



# ABSTRACTS

## EDUCATION WITH SUSTAINABILITY

15-17 AUG 2022



Coláiste  
Teicneolaíochta  
an Árainnigh  
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## **Complexity, Challenge and Creativity: Teaching Sustainability Concepts in a Virtual International Exchange Project.**

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**Abstract:** Sustainability is a global responsibility. Teaching sustainability is not a linear exchange but rather an immersive process that should challenge and energise students’ thinking. Virtual International Exchange (VIE) is a pioneering pedagogy that embeds an international experience into a planned curriculum. Collaborative Online International Learning (COIL) projects are an example of VIE. Through COIL partnerships, students work in teams to achieve goals and build intercultural awareness and communication skills. This paper illustrates impacts from an action research study of a COIL project, Operation Brent. Operation Brent created a curriculum opportunity through which students based in Georgian College, Ontario and IT Sligo collaboratively explored sustainability concepts. The project facilitated interaction and engagement with the students working across international locations, using digital technology to cocreate solutions to an exciting real-world business challenge. The challenge centred on building awareness and designing solutions that supported implementation of UN Sustainable Development Goals for an international food manufacturer who also operated between Ontario and Sligo. The project brief encouraged students to actively explore sustainability before then selecting one of the goals as the primary focus of their project.

Snapshots from the journey, will showcase how participants gained:

- An Appreciation of different perspectives on sustainability through identifying similarities and differences in cultural, political, and social perspectives.
- Development of cultural self-awareness through reflecting on experience and from articulating insights.
- Practice of intercultural communication by negotiating and collaborating to produce shared project outcomes.
- Recognition of the carbon offset generated by the planting of trees on each campus.

The paper will conclude with key recommendations for faculty considering embedding sustainability concepts into a COIL project into their programmes. Recommendations include the impact of designing a learning space that promotes discourse, encouraging students to voice beliefs and attitudes in order to explicate behaviours that underpin active global citizenship.

**Keywords:** teaching sustainability, internationalisation

## Using a Dynamic Pan-Disciplinary Framework and Open-Source Resources to Integrate the Sustainable Development Goals into Your Curriculum

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**Abstract:** Higher education plays a major role in contributing to the UN Sustainable Development Goals (SDGs) by preparing lifelong learners for the challenges of the 21st century. Integration of SDGs across university curricula appears compartmentalised or approached through informal and hidden curriculum while often lacking a transdisciplinary perspective. University College Cork (UCC) is systematically and explicitly integrating sustainability across its curricula in response to Priority 1 of its [Academic Strategy](#), the Connected Curriculum. This involves not just transmitting knowledge about sustainability, but cultivating the mindset required for teaching staff to guide and equip students to address the critical challenges and develop competencies underpinning sustainable development. By embedding Education for Sustainable Development (ESD) into formal curriculum, we aim to provide equal student access and foster the development of globally minded and action-oriented citizens who are empowered to develop innovative solutions for a sustainable future. We also aim to futureproof curriculum for accreditation bodies such as Engineers Ireland who are increasingly looking for evidence of students attaining these competences.

This workshop showcases a dynamic framework highlighting where spaces exist in curricula to integrate SDGs by focusing on action-oriented outcomes. Participants will unpack the [SDG toolkit](#) which sits under this framework and consider the potential implementation of the teaching resources in their educational context which was co-created with staff, students and outside stakeholders. This 2-hour skills training workshop will commence with an overview of the SDGs and consider their broad scope and interconnected nature. Next, we will utilise a mapping technique to frame your discipline, programme, module or learning unit with corresponding SDGs targets. Finally, participate in a transdisciplinary exercise to address a cross-cutting societal challenge (e.g., climate change) in the context of your bio-region, nation or local community. This workshop is aimed at all teaching staff regardless of discipline or previous levels of engagement with ESD.

## **Integration of the Sustainable Development Goals in Ocean Science**

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**Abstract:** As our global population continues to grow, oceans and marine resources are under increasing pressure from multiple activities. Wide-ranging issues such as unsustainable fishing, marine pollution, and ocean acidification present complex challenges. The Sustainable Development Goals (SDGs) set tangible targets and measurable indicators to stimulate action to mitigate and manage these increasing anthropogenic effects. Within Higher Education, Education for Sustainable Development (ESD) can foster important knowledge and key skills to address declining ocean health. A suite of methods and tools are needed to help integrate the SDGs into research and teaching to support disciplines such as ocean science. In order to better understand how the three pillars of sustainable development (Economic, Social and Environmental) can be better integrated in ocean science education, we performed a systematic literature review and mapped the curriculum of several Master of Science fundamental ocean science courses to the SDGs. From the results obtained we highlight current biases in addressing sustainable development in ocean science education and we discuss opportunities for increased incorporation of ESD in such courses. We believe a framework for the inclusion of the SDGs in ocean science education will offer an opportunity to contribute substantially to global efforts towards a healthier ocean and planet.

