce Waterloo’s strengths of applied and experiential learning.

**Description:** There are two flexible pathways recommended to be explored and piloted in phase 2 of this project. The first is an alternative credential program for students developed by the Sustainability Office and Waterloo Climate Institute using the new alternative credentials framework as it is developed. Separate from their studies, students will have the opportunity to explore sustainability, complete requirements, and earn a University of Waterloo credential. This could function similarly to the WWF Living Planet Leader program, where for example students can track a portfolio of sustainability experiences to earn a certificate, including volunteering with campus or community clubs, sustainability courses, work experience, and/or personal action. The EDGE certificate with CEE and other student credentials on campus will be considered as models. The second program is a set of capstone/final year project awards, one in each faculty, to award final year undergraduate projects that incorporate sustainability. This is modelled off the highly successful Capstone Award for Sustainability in the Faculty of Engineering.

**Lead:** Sustainability Office and Waterloo Climate Institute

**Engaged:** Students across all faculties will be engaged in this work.

**Resources:** Staff capacity from Sustainability Office and Waterloo Climate Institute will be used to design and pilot an alternative credentials program that could help increase student enrollment in curricular and co-curricular sustainability programs. Capstone project awards in all faculties, requires a small amount of staff capacity from the Sustainability Office, and a budget of \$3,000 for the awards.

**Timeline:**

- Winter 2024 – Spring 2024: Sustainability Office and Waterloo Climate Institute develop an alternative credential for students to take in addition to their studies, in accordance with the alternative credentials’ framework; initial discussions with faculty leads for the sustainability capstone/final year project awards, confirming requirements and eligible projects
- Fall 2024: Alternative credential launch, open for student enrollment, managed by the Sustainability Office and partners; capstone/final year project awards are announced to faculty members and students
- Winter 2025: Eligible capstone/final year projects are reviewed, prizes are awarded by appropriate panels chosen by the faculty; both programs are reviewed with key stakeholders to assess impact, identify opportunities for improvement, and form recommendations

### **8.1.2 Community Building**

**Recommendation 5: Establish an ongoing community of practice to exchange peer support.**

**Rationale:** Consultations with faculty members emphasized a desire to complete this work in communities, and specifically mentioned the value of a community of practice for this work.

Additionally, peer institutions have expressed the value of peer programs at their institutions to foster interdisciplinary thinking, hold peers accountable, and learn from experiences. As mentioned in the literature review, there is significant literary support for pursuing sustainability integration in communities for these same benefits.

**Description:** This community of practice will be formed to provide campus-wide support for integrating sustainability into curriculum. Faculty will gather for sessions to share learnings, resources, and experiences integrating sustainability into their curriculum. There will also be sessions with ASUs including CEE, CTE, and WCI, to discuss existing supports on campus for this work, and opportunities to connect with them. While the nature of this community of practice is interdisciplinary to encourage interdisciplinary thinking, as it grows there will be opportunities to connect specifically within faculties where there may be more shared experiences.

**Lead:** Sustainability Office

**Engaged:** Faculty members across all faculties will be engaged as members of the community of practice, Teaching Fellows, informal sustainability curriculum faculty champions, and ASUs across campus will be engaged for various sessions, such as CEE, CTE, CEL, and WCI.

**Resources:** The community of practice will primarily be supported by staff capacity in the Sustainability Office; however, it will also require minimal additional support for specific sessions and logistics from departments across campus.

**Timeline:**

- Spring 2024: Initial events and workshops to generate interest and support are held
- Fall 2024: A formal community of practice is formed, with appropriate technical support for communications and logistics

## **Recommendation 6: Pilot workshops and other activities within CoP during phase 2.**

**Rationale:** As noted in the resources section of the literature review, workshops are identified as a potential resource that can help bridge gaps for faculty to learn about sustainability, its relevance, and opportunities to connect it in their content. Additionally, consultations with faculty identified workshops as a potential entry point to consider sustainability in their curriculum and to connect with peers.

**Description:** Workshops on integrating sustainability will provide faculty with opportunities to connect with peers and to learn about sustainability curriculum integration, relevant tools and resources, and appropriate groups on campus to connect with for this work. Topics will cover both knowledge and skills in the cognitive domain as well as holistic approaches that consider affective, values-based and embodied (psychomotor) approaches. This will include partnership with Indigenous colleagues to provide workshops on best practices to engage with Indigenous perspectives and develop relational knowledge, particularly as it relates to land-based learning. For example, topics could include:

- Introduction to the sustainability curriculum integration framework
- How to connect with CEE to integrate sustainability into co-op
- Curriculum development supports with CTE
- Opportunities to learn about relational knowledge from Indigenous colleagues,
- Workshops on best practices for connecting with Indigenous perspectives on sustainability and land-based learning, and
- Learning about the relevance of climate change with WCI, among others

Topics will be queried from members of the community of practice and may also include case studies from other campuses.



**Lead:** Sustainability Office

**Engaged:** Faculty members across campus will be engaged as participants in these workshops. ASUs across campus, such as OIR, CEE, CTE, and WCI, and sustainability or climate related working groups, will likely be engaged as co-facilitators of these workshops.

