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# PROFESS 12



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## Project Report 3

# PROFESS 12 – Briefing Document for Co-creation Exercise

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0.0	8 <sup>th</sup> December 2022	Initial draft prepared for comment	UB		
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## Project title note:

PROFESS 12 is the acronym for “PROFessional skills for Engineering students - Summer School to achieve SDG 12”. The project aims to develop Professional Skills in Engineering Students through an innovative and inclusive Summer School designed to equip students with the intercultural skills necessary to meet the SDGs.

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## Executive Summary

This document was prepared as a guide for co-creation exercises which are carried out with students to help design the PROFESS 12 Summer School. The briefing document has been prepared with information on how the co-creation exercise (in the form of a 2 hour workshop) will be facilitated and also includes background material which can be issued to students to prepare them for the event.

## Summary of Overall Research Project

The main purpose of the PROFESS 12 (PROFessional skills for Engineering students - Summer School to achieve SDG 12) project is to build on the global research on skills requirements, to translate them to an Ireland-specific framework and to then design, trial and evaluate an innovative and inclusive Summer School to provide students with opportunities to develop these skills. The UNESCO (2017) framework, the Guidelines for the Design of Inclusive Engineering Programmes (Mills, Ayre and Gill, 2010) and the use of the “The Intercultural learning for Pupils and Teachers Toolbox” (<http://intercultural-learning.eu/>) will inspire the design of the School, which will be co-created with students from North and South with a focus on solutions for SDG 12 (Responsible Consumption and Production).

The project has **four objectives**:

- To identify and rank in order of importance, the professional skills that engineers will need to meet the SDG goals and Government commitments to 2030.
- To compare and contrast stakeholder views on the importance of specific professional skills so that we may learn from each other through our diverse experiences and gender differences.
- To co-create and test an innovative and inclusive Summer School to help students develop the skills necessary to meet SDG 12.
- To better understand each other’s cultural backgrounds and to build mutually beneficial sustainable relationships that capitalise on the intercultural synergies between researchers, academics and students, North and South.

The project consortium has two academic partners (TU Dublin and Ulster University) and the objectives will be achieved through several work packages which are summarised in Figure 1 along with the Project Outputs.

### Work Package 1: Literature Review and Professional Skills Survey

First, the research will identify engineering students, academics and employer’s perceptions of the professional skills that engineers North and South need to meet the SDGs (WP1). Focusing on the seminal work of Wiek et al., (2011) and UNESCO (2017) coupled with the previous work completed by the project partners in the A-STEP 2030 project, we will review the relevant literature and distil the findings to compile a list of professional skills requirements. We will be mindful of selecting literature from both genders to ensure an unbiased view. We will use this list to create a survey to gather the views of the key stakeholders (employers, academics and students) in engineering education (North and South) to help us to identify and rank the key skills required.

### Work Package 2: Key stakeholder perceptions on priority skills

WP 1 sets the scene for skills requirements on a global scale: WP2 turns our focus to the Island of Ireland. Using the results of the survey, we will compare and contrast stakeholder views based on the local context North and South, the discipline and stakeholder view and also the gender specific perception (WP2). The **key aim of this Work Package** is to learn from each other, hence a detailed analysis of the survey differentiated by key perspectives will help us better understand the perceptions of each group.

### Work Package 3: The PROFESS Summer School

WP3 will run in parallel with WP2 to meet the key milestones of the project and involves the design and trial of the PROFESS 12 Summer School. Based on the skills identified in WP1 and WP2, we will initially create a Briefing Document for the Summer School (R3 in M11).

The design of the PROFESS 12 Summer School will **be co-created with engineering students** from both Universities in two separate Multiplier Events (ME1 and ME2) in M13. We foresee these as a think tank where students will be encouraged to be creative and outrageous in their ideas surrounding the design of the Summer School.

The Summer School will take place **physically over five days** with a kick off session (in the border region, meeting half way) on 4<sup>th</sup> March 2023, to coincide with the World Engineering Day for Sustainable Development (Milestone). Students will undertake icebreaker activities, be introduced to the concepts of gender inclusivity, the SDGs, UDL, unconscious bias and the value in developing intercultural skills. We will then spend two days in the North and two days in the South and in addition to student centred classroom activities, we will include cultural trips and activities to help the students integrate.