**Keywords:** ocean sciences, curriculum, SDG Mapping tools

## **Sustainability in Higher Education for Information Technology and Computer Science – a review of the approach at the Hogeschool van Amsterdam**

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**Abstract:** Higher education institutions have a double duty with regard to sustainability. They should instruct their students whilst also being an exemplar of sustainability practices. Directly addressing the subject of sustainability in every curriculum is not practical, possibly not appropriate and, in some subjects, perhaps not even possible. What approach can be taken when teaching computer science subjects such as algorithms and data structures, programming and more “multi-disciplinary” subjects such as software engineering? In the ICT department at the Hogeschool van Amsterdam (HvA) there is a clear effort to be an exemplar of sustainable practices, particularly with regard to information technology itself. There is less of a clear approach to the inclusion of sustainable practices in the curriculum but there are signs of progress being made. This presentation will cover the approaches at HvA and include some of the thinking and research on integrating sustainability related pedagogy into numerate disciplines such as programming.

**Keywords** sustainability, computer science, numerate disciplines, software engineering

## **The SDGs and micro-credentials, hand in glove?**

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**Abstract:** The sustainable development goal (SDG) framework places education in a central role as a catalyst for transformational change. The SDG agenda calls for a multidisciplinary approach to interpreting and responding to the myriad challenges presented by climate change and the mammoth task of creating a just and equitable society for all to enjoy and prosper.

Third level institutions have an important role to play as recognised drivers of global, national, and local innovation, economic development, and societal wellbeing.

Micro-credentials offer a flexible and accessible alternative for learners to undertake short accredited programmes of study and was considered an ideal vehicle for the development of a suite of non-discipline specific SDG related modules and programmes.

To this end a multi-disciplinary team was formed in the ATU to design a suite of SDG related micro-credential modules that focusses on the regional application and implementation of the SDGs.

The team created a level-6 20 credit Special Purpose Award (SPA) made up of 4 x 5 credit modules around the themes of partnership, people, planet and prosperity. The delivery mode is online and primarily asynchronous, but also includes direct engagement with teaching staff for assessment feedback and as such can be considered to have an element of blended/synchronous delivery. The programme focusses on the use of RLOs (reusable-learning-objects) and the content and delivery design considers the principles of universal design for learning (UDL).

The programme and the modules are designed to be available to all students and staff in ATU who want to understand what they are, why they are important and how to achieve them.

The course will appeal to those seeking to adapt their thinking on their personal stake in supporting the SDG framework in totality; and by doing such, further consider their professional practice to embed sustainable practices in their work.

**Keywords:** Sustainable Development Goals, SDGs, Micro-credentials, asynchronous, blended, Universal design for Learning UDL, accessibility.

## **Journeying through Visions of Utopia to a Zero Draft Treaty. Teaching ethical sustainability and law to postgraduate students.**

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**Abstract:** How did we move from philanthropy in the 19<sup>th</sup> century, to corporate social responsibility in the 20<sup>th</sup> century, and now to 'business sustainability and human rights' in the 21<sup>st</sup> century?

Translating ethical sustainability ideas into policy and legal concepts is complex and multifaceted. Today there is a sustainability convergences where different disciplines have sought to integrate highly specialised domains of knowledge. Communicating those distinct fields and disciplines in higher education means traversing ethics, law, social and environmental policy, in an ever more complex field concerned with ethical sustainability. In the field of law and sustainability policy, this includes traversing the historical journey from 19<sup>th</sup> century utopian visions of a better world through planned towns and cities, to the so-called "Zero Draft" of an international legal treaty to regulate transnational corporations and other business enterprises with respect to human rights. National policy and law, EU law, non-financial reporting, compliance law, and new human rights treaty initiatives, and UN policy and reports, all contributed to the journey that fall under the ever-expanding umbrella of sustainability. These challenges have also been disruptive to the commercial sector who now seek to keep ahead of the curve of new sustainability laws by embracing various forms of reporting and disclosures.