**Resources:** Staff capacity from the Sustainability Office will be provided through the Sustainability Curriculum Specialist to manage logistics of these workshops including booking rooms, organizing refreshments, and sharing information about the workshops. Capacity from ASUs will be needed on a per-workshop basis as they lead and facilitate. A budget of \$1000 will be used to facilitate 5 workshops in the first year for logistics and food.

**Timeline:**

- Winter 2024 – Spring 2024: Partnerships with ASUs are discussed to identify opportunities for workshops and initial workshops are held
- Fall 2024 – Winter 2025: 2 workshops are held per term based on recommendations from faculty advisors, logistics for these are managed on an ongoing basis per workshop, a formal community of practice is established in coordination with these workshops.

### **8.1.3 Executive and Systems Support**

#### **Recommendation 7: Strengthen ongoing collaboration and relationship building between environmental sustainability curriculum and Indigenous Peoples.**

**Rationale:** In consultations, many faculty noted that the topics of environmental sustainability and Indigeneity similarly required reviewing and updating curriculum, centering values that may not currently be represented in the curriculum. Peer institutions have adopted similar or joint efforts to honour both environmental sustainability and Indigenous Knowledges in their curriculum with some success and others have expressed concerns that separated models have failed to meet goals. While this may step beyond the initial scope of this work, there is often a need and an opportunity for departments and programs to consider these topics carefully and in consideration of each other.

**Description:** There is a clear connection between campus Indigenization efforts and campus sustainability curriculum efforts. Reflected in this, there is a lot of thought and intentionality that needs to go into both initiatives, including on how they are connected and who needs to be involved. For this, there is a need for relationship building and making space for these conversations. This work is already underway and has been reflected to a lesser extent in some recommendations. However, it also needs to be an explicit priority to be part of work going forward in other areas and can be broadly applied to all recommendations. This relationship and connection building is the primary scope of the work for this recommendation in phase 2, and it is not entirely clear yet what this may look like. Additional actions and support, should it be appropriate, could include creating opportunities for broader relationship building and connection making on campus and engagement in pilot projects on paths to include Indigenous voices and Knowledges in curriculum as well.

**Lead:** Office of Indigenous Relations, Indigenous Knowledges and Anti-Racism team within the Centre for Teaching Excellence, and the Sustainability Office

**Engaged:** Indigenous colleagues on campus as well as colleagues working in sustainability, land restoration, and curriculum development will be engaged in this relationship and connection building.

**Resources:** Staff capacity will be needed for leads to support this relationship building and initiatives related to other recommendations. Other colleagues on campus will engage as they have interest and capacity.

**Timeline:**

- Spring 2024: Advisory group is formed with Indigenous representation
- Spring 2024-onwards: Ongoing conversation between leads and other colleagues as appropriate on the connection between environmental sustainability and Indigenous Knowledges in the curriculum continue. Specific actions to emerge through discussions

**Recommendation 8: Consider formal and informal incentives for faculty support of this work.**

**Rationale:** Motivators identified in the literature review included several opportunities that are beyond the scope of this project, such as reinforcement through performance reviews, senior recognition, and cultural changes (Leal Filho et al., 2015) (Ralph et al., 2014). Similarly, many consultations on campus identified the need for incentives for sustainability integration to be consistent with existing formal and informal incentives for faculty. Many believed that the rewards need to be consistent and integrated to provide clear messaging and genuinely motivate. These recommendations in the literature review and consultations will need more extensive review and support.

**Description:** There is no specific scope of work proposed to proceed with through Phase 2 of this project, as it is acknowledged that there are many ongoing conversations and processes underway that are already exploring how to better align faculty recognition with many types of institutional initiatives and priorities. However, the intent here is to flag that this is a widely communicated barrier that was raised during consultations, and integration of sustainability may be another consideration that would inform those alignment efforts. Potential support, should it be warranted or valued, could be in communicating the findings from the consultation processes and ongoing implementation efforts to appropriate bodies, if desired.

**Lead:** TBC

**Engaged:** TBC

**Resources:** Budget and capacity support may be needed depending on process.

**Timeline:**

- 2024: A process to review formal and informal incentives for support should be identified
- 2024 – 2025: Initial commitments and structure for this review are established

**Recommendation 9: Identify opportunities to pilot interdisciplinary sharing of resources beyond course-level funding units.**

**Rationale:** As noted in the literature review best practices, sustainability is highly interdisciplinary and best sustainability curriculum integration will include perspectives across campus and culture shifts to support other ways of knowing, doing, and being. Lack of expertise on sustainability within departments, either broadly or on specific topics, was identified as a barrier both in the literature review and in consultations. Consultations, however, identified many groups across campus with sustainability expertise that could be well-suited to support interdisciplinary collaborations. Mechanisms for interdisciplinarity can potentially leverage this expertise and existing resources to provide strong sustainability curriculum in a broader range of disciplines. Further, beyond individual faculties and disciplines is another way of knowing, doing, and being that needs to be respected. This requires different systems of learning including relational learning.

