

Education for Sustainable Development

Teaching and Learning
Case Studies

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Education for Sustainable Development

How we teach and learn:
Key competencies for
engaging with education for
sustainable development



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A Introduction



Initiative Details

Overview

The case studies presented were part of an interdisciplinary project at University College Dublin entitled: *How we teach and learn: Key competencies for engaging with Education for Sustainable Development*. The project was funded by the UCD Sustainability Seed Funding Scheme 2024/2025.

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Disciplines

- Agriculture Forestry, Fisheries and Veterinary
- Health and Welfare
- Social Sciences, Journalism and Information
- Education
- Teaching and Learning

Programmes

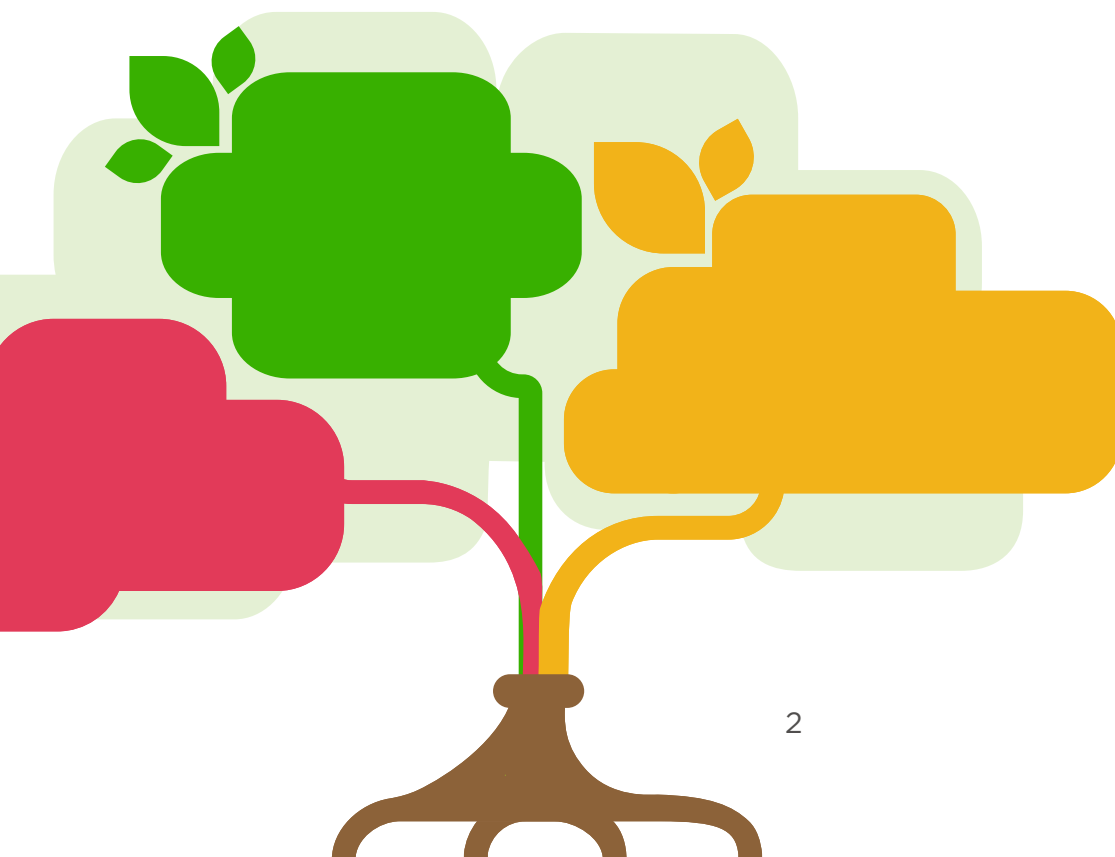
- MSc in Clinical Nutrition and Dietetics
- MA Education
- MSc Education, Children & Youth
- MSc(Agr) in Sustainable Agriculture and Rural Development
- BSc Human Nutrition

Student Engagement

The initiative reached 92 students across 5 programmes in 4 modules. There were 56 taught masters students, and of these 10 were international students. There were 36 final year undergraduate students.