### Work Package 4: Evaluation of the PROFESS Summer School

Finally, the impact of engaging students, researchers and academics in this Summer School will be evaluated in WP4. The evaluation has three aims. Firstly, through both qualitative (discussions) and quantitative measurements the effectiveness of the Summer School from the students' perspective can be assessed. Secondly, students will be asked to reflect on their experiences and to provide feed forward advice for the next iteration of the project on a European scale.

Thirdly, we also wish to acknowledge and reflect on the importance of an all-Ireland project such as this, as a way to help collaboration between researchers, academics and HEIs, North and South. Hence we will also investigate how effective the project was in enhancing relationships between researchers and academics and the HEIs involved through the use of a focus group between the researchers involved.

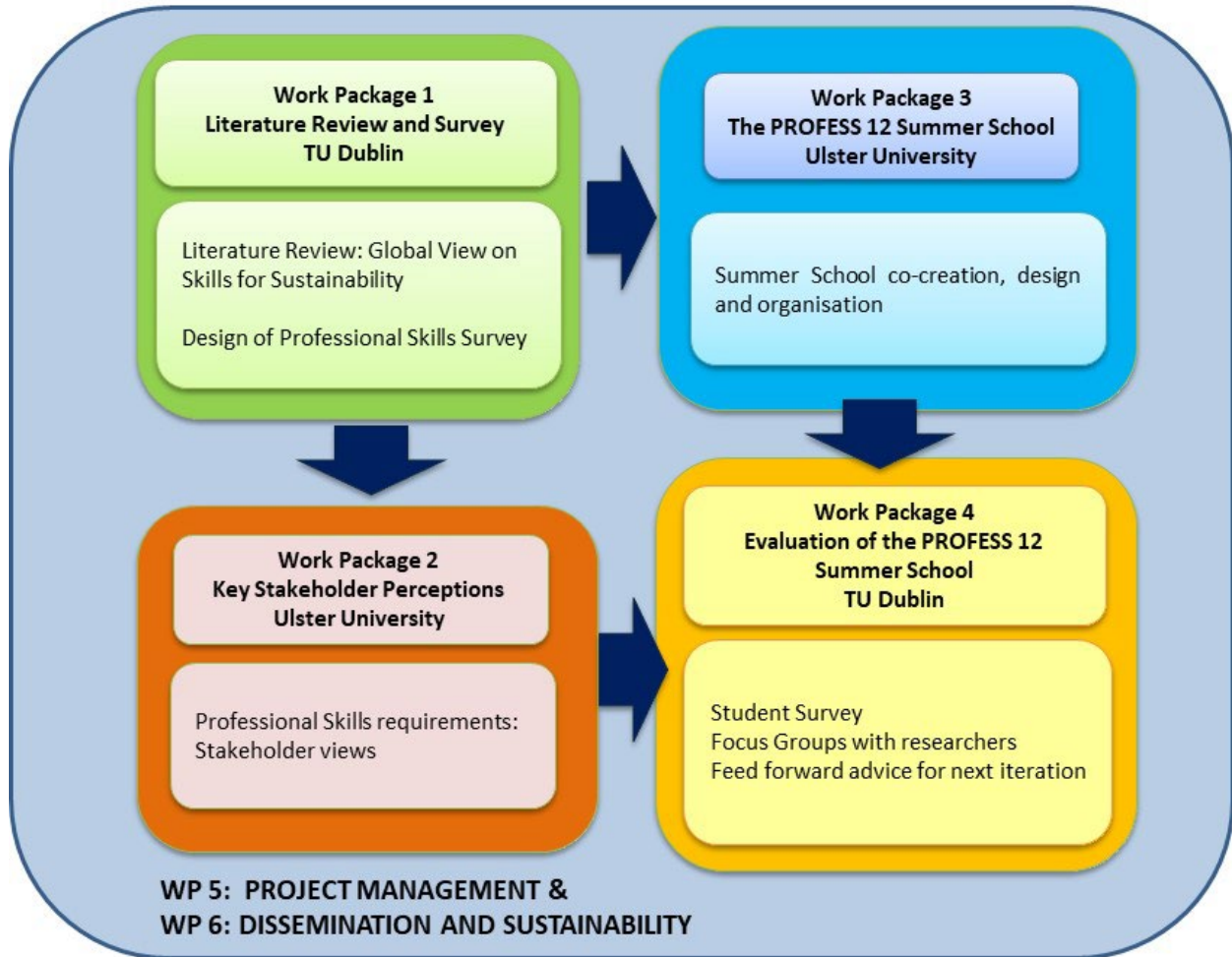


Figure 1: Work packages and Project Outputs in PROFESS 12

In addition to specific outputs from work packages, we also hope to achieve some additional outcomes such as an improved cultural awareness, better understanding of skills requirements in engineering, implementation of innovative teaching practices, promotion of co-creation of curriculum elements and a better appreciation for the role of gender in research planning, data collection, analysis and dissemination.

## Invitations to Participate

The co-creation exercise is intended to engage students and academics in the design of a Summer School to address two priorities:

- Developing competencies to achieve the SDGs, with a particular focus on SDG 12
- Improving awareness of the importance of intercultural skills

The Summer School will be residential and will take place over five days, including one launch day in March 2023, two days in Dublin on 29<sup>th</sup>-30<sup>th</sup> May followed by Belfast in 31<sup>st</sup>, 1<sup>st</sup> and 2<sup>nd</sup> June. It is planned that there will be ten students from Ulster University and ten students from TU Dublin participating in the Summer School.