This paper seeks explore some of these various challenges and share pedagogical methods that traverse these multiple domains while making the discipline of sustainability policy and law both accessible and relevant. The focus is to communicate sustainability to future leaders in in the private and public sectors that is both pedagogically clear and transparent to the learner. The outcome is to ensure that the learner has critically engaged and interrogated key fields of knowledge in sustainability policy and law, which in turn will influence future public and commercial responses to future global sustainability.

**Sustainability in Mid Sweden University everyday life (HIMUV). Project design and preliminary results to date.**

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**Abstract:** The base of this presentation is the project Sustainability in Mid Sweden University everyday life (HIMUV). The aim of the project is to increase knowledge regarding sustainable development among all university employees and students. Thereby, the project aspires to provide the opportunity to contribute to Mid Sweden University becoming an important player in the work for increased knowledge regarding sustainable development. During the project period of June 2021-2023, work in progress will increase and strengthen the sustainability culture among the university's employees and students. However, to be able to work sustainably, employees and students must know how the University defines sustainability and how it can become a natural part of everyday work to contribute to sustainable development. Therefore, the project will map the knowledge sustainability work among the university's different professional categories and design training materials for employees and students and suggest procedures for its use. Deliverables and goals include suggestions regarding what employees and students should know about sustainability. A collection of examples that show how different functions and subjects at the university can incorporate sustainability in everyday life will be used to produce a digital education material for employees and students. In this presentation, the project work to date will be reported. Interviews, surveys and group meetings with employees in the area of sustainability will be presented as well as next steps in the project.

**Keywords:** Higher Education, Students, Sustainability, Teachers



## **My Green Lab certification for teaching laboratories (poster presentation)**

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**Abstract:** Science laboratories are a highly resource-intensive space, and a culture of sustainability is vital to ensure fewer resources are consumed. While this is true for all research and industry laboratories it is of heightened importance when it comes to teaching laboratories. In these learning environments future laboratory workers and managers are trained and influenced by the culture and practices in place. In this way the laboratory environment itself provides valuable opportunities for incorporating education for sustainable development at a key stage in training the future workforce. My Green Lab is a non-profit organisation bringing together laboratory workers from all disciplines and regions to improve sustainability in laboratory practices, both fundamentally and permanently. My Green Lab certification is recognised as an important measure by the United Nations Race to Zero campaign and provides the gold standard for best sustainable laboratory practices worldwide. The School of Science and Computing at ATU Galway has undertaken the certification process for all teaching laboratories during the past year. Here, we outline the process, including tasks completed to date. The smooth steps to more sustainable practices are highlighted, along with the larger and more challenging changes that would embed sustainability in laboratory activities. The My Green Lab certification process has led to the creation of a dedicated team of project leaders at ATU Galway, importantly including laboratory technicians. A communication campaign is currently under development with the aim of promoting education for sustainable development in all stages of planning and executing laboratory activities. Through the certification process it has been possible to implement important physical changes, as well as changes in mindset, both of which are already providing evidence for a long-term commitment to education for sustainable development. Increasingly sustainable laboratory practices provide a rich learning environment while also reducing resource consumption, a win-win scenario.

**Keywords:** science, waste, water, energy, community

## **An International Analysis Of Measuring And Reporting Tourism Emissions: A Case Study Of Irish Tourism**

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**Abstract:** Tourism contributes significantly to global emissions and climate change. However, it has continuously been excluded from national emission frameworks globally. The main climate change challenge that the tourism industry must confront is the radical need to decarbonise to progress towards a climate-neutral industry by 2050.

The purpose of this study was to identify the most appropriate method for measuring and reporting tourism emissions to establish the first baseline carbon footprint of a popular island-based tourist destination. This study conducted a comparative analysis of international studies that have measured and reported the carbon footprint of tourist destinations. The findings identified that the preeminent environmentally-extended input-output life-cycle analysis methodology for measuring emissions cannot be implemented internationally. This is due to the lack of tourist destinations having compiled the Tourism Satellite Accounts, because of the lack of available data and resources. The bottom-up methodology is recognised as a suitable starting point for most tourist destinations to measure emissions - as tourism activity data is typically gathered annually. However, some tourist destinations lack the comprehensive tourism data required, which hinders destinations from utilising any methodology to measure, monitor and report tourism emissions annually.

Consequently, this study contributes new knowledge to the tourism industry on the advantages, limitations and barriers of utilising each methodology to measure and report tourism emissions. In addition to this, a scientific and evidence-based solution to overcoming the absence of comprehensive tourism data is outlined to allow other destinations to replicate this study. Climate action must play a leading role in national tourism plans by measuring and reporting tourism emissions to develop evidence-based decarbonisation strategies for sustainable destination management. Unless the tourism industry provides evidence of decarbonisation it cannot be considered sustainable. Evidently, climate action requires the collaboration of the entire economy, and until now, this research has not been completed.