**Description:** Mechanisms for sharing resources effectively across disciplines and departments will be identified by the advisory committee and implemented in phase 2. Additionally, the advisory committee in phase 2 will identify ways to remove administrative barriers, such as

sharing partial course credit or incentivizing guest lectures and module creation. There are numerous good examples at the individual course scale that can be reflected on, including cognitive science and the wicked problems courses. Opportunities identified throughout consultations with faculty included development of pre-built course content modules (e.g., slides, factsheets, reading lists, etc.) that could be shared campus-wide with interested programs/courses, funding mechanisms at finer resolution than courses to support guest-lecturers and interdisciplinary teaching methods, and coordination between classes on interdisciplinary assignments. Project partners have also identified a need to reflect on resources and structures to support other ways of knowing, doing, and being in curriculum, particularly as it relates to sustainability. Workshops and communities of practice will be reflected on as potential avenues to share resources. These highly commensurate with recommendations developed through the 2020 final report of the Interdisciplinary Task Force for the 2020-25 Strategic Plan and could help overcome noted barriers by leveraging collective strengths.

**Lead:** TBC

**Engaged:** Teaching Fellows and sustainability curriculum champions (potential leads), OIR, Teaching Innovation Incubator, several ASUs across campus, faculty members from all faculties, and student representatives will be engaged in a Working Group.

**Resources:** Staff capacity from various groups on campus on an ad-hoc basis will be used to pilot initiatives. Additional budget or capacity to support pilot projects may be needed depending on recommendations, however there is an overall goal to share resources and reduce resource needs.

**Timeline:**

- Spring 2024: Advisory group identifies potential methods of resource sharing
- Fall 2024 – Winter 2025: Initial pilots of recommended methods

**Recommendation 10: Identify opportunities to increase the profile of and reinforce action toward sustainability curriculum integration.**

**Rationale:** In consultations, many faculty identified that they did not feel sustainability was a priority to their department or to the University and many others felt they struggled with competing institutional priorities. This contrasts with previous communications from senior administrators claiming a climate emergency and stating that sustainability is part of every employee's job. Clear communication will likely help address this if done intentionally. Clear senior communication is also identified as a motivator and a powerful resource in the literature review and in the peer scan, as it sends a clear signal of priority to all faculty.

**Description:** The advisory group in phase 2 will recommend some methods to increase the profile of this work within the university, to be piloted in the 2024/2025 academic calendar year. This may include promotion or recognition of pilot projects, representation from the President or the Provost at events for the Community of Practice, promotion of connections to institutional and faculty/department strategic plans, regular updates within governance bodies such as Senate and Council of Academic Leaders, or formal communications from Central Communications.

**Lead:** TBC

**Engaged:** Central Communications, the Sustainability Office, and senior administration will all be engaged to demonstrate the value of this work to the University.

**Resources:** Some capacity will be needed from Central Communications, senior administration, and the Sustainability Office to develop and deliver on strategies.

Timeline:

- Spring 2024: Advisory group determines best methods to increase the profile of this work with recommendations
- Fall 2024 – Winter 2025: recommended methods actions on

**Recommendation 11: Improve ways to identify existing sustainability-related course content.**

**Rationale:** Many peer institutions have a record of sustainability-related courses that students can review to select sustainability courses related to their discipline. For example, at Western University, this was deeply integrated into their course registration process with great success and UBC has a standalone list of courses related to sustainability and climate change, which can be added to by instructors. Similarly, feedback from consultations with faculty at the University of Waterloo identified a need for faculty to identify their own sustainability content in their discipline, and a need for this to be easily done within systems faculty members already use.

**Description:** The Sustainability Office and Registrar’s Office will determine potential mechanisms to identify sustainability-related course content, such as within the academic calendar, using outline, or curating a standalone list of sustainability-related courses. They will meet with appropriate groups on campus to identify what could be feasible and how these solutions would be received. The representatives from the Sustainability Office and the Registrar’s Office will then select mechanisms to pursue and will work with appropriate stakeholders to develop capabilities for these mechanisms.

**Lead:** Registrar’s Office, Sustainability Office, Outline tool administrative team

**Engaged:** Faculty members will be engaged in consultations and training of new systems. Other key stakeholders on campus such as Indigenous Relations and the Office of Equity, Diversity, Inclusion and Anti-racism may also be engaged for similar initiatives.

**Resources:** Staff capacity will be provided from the Sustainability Office and will be required from senior managers in the Registrar’s Office overlooking the course calendar and course registration. Additionally, staff capacity will be needed to update systems.

**Timeline:**

- Spring 2024: Initial meetings take place and key stakeholders are consulted
- Fall 2024: Infrastructure for a solution is developed
- Winter 2025: Initial pilots of solutions are tested, recommendations for further development are made after consulting with key stakeholders involved

**8.2 Next Steps**

Following the original project proposal, some recommendations are already committed to and will be supported throughout phase 2 of the project from March 2024-March 2025. This includes the recommendations 1 and 2, the development of a toolkit of resources and identifying and building a support structure for this work. Recommendation 5 has also been committed, to develop an ongoing community of practice to support this work. Additionally, pilot projects will take place throughout phase 2 to test the resources and supports to identify opportunities for improvement and resources needed to support this work in the long term.