Students were invited to participate in both the cocreation exercise and the summer school by circulation of an email which included an application form (Microsoft Forms). Applicants to the cocreation exercise were asked to complete the following questions:

- Name, Email Address, Course Enrolled in, Year of course, Gender.
- Applicants were also invited to respond to three questions:
  - What are your views on Sustainability?
  - Why do you want to participate in this summer school.
  - What qualities do you possess that would make this summer school a success?

The invitation to participate is included in Appendix A. In TU Dublin, we initially received very few applications for the co-creation exercise but 17 applications for the summer school. Summer school applicants were invited to attend the co-creation exercise with a follow up email and the final number of attendees was seven. The co-creation exercise took place in TU Dublin on Thursday 26<sup>th</sup> January 2023 and in Ulster University on February 10<sup>th</sup>. The email which was sent to students prior to the cocreation exercise is included in Appendix B.

## Overall Format of Workshop

The cocreation exercise was created in workshop format in order to gain information on four topics:

- What would students like to get out of the Summer School? (to inform the aim and learning outcomes of the summer school)
- What topics would students like to be covered in the Summer School? (to help focus the learning activities)
- How do students want to learn about these topics? (to inform the teaching pedagogies used)
- How do students want to show how they have met the objectives? (to inform the assessment criteria)

To begin, it was important to create an icebreaker to help students get to know each other and so the session started with lunch, an icebreaker and a case study to encourage students to work in groups and to set the scene and start the conversation about SDGs. The detailed format of the workshop is included in Table 1.