**Keywords:** Climate Action; Tourism Emissions; Carbon Footprint Methodologies; Sustainable Destination Management; Decarbonisation.

## **Sustainable Futures: Collaborative Education for a Low Carbon Future**

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**Abstract:** Under the Sustainable Futures theme, University College Cork, Maynooth University, and the Atlantic Technological University in Sligo, have developed a joint Postgraduate Certificate and MSc in Sustainability in Enterprise, funded by the Higher Education Authority's Human Capital Initiative, in recognition of the growing national and international market for graduates in sustainability. These part-time online programmes are open to graduates from Engineering, Science, Business, Management, Economics, Sustainability, and related disciplines. They are open to both recent graduates and those currently in employment.

Sustainable Futures is focused on climate action, environmental sustainability, and achieving net zero in industry and enterprise. It aims to empower leaders to act so that humans and nature can thrive for generations to come. Our community, collaborative environment and educational programmes will produce leaders who are equipped to lead the transition to a sustainable and net zero future. Sustainable Futures is committed to working closely with current and future enterprise partners to design and deliver climate action and sustainability in enterprise solutions and educational programmes.

The first cohort of students began their studies in Semester 1 2022 with the module 'Introduction to Sustainability & the Natural Environment'. The lecturer will share his experience of teaching and learning, and student engagement in the delivery of this module.

## **Creating spaces for cross-cutting concerns within higher education curricula: a framework for intervention.**

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The need for the transformation of society in addressing pressing and emerging challenges such as climate change requires a radical transformation of our systems of education to enable the development of competencies and capacities needed. Despite the urgency of these challenges however, significant barriers to change have been documented. The primary aim of this paper is to describe an implementation framework for integrating and embedding cross-cutting sustainability concerns across the higher educational curriculum. This framework builds on existing work in the fields of sustainability in higher education, sustainability transitions, responsible research and innovation and other related areas such as sustainability science. In particular it draws from existing sustainability and RRI competency frameworks as well as research on the drivers and barriers to embedding sustainability within higher education curricula. A key objective of the framework is to enable the integration of multiple perspectives on central issues, hence building skills needed for inter- and trans- disciplinary research. The contribution of this framework in providing opportunities to connect diverse groups and disciplines, structure the exploration of relevant challenges, deepen dialogue, and stimulate creativity in the context of uncertain futures will later be assessed through a pilot study.

**Keywords:** sustainability competencies, higher education, responsible research and innovation

## **A Call to Action: Overcoming Challenges & Seizing Opportunities to Integrate ESD into Third-Level Education in Ireland.**

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**Abstract:** Higher Education Institutes (HEIs) are key drivers for Education for Sustainable Development (ESD) and play an integral role in promoting active citizenship and positive societal transformation. This paper serves as a call to action to amalgamate ESD into the foundation of our third-level education system. Based on insights gathered from students and staff from Irish HEIs at online workshop sessions, this paper highlights the common challenges and opportunities related to the integration of ESD into third-level education. Participants will gain insights into the main obstacles facing ESD in Ireland. These include issues such as lack of skills and knowledge, time constraints, lack of allocated fundings and resources, and difficulties with engagement. It is by identifying these challenges that the principal opportunities in ESD can be recognised and acted on.

This paper highlights the importance of peer-to-peer learning and Continuing Professional Development for teaching staff when building sustainability competencies, the critical need to establish a sustainability standard for all HEIs in Ireland, and how the cultivation of collaborative links between institutions, staff, and students will help to achieve the shared vision of ESD. A whole systems perspective is essential if sustainability is to be integrated into our education system. This work is particularly relevant given the publication of Ireland's new National Strategy on Education for Sustainable Development this year. ESD can be a positive catalyst for change if the shared challenges and opportunities identified in this paper are acted on. Establishing an interdisciplinary and standardised ESD curriculum will empower our students and staff to become positive agents of change and help to enhance learning, teaching, and the overall academic experience in Irish HEIs.

**Keywords:** Education for Sustainable Development, Higher Education, Interdisciplinary, Active Citizenship.

## **How to make an online bootcamp super fun and exciting**

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**Abstract:** Ben has been running an online innovation bootcamp for the past 2 years together with HDM Stuttgart, HVA Amsterdam, and Ryerson Canada. In this session he will reveal all the best practices that make online teaching super fun and energising to the students. Ben will uncover the secrets of LEGO Serious Play, Google JamBoard, the power of music and last but not least... eyeball yoga.