Next steps for these committed recommendations are identified in Table 4.

*Table 4: Next steps for committed recommendations*

- |                    |   |
|--------------------|---|
| <b>Winter 2024</b> | <ul style="list-style-type: none"> <li>• <b>Framework UX testing and Beta testing</b></li> <li>• <b>Resource curation</b></li> <li>• <b>Meeting with ASUs to confirm support</b></li> </ul> |
|--------------------|---|

<b>Spring 2024</b>	<ul style="list-style-type: none"> <li>• Official launch of the toolkit</li> <li>• Events to generate community and interest in a community of practice</li> </ul>
<b>Fall 2024</b>	<ul style="list-style-type: none"> <li>• Official establishment of community of practice</li> </ul>
<b>Ongoing</b>	<ul style="list-style-type: none"> <li>• Maintenance and curation of the toolkit</li> </ul>
<b>Spring 2024 - Winter 2025</b>	<ul style="list-style-type: none"> <li>• Management of support requests to faculty</li> </ul>

Other next steps will be dependent on the recommendations that are adopted. Thus, next steps for these recommendations are to meet with appropriate groups on campus to share this final report, the findings of phase 1, and generate support for recommendations in phase 2. Once there are clear decisions on these recommendations, the Working Group will be able to identify clear next steps for these recommendations.

To reduce redundancies and create an integrated approach to this work, another next step is to coordinate with other units on campus working on integrating sustainability. Throughout consultations it became abundantly clear that there are many different groups working on integrating sustainability, currently in siloes. In alignment with project goals to create coordinated efforts, next steps are to continue connecting with these groups to identify opportunities for information sharing and coordinated efforts.

### **8.3 Success Factors**

Referring to initial success factors, the Working Group has identified all but one as continuing to be relevant for phase 1. The one that is no longer relevant is the development of a framework, as it has already been completed. The Working Group identified two additional goals for phase 2 to implement the framework and resources developed in phase 1. The full list of success factors for phase 2 of the project is listed below.

1. Improve coordination across campus regarding sustainability curriculum collaborations.
2. Increase interest in and commitment to sustainability/climate integration across the undergrad curriculum.
3. Develop supportive resources for implementation.
4. Identify pilot projects to use the flexible framework developed in phase 1.
  - a. Support pilot projects in this process.
5. Identify and develop/share resources to implement sustainability in the curriculum.

## 9. Appendices

### 9.1 Project Working Group Membership

<b>Role</b>	<b>Name</b>	<b>Title</b>
<b>Chair</b>	Mathew Thijssen	Director of Sustainability
<b>Teaching Innovation Incubator Representative</b>	Kyle Scholz	Interim Managing Director, Teaching Innovation Incubator
<b>Associate Dean, Undergraduate Studies, Faculty of Environment</b>	Johanna Wandel	Associate Dean, Undergraduate Studies, Faculty of Environment
<b>Program Director</b>	Laura Deakin	Associate Dean of Science for Teaching and Learning
<b>Faculty Administrative Representative</b>	Kirsten Muller	Department Chair, Biology, Faculty of Science
<b>Faculty Administrative Representative</b>	Diane Williams	School of Public Health Sciences Associate Director, Undergraduate Studies, Faculty of Health
<b>Faculty Administrative Representative</b>	Derek Rayside	Associate Dean, Co-operative Education & Professional Affairs, Faculty of Engineering
<b>Faculty Administrative Representative</b>	David Ha	MAcc Co-Director, School of Accounting and Finance, Faculty of Arts
<b>Faculty Representative</b>	Christine Barbeau	Associate Dean, Teaching; Faculty of Environment Teaching Fellow
<b>Faculty Representative</b>	Michael Waite	Professor, Applied Mathematics, Faculty of Math
<b>Faculty Representative</b>	Nadine Ibrahim	Lecturer, Turkstra Chair in Urban Engineering, Civil and Environmental Engineering, Faculty of Engineering
<b>Centre for Teaching Excellence Representative</b>	Julia Burke	Faculty Liaison: Environment; Accounting & Finance; Political Science; Economics
<b>Co-operative and Experiential Education Representative</b>	Shabnam Ivkovic	Director, International Strategic Initiatives
<b>WUSA Appointee</b>	Katie Traynor	WUSA Vice President
<b>Student Representative</b>	Maya Morton Ninomiya	Student, Faculty of Health
<b>Student Representative</b>	Frances Hallen	Student, Faculty of Engineering
<b>Student Representative</b>	Yangchen Zhou	Student, Faculty of Math
<b>Student Representative</b>	Ceileigh McAllister	Student, Faculty of Environment
<b>Sustainability Curriculum Specialist</b>	Abigail Loewen	Sustainability Curriculum Specialist, Sustainability Office

## 9.2 Project Working Group Terms of Reference

### 1. PURPOSE

The Working Group on Integrating Sustainability in Undergrad Programs (the “Working Group”) will provide support and guidance overseeing the “Integrating Sustainability and Climate Change in Undergraduate Programs” project, which has been approved through the Beta Teaching Innovation Incubator throughout 2023/24.

### 2. MANDATE

Specifically, the Working Group will, individually and collectively:

- i. Review materials provided by Project Team members and core staff, providing comment and feedback,
- ii. Provide insight from respective constituencies to better understand opportunities and barriers related to project objectives,
- iii. Support Project Team members where necessary, with specific deliverables such as data collection, facilitate introduction and connections to other relevant stakeholders as may emerge over the course of the project, and conduct individual analysis relevant to their positions,
- iv. Design and promote broader consultation sessions and outreach activities to the University community,
- v. Decide upon recommendations and outcomes that can be brought forward to various institutional governance bodies for approval as part of interim and final reports.

For clarity, it is recognized that the Working Group is advisory in nature and it does not have decision-making authority on matters pertaining to curriculum development.

Recommendations would be brought forward through all normal curriculum development and approval processes and bodies.

### 3. MEMBERSHIP

Membership of the Working Group should be representative and inclusive, wherever possible, while still maintaining a reasonable size to support logistical coordination and streamlined discussions:

- i. Director of Sustainability (Project Team member)
- ii. Associate Dean, Undergraduate Studies, Faculty of Environment (Project Team member)
- iii. Beta TII representative, (Project Team member)
- iv. Sustainability Curriculum Specialist (Project Team Member)
- v. One additional ADU, Program Director, or Department Chair (Project Team Member)
- vi. Two to three additional faculty administrative representatives, including ADUs, Program Directors, or Departmental Chairs, preferably from a variety of academic disciplines
- vii. Two to three instructors, preferably from a variety of academic disciplines
- viii. Up to four undergraduate student representatives
- ix. One representative from Cooperative Education (*ex officio*)
- x. One representative from the Waterloo Undergraduate Student Association (*ex officio*)
- xi. One representative from the Centre for Teaching Excellence (*ex officio*)

All members shall serve in an ex-officio or voluntary capacity, except for undergraduate students listed under 2.viii, who shall also be eligible for an honorarium in recognition of their support and time.

Members for 2.vi, 2.vii, and 2.viii shall be decided upon by the Project Team, based on an open call for interest in participation. Effort will be made within these decisions to balance representation across academic disciplines and to include a diversity of perspectives.

#### 4. PROJECT TEAM

Members of the project team, as noted in Section 3, will participate as members of the Working Group but be responsible for more direct implementation and day-to-day support of project management. This shall include but is not limited to:

- Creating Working Group agendas and minutes
- Logistically supporting workshops, events, and other outreach and engagement efforts
- Collecting and analysing data and conducting research
- Drafting, soliciting feedback on, and iteratively revising core project deliverables, such as interim and final reports

In practice, it is expected that the Sustainability Curriculum Specialist would support much of this work, with guidance from other members of the Project Team.

#### 5. REPORTING AND ACCOUNTABILITY

As the project is supported through the Beta TII, the Working Group's recommendations shall be provided to the AVP Academic. A termly report of the Working Group's activities will be presented to the AVPA.

Recognizing the collaborative nature of the project, it is understood that Working Group activities and draft/final deliverables may also be shared with other groups and committees across campus, for feedback, input, and potential review. This could include but is not limited to the President's Advisory Committee on Environmental Sustainability, Senate Undergrad, and other bodies as appropriate.

#### 6. DECISION-MAKING

As the project develops, it is understood that the Working Group may need to make decisions from time to time, including on both procedural (project logistics, consultations, etc.) as well as substantive matters (recommendations, directions).

Wherever possible, the Working Group will attempt to operate on a consensus basis. Where this is not possible, decisions will be made by a vote, with a simple majority to be the basis of decision-making. Final recommendations may note accordingly where there are differences of opinion, should they emerge.

#### 7. MEETINGS

As the project is proposed to be completed throughout 2023, it is expected that the Working Group will be required to meet several times in order to deliver on its mandate. It is proposed that the meetings are, roughly every 4-6 weeks from May through November 2023. Specific dates will be scheduled in early 2023 as the workplan is finalized.



Members of the Working Group should expect approximately 1-2 hours per meeting, plus 1-2 hours for review of any pre-circulated materials, research, reports, etc.

Quorum for meetings shall be at least 50%+1 of Working Group membership.

Agenda packages for meetings will be distributed 5 business days in advance, and meeting minutes posted no later than 10 business days after the meeting.

### **9.3 Consultation Questions**

#### Existing Sustainability-Related Curriculum

1. Do your programs have overall learning outcomes or other requirements that specifically address sustainability?
  - a. What are these requirements?
  - b. What is the student response/engagement with these?
  - c. Do you have any feedback on these requirements from students or faculty? If yes, is this something you can share?
  - d. What have you seen the outcome of these to be?
2. Do your programs have components of courses that address sustainability?
  - a. If so which courses and what components?
  - b. What are the outcomes of these?
3. How do faculty engage with efforts to integrate sustainability in courses and programs? Have there been faculty conversations, support, or pushback on efforts?

#### Opportunities and Barriers

1. What sustainability-related skills or knowledge does a graduate from your discipline need, or would help them succeed?
2. What are the barriers that you can foresee that would hold back integration of sustainability?
3. What would you like to see for sustainability integrated in your curriculum? What would the ideal be for you?
4. What do you think would work well to integrate sustainability in your curriculum?
5. What might stop someone from using these available resources?

#### Feedback on a Potential Framework

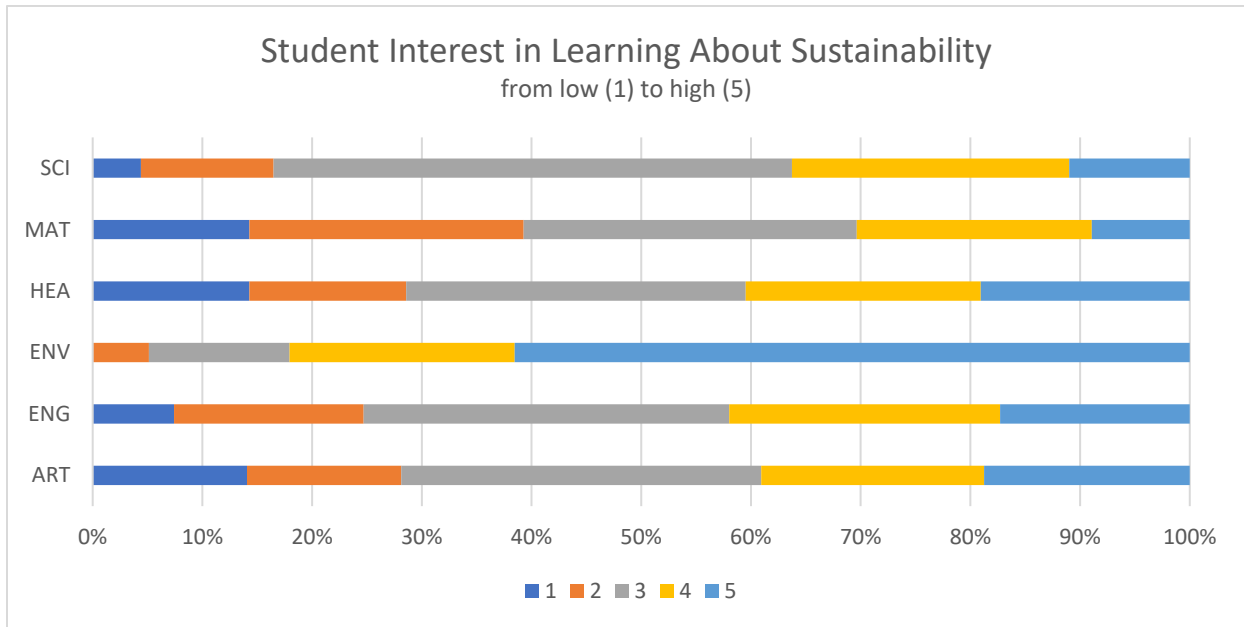
1. What resources or tools would be useful to integrate sustainability across your programs? (blue sky)
  - a. If some prompts are useful, some tools to consider could be community of practice, prepared modules ready to be implemented, example course outlines, lesson plans, sustainability case studies, etc.
2. Reflecting on the preliminary framework that has been developed by the Working Group, what parts resonate with you and your department? What needs to be changed?
  - a. What aspects could you see being adopted or used in your discipline? What could we do to help encourage that?
3. There are some tools we have already identified in the framework, which of them would be helpful to you and are there other ones we should add?
  - a. What would make these easier to use or implement?

#### Barriers and Opportunities Related to Specific Tools

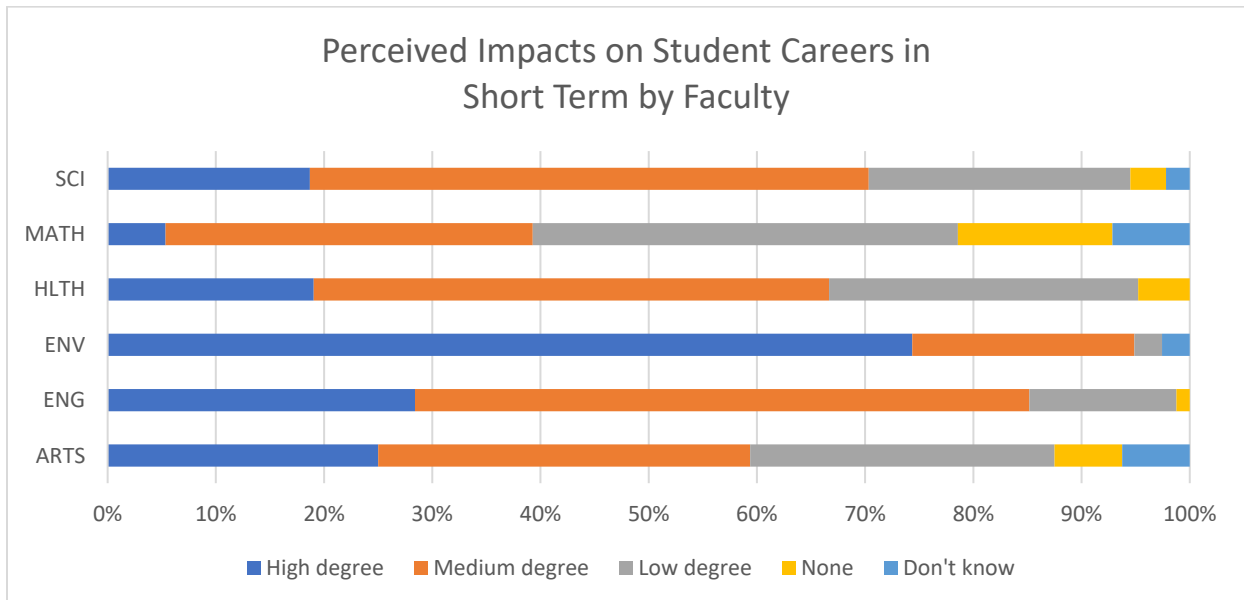
1. What barriers, if any, exist in being able to use these tools?