Table 1: Detailed format of co-creation workshop

Timing	Task	Activity Type
1.00pm 1.30pm	– Lunch (30 mins)	<p>Students and facilitators are invited to a light lunch and asked to introduce themselves to each other. (Depending on numbers, each participant could introduce themselves)</p> <p><b>Facilitator welcomes participants, introduces the concept of Sustainable Development and explains how the activity will proceed.</b></p> <p><b>Facilitator shows this video as intro to SDGs.</b>  <a href="https://www.youtube.com/watch?v=M-iJM02mHg&amp;t=14s">https://www.youtube.com/watch?v=M-iJM02mHg&amp;t=14s</a></p> <p>Circulate attendance sheet along with section asking for contact details – may also need consent form to be signed.</p>
1.30pm 2.00pm	– Icebreaker (30 mins)	<p>Students are broken into groups of 3-5 people and undertake an icebreaker activity. Options include: Marshmallow Challenge which requires teams to build the highest tower possible to support a marshmallow in 18 minutes using spaghetti, string and sellotape. More info: <a href="https://www.marshmallowchallenge.com/">https://www.marshmallowchallenge.com/</a></p> <p>People Bingo – students have to speak to each other to gain information to complete the Bingo template ( See Appendix C)</p>
2.00pm 2.15pm	– Case Study (15 mins)	<p>Each group is given a case study in relation to SDG 12 and asked to think about how they would go about solving this problem. (or what skills would they need)</p> <p>They are asked to brainstorm individually and write keywords on post its and to place them on a display wall/flipchart.</p> <p>Meanwhile the facilitators start to group the post its into themes on the wall.</p> <p>WE GIVE THEM ALL THE SAME CASE STUDY AS WE WON'T HAVE TIME TO EXPLAIN EACH (We take photos of this to use as data)</p>
2.15pm 2.25pm	– Facilitator feedback on Case Study (10 mins)	<p>The facilitator summarises the brainstorming activity by reading through the post its and reporting back to the whole group. The facilitator can also ask questions to get students thinking about other issues.</p>

		<ul style="list-style-type: none"> <li>• Who needs to be involved in solving this problem?</li> <li>• What skills do you need?</li> <li>• Where is the gap in your ability to solve this?</li> </ul> <p>The facilitators collect the post its and use this data for analysis.</p>
<b>2.30pm – 2.45pm</b>	– Aims for the Summer School (15 mins)	<p>The facilitator reminds students that we are going to design the Summer School to help develop the skills identified in the Case Study</p> <p>They now ask each group to brainstorm what should be the aims of the Summer School          “What do you want to get out of it?” or          “What do you want to see included in the Summer School?”</p> <p>Students write responses on a flipchart.</p> <p>(Facilitators collect these and use for data or to write the learning objectives)</p>
<b>2.45pm – 3.00pm</b>	– Facilitator feedback on Aims (15 mins)	<p>Facilitator now summarises the thoughts of those in the room using the responses on the flipcharts</p>
<b>5 min break for tea / coffee.</b>		
<b>3.00pm – 3.20pm</b>	Teaching pedagogies for Summer School (20 mins)	<p>Facilitator asks groups to think about “how” they want (or what is the best method) to learn about these things and mentions that we have some budget for guest speakers, site visits, tourist type visits, and so on in addition to what types of work they might like to do in the classroom.          (Problem Based learning, presentations, research etc)</p> <p>Groups write their responses on a flipchart.</p> <p>(Facilitators collect these and use for data)</p>
<b>3.20pm – 3.35pm</b>	– Facilitator summarises the “how” by reading through the flipcharts or VOTE or BOTH	<p>Another option is that whilst the students are writing these down, the facilitators summarise them on the board and then students are asked to “vote” on what they would prefer by placing a post it by it.          This would give us an idea of what to prioritise?</p> <p>(Facilitators take a photo of this)</p>
<b>3.35pm – 3.45pm</b>	– Assessment techniques	<p>The final question asked students to suggest “how” they might show how they have met the objectives.</p>

		We could do this by just asking them to call out suggestions and we write them on the board. In this way, one idea can bounce from another and it would be pretty quick.
<b>3.45 – 3.50pm</b>	Sum up	Facilitator sums up the cocreation exercise and lets students know that this information will be used to design the detail of the summer school.  Thank you.

## Data Collection

Facilitators will collect the written information provided in each session and will take notes on verbal suggestions / discussions provided by students. This data will be used to answer the following research questions:

- How do students perceive how the SDGs will be achieved?
- What skills do students perceive are needed to solve the SDGs?
- Who do students think need to be involved in solving the SDGs?
- Where do student perceive there is a gap in their ability to solve the SDGs?
- What teaching methods do students believe are best to learn about the SDGs?
- In what ways do students prefer to show that they have met learning objectives in relation to the SDGs?