## TWO-WAY ENGAGEMENT WITH STAKEHOLDERS TO IMPROVE BIOSECURITY AROUND INVASIVE ALIEN SPECIES IN THE WORKPLACE

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**Abstract:** Being an island means that Ireland's biodiversity is particularly vulnerable to the threat of invasive alien species (IAS). However, islands also offer greater opportunities for protection from IAS than individual states in a continental land mass. Promoting good biosecurity and a strong sense of biosecure citizenship must become a priority among the broad range of stakeholder groups who engage in risky behaviour for the spread of IAS.

Here we present a daylong workshop, part-funded by the ESAI Grassroots Workshop Support Scheme, took place at the Institute of Technology, Sligo. This workshop drew together a broad range of stakeholders, from state-sponsored competent authorities, to consultants, members of community groups and recreational water-users. The measurable outcomes from the workshop were a repeated survey, plus the collated outputs from an elicitation session. Rather than identifying any specific species, the emphasis for the workshop was on practicing good generic biosecurity. With a small amount of guidance towards reliable sources of information, participants reported an increased confidence in identification skills. The most significant change after the workshop was in participants' confidence in designing good biosecurity plans and carrying out effective biosecurity measures in the field. Of those who attended, 93.8% reported that their behaviour would change as a result of the workshop.

The facilitated elicitation process identified some of the existing obstacles to practicing good biosecurity in the workplace, drawn from participants' experience on the ground. During the elicitation process, extensive information was gathered in the form of a prioritised range of obstacles affecting participants' ability to engage in effective biosecurity, and a list of opportunities that these stakeholders perceived as open to promoting good biosecurity.

This information is now available to managers and policy-makers to inform future biosecurity measures on the island of Ireland, and is potentially transferrable to other jurisdictions.

**Keywords:** invasive species; biosecurity; stakeholder engagement

## **Combining Science And Art Creates Unique Opportunities In Education For Sustainable Development**

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**Abstract:** Recent reports investigating the ongoing climate and biodiversity crises have indicated nature's decline is 'unprecedented', species extinction rates are 'accelerating', 'transformative change' is required and it's 'now or never'. Quality education for sustainable development provides a powerful tool to drive action towards addressing the challenges we face. Awareness and knowledge of the effects of ongoing human activities on our ecosystems can influence societal values and attitudes to motivate responsible action towards a more sustainable future. Here, we have undertaken a transdisciplinary project bringing together education, science, art, and taxidermy to highlight the plight of a range of seabird species in the face of ongoing pressures. Our project addresses the three pillars of sustainability providing learning opportunities in environmental, economic, and social sustainability. For example, through the installations we have prepared, we highlight global issues such as climate change, biodiversity loss, food provision, waste management and sustainability in the built environment. We employ ethical taxidermy techniques making use of animal specimens found dead, and when carried out ethically, taxidermy provides a visually impactful, educational tool. Through this creative, innovative, and appealing artistic approach to taxidermy we have developed resources that convey vital messages of conservation and biodiversity protection, as well as social responsibility in protecting our natural heritage. These resources provide unique opportunities for developing a range of lessons to support education for sustainable development in both formal and informal learning environments. We provide an outline of the project tasks and timeline. We also share a case study of the use of the project in providing education for sustainable development in an informal learning environment during a recent museum exhibition.

**Keywords:** environment, biodiversity, climate, taxidermy



## **Inquiry-based learning in the local environment: curiosity, connection and action for sustainability.**

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**Abstract:** Understanding how best to educate for sustainability (EfS) must be a priority in this time of environmental crisis. Our young people will inherit profound environmental challenges, and our educators are tasked with preparing them to meet these challenges. The aim of EfS is to develop in the learner the knowledge, skills, values and attitudes enabling informed decision making and responsible action for environmental integrity. Thus, appropriate pedagogies are those that are participatory, value the voice and agency of the learner, value criticality and reflection, and leave space for creativity and imagination. A pedagogy of inquiry demands deep, critical thinking and constructs children and young people as active agents in their engagement with the world.

The value of direct experience of the local environment lies in its embracing of the messiness and complexity of the immediate locality rather than attempting to teach abstract concepts. Children's engagement with global issues of sustainability, such as climate change or biodiversity loss, may first be kindled through finding magic and wonder in their own local places, in the natural world that surrounds them.

Using examples drawn from across Marino Institute of Education's degree programmes, this paper will explore how inquiry learning in the local environment empowers young learners to be critical thinkers and advocates for environmental justice.