Keywords

UNESCO Competencies, Metacognitive skills, Critical thinking, Collaborative learning, Systems thinking





5

programmes

4

modules

92

students

36

final year
undergraduate
students

56

taught masters
students

10

international
students



Initiative Description

Background

It is widely accepted that Higher Education institutions are well placed to take a leadership role as ‘agents of change’ in transforming societies towards a more sustainable future by effectively championing education for sustainable development (ESD) (Berchin, 2021). UNESCO has identified the latter as key to achievement of sustainable development goal (SDG) 4, Quality Education, and in turn a key driver for the other sixteen SDGs. Additionally, there is increasing recognition that in order to tackle the ‘wicked’ global challenges we face, there is a critical need for transdisciplinary engagement with ESD, and in particular, interdisciplinary collaboration in its delivery. What there is less clarity about is how students across all disciplines can be supported in engaging with ESD within their programmes in order to meaningfully embrace sustainability challenges and gain an appreciation and understanding of the relevance of the SDGs to their careers and lives. This is particularly challenging in subject areas not traditionally linked with sustainability, or where the linkage is less intuitive.

UNESCO identified eight, content-independent core competencies considered essential for enabling ‘sustainability citizens’ and the successful achievement of the SDGs (UNESCO, 2017). They include systems thinking, anticipatory, normative, strategic, collaborative, critical thinking, self-awareness, and integrated problem-solving competencies. In an educational setting, competency has been defined as, “a complex combination of knowledge, skills, understanding, values, attitudes and desire which lead to effective, embodied human action in the world, in a particular domain” (Hoskins, 2008).

Gaining proficiency and progression in competence towards mastery of the ESD core competencies requires experiential learning opportunities, and is in turn underpinned by effective metacognitive skills.

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Metacognition, or ‘thinking about thinking’ refers to the ability to assess one’s ability or approach, reflect and strategize how to improve and progress (Flavell, 1979). This overall approach is core to effective lifelong learning and, in turn, the ultimate goal of enabling agile, adaptable ‘sustainability citizens’.

Exploring strategies that support staff and students from diverse disciplines in the development of these core ESD competencies, supported by metacognitive approaches, offers huge potential benefits to students and opportunities in turn for meaningful interdisciplinary collaborations.

This initiative engaged the UCD community to explore and strengthen the knowledge and application of key competencies for ESD as a step towards the development of a shared pathway to ESD integration across disciplines.

Description of Approach Taken

A pre-existing case study performed by one of the authors, Emma O’Neill, had explored application of a learning design framework, the Metacognition Design Framework (O’Neill et al. 2025), to support metacognitive skill development in students ([Metacognitive Learning Video Case Study](#)). This case study had used this framework and its ‘I-SEE’ learning strategies; Introducing, Signposting, Enabling and Evaluating, as a mechanism for supporting student-centred learning in the module, ‘Veterinary Clinical Neurology’.

This module supported students in action-oriented collaborative groups, working on gradual release clinical problems learning how to critically evaluate and problem solve real-life clinical scenarios. Students were also coached to critically reflect on their learning allowing them to improve and up-skill moving forwards. The students involved had recognised that this approach helped them to become more aware of their learning, prompting them to stop and question if they understood concepts, and aiding them in seeing the ‘big picture.’

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Staff noted that taking this approach moved the learning focus towards more holistic approaches building deeper knowledge rather than focussing on surface approaches. The student-centred learning approaches taken in this module align clearly with those outlined by UNESCO as key to supporting ESD (UNESCO, 2017) and sustainability core competency development.

Competencies cannot be taught, but instead must be developed by learners through action, experience and critical reflection on this process. This module provided opportunities for students to develop the eight core competencies referred to by UNESCO, with metacognitive skills underpinning effective development of them all. This module design and the associated learning resources developed as part of this UCD Fellowship in Teaching and Academic Development project were used as a point of reference for the current collaborative project.

The aim of this collaborative project was to design and learn from four real-world case studies in different disciplinary contexts that placed ESD competency development and metacognitive approaches centrally within the teaching and learning activities. The case studies were designed to reflect the disciplines of the collaborative group and, through the nature of the diversity of disciplines involved, the project showcases the potential for transferability and scalability of this approach. The