## Materials needed for event

- Attendance Sheet for signature
- Room to be able to show video (or email it to students beforehand)
- Bag of spaghetti, bag of marshmallows, masking tape and string for Marshmallow challenge  
Instructions for Marshmallow Challenge (and playlist for 18 mins)  
People bingo printed out for each person if required.
- Case Study printed out for each person
- Post Its
- Flipcharts – 1 per group
- Markers to write response
- Envelopes to collect post its for each question
- Blank A4 paper and blu tack to put up options for voting if required.
- Stickers for name tags

## Ethical Approval

Ethical approval for the collection of data in relation to the exercise was obtained through TU Dublin REIC on behalf of the PROFESS 12 team (REIC-21-74). All data was anonymous and was collected by one researcher.

## Outcomes of co-creation event

The co-creation exercises were held on 26<sup>th</sup> January 2023 and 10<sup>th</sup> February 2023 and included a total of 19 students. The discussions and outcomes were used to design the intricacies of the PROFESS 12 Summer School, which is included in PROFESS 12: Report R4 – Design of Summer School.

## Acknowledgements

We would like to acknowledge the HEA, DFHERIS, The Shared Island Fund and the North South Research Programme for this project.

## Appendix A – Invitation email to students

Dear Students,

As you may be aware, we are organising a five day Summer School in May/June 2023 as part of the [PROFESS 12 project](#) which will focus on helping engineering students develop skills in order to achieve the Sustainable Development Goals. The Summer School will include ten engineering students from TU Dublin and ten engineering students from Ulster University spending two days in Dublin and three days in Belfast. The expenses for travel, meals and accommodation will be paid for by the project.

This email includes two application forms, one for a co-creation workshop to help design the Summer School and the second for the Summer School itself. We invite you to apply for both the co-creation exercise and the Summer School itself.

### **Cocreation Exercise.**

The co-creation exercise is a workshop with students and academics which aims to design the summer school. We want to include students in the design process and so you are invited to attend this workshop (with lunch) on **Thursday 26<sup>th</sup> January from 1pm – 4pm.**

Please apply for the cocreation exercise here:

**COCREATION EXERCISE APPLICATION**

### **Summer School**

The Summer School will take place over 6 days and you must be available to attend on all six days as follows:

#### **Saturday 4<sup>th</sup> March 2023 (8am- 7pm)**

Launch Day to celebrate World Engineering Day for Sustainable Development.

A bus will be provided from TU Dublin to the Launch Day event in Co Louth where you will join your Ulster University summer school colleagues.

#### **Monday 29<sup>th</sup> May @ 8am to Friday 2<sup>nd</sup> June @ 6pm inclusive.**

Students will spend the first two days in Dublin including hotel accommodation and then travel to Belfast for a further two days including hotel accommodation returning to Dublin on Friday 2<sup>nd</sup> June @ 6pm.

Selection

Please be aware that the ten students for the summer school will be selected to ensure there is at least 40% of each gender. Shortlisted students will be interviewed after the application process deadline.

**SUMMER SCHOOL APPLICATION**

## Appendix B – Background information for cocreation exercise.

Dear Students,

To learn more about our PROFESS 12 project: <https://www.tudublin.ie/research/discover-our-research/profess12/>

To learn more about the Sustainable Development Goals: <https://sdgs.un.org/goals>

Specific information on SDG 12: <https://sdgs.un.org/goals/goal12>

To understand the range of competencies that engineers will need to solve the SDGs: [Preparing engineering students for the Challenges of the SDGs - what competences are required](#)

To learn about the importance and ways of developing Intercultural Skills:

[Home - Intercultural Learning & internationalisation for secondary schools \(intercultural-learning.eu\)](#)

<https://www.unesco.org/interculturaldialogue/en>

<https://en.unesco.org/themes/intercultural-dialogue/competencies>

We look forward to hearing from you on 18<sup>th</sup>.

## Appendix C – People Bingo Template

### People Bingo

**Find people who answer yes in each box & place their name in the box.**

**Try to include all participants in the room in the overall page.**

**You must have a different person for each one**

Practices Yoga or Dances	Knows a second language	Plays a team sport
Celebrates their Birthday in August	Lives outside of Dublin	Been on holiday last year (staycation counts)
Was born overseas	Has a pet Dog	Has played bingo
Cycles a bike	Has a sister	Owens a pair of Nike trainers

## Appendix D – Case studies

### Case studies for Co-Creation Exercise

#### Reducing waste generation

According to a report by the Central Statistics Office in May 2022, the amount of waste generated per person in Ireland was 330 kg/year.