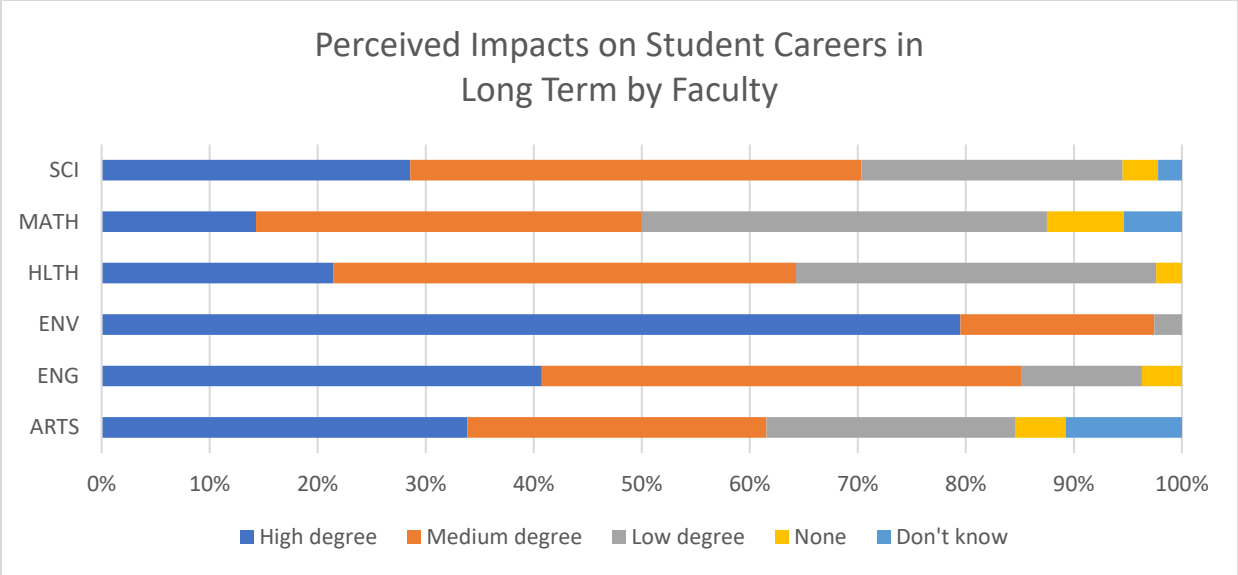
- Are there any other opportunities or approaches we haven't discussed that you think could improve integration of sustainability across your program?

### 9.4 Student Interest by Faculty

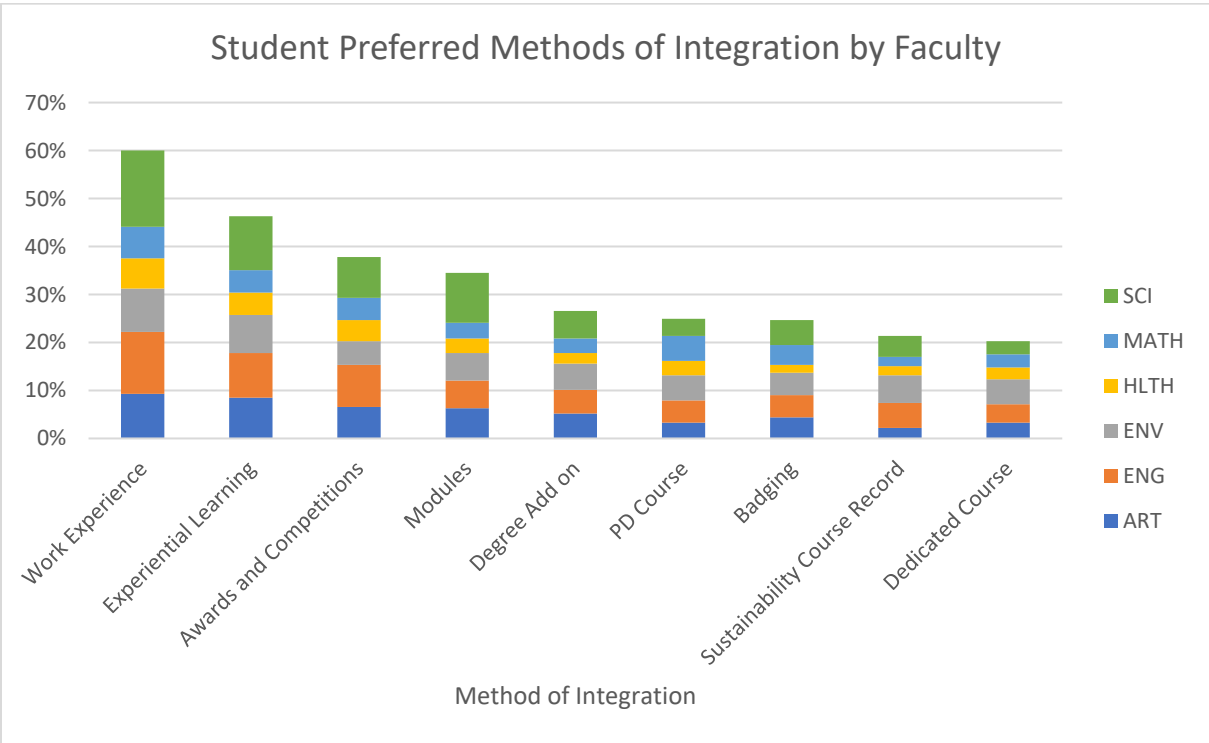


### 9.5 Perceived Career Impacts by Faculty





### 9.6 Preferred Methods of Integration by Faculty



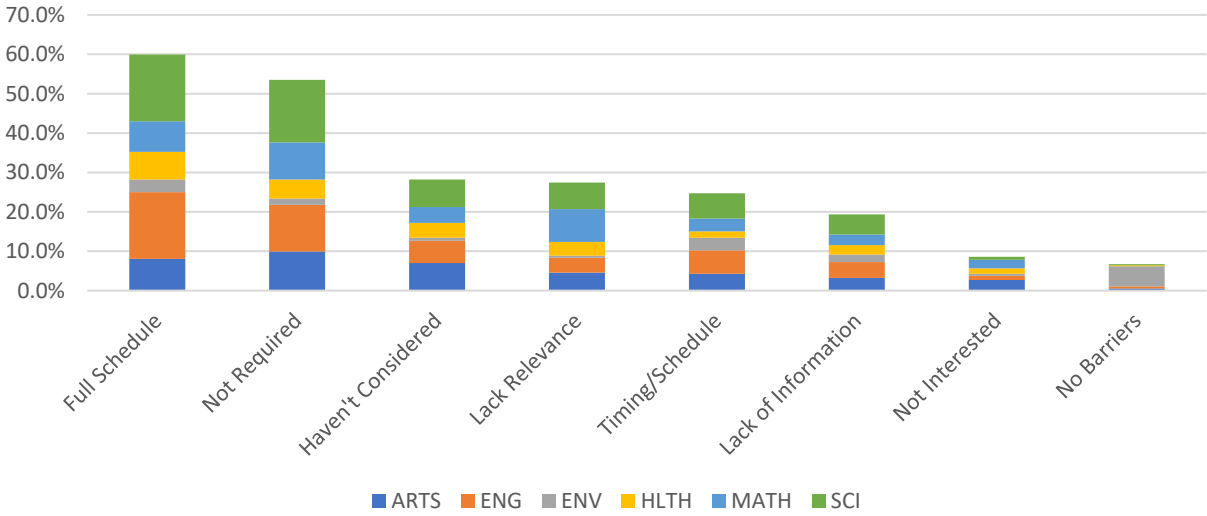
Methods of integration as described in the survey:

1. Work Experience – Opportunities to include sustainability concepts in co-op and other work placements.
2. Experiential Learning in Courses – Opportunities to engage in applied projects, with real world problems. I.e., Using concepts/skills from a course toward a sustainability issue.

3. Awards and Competitions – Sustainability awards for leading projects that have opted to use a sustainability as a focus.
4. Modules in Course(s) – Within existing course(s) in your discipline, sustainability topics are discussed and included in the content and/or problems and assignments.
5. Sustainability Certificate/Degree Add-on – Within your studies, a series of courses concentrating on sustainability, to earn a sustainability credential.
6. PD Course on Sustainability – A professional development course that covers basics of sustainability, impacts to industry, and potential impacts to career.
7. Badging – Formal or informal recognition for sustainability curricular and/or extra-curricular experiences.
8. Sustainability Courses Record – A list of courses that contain sustainability content for student reference when selecting courses and electives.
9. Dedicated Sustainability Course(s) – Within your program, a required course that covers sustainability and related topics to your discipline of study.

### **9.7 Barriers Experienced by Faculty**

### Barriers Experienced for Sustainability Courses



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