Forty eight percent (48%) of the population have access to disposal of organic brown waste, (the brown bin) and it is increasing slowly with every passing year. However, the EPA (Environmental Protection Agency) noted that over 60 % of household waste is placed in the residual or the recycling waste bin.

Ireland needs to work on reducing the amount of waste generated per person annually and reduce the amount of food waste in particular to at least the EU average number i.e., 127 kg/person annually.

#### Case Study for reducing food waste on University Campus

Your task:

How would you go about reducing the amount of food waste created within the University Campus?



## Hints to assist if required

- Identify how much food waste and general waste is generated on campus and how it is disposed (under which category)
- After knowing the details, how do you think the amount of food /organic waste can be segregated and disposed of, so that it can be redirected for composting rather than the landfill.
- Identify if there are sustainable solutions to reuse and recycle items on the campus, such as water fountains for drinking water/reusable cups for water and coffee. Also consider furniture and electronic waste generated on campus and explore options for buying used goods to reduce consumption of new materials.
- If these provisions are not in place, suggest ways in which these can be implemented and used to make the campus greener by reducing the amount of waste produced and reduce the amount of materials consumed.
- Ask students to highlight ways in which they can help reduce waste generation, incorporate reuse and recycling of materials on an individual and community level.

## Implementing green energy solutions / reducing energy consumption

As per the Sustainable Energy Authority of Ireland's (SEAI) report, renewable energy is the second largest source of energy used for electricity generation after natural gas in Ireland. The rising prices of oil and gas have led the country to reconsider the approach to develop high levels of self sufficiency in terms of its energy generation capacity to reduce its reliance on fossil fuels.

In 2020, 42% of electricity was derived from renewable energy sources mainly wind and hydro power. Still more efforts are required to be made, both on an individual and a mass level to increase the share of renewable energy in generation of electricity and to reduce CO<sub>2</sub> emissions to avoid using fossil fuels.

Case Study for reducing energy consumption on university campus and suggestions for implementing renewable energy generation on campus.

Your task:

How would you go about reducing the energy consumption and implementing renewable energy solutions on the University campus?

### Hints to assist if required

- Identify what is the current energy consumption of the campus and if there is any share of renewable energy in it?
- Suggest different types of renewable energy alternatives that could be used to generate electricity on site.
- Identify ways in which the energy use of the building can be reduced and how it can be implemented.
- How much does reduction in carbon emissions could be likely achieved if these changes are implemented?
- Suggest general ways of being more energy efficient in your homes and in workplaces.
- How can the implementation of renewable energy generation be increased on an individual level and a community level? What are the limitations or viewpoints of people in these regards?

## Sustainable Fashion and reducing consumption of materials

Fast fashion is an ongoing problem as it is the leading contributor to waste generated. Synthetic fibres account for a large section of fibres used for manufacturing clothing items which when discarded, leads to environmental problems. Reusing goods as long as they are in a condition to be reused is a good concept for preventing clothing items and household items to go to waste and rather be redirected to someone who can use it.

Identify ways to increase awareness of sustainable fashion and reduce materials consumption by reuse/recycling of household and clothing items

Your task:

How would you go about increasing awareness and engaging your peers to move towards a model of sustainable fashion and consumption?

By sustainable fashion, we do mean clothing, but also electronics, books, household items that are no longer needed by the user.

## Hints to assist if required

- Ask them about their awareness on fast fashion clothing and the problems associated with it.
- Increase awareness of sustainable clothing and the advantages it has to offer.
- Many university students especially in their university and private accommodations use huge quantities of household items including but not limited to books, stationery, clothes, furniture, electronic equipment, kitchen and other cooking items. Once they leave university, they tend to get rid of some of these items.
- Is there a solution to redirect these items from preventing it going to waste by making them reusable (E.g. Thirft store/ charity store, partnership with Terracycle etc)
- Ask students to suggest ways that they can implement to reduce impact of fast fashion and reduce their consumption of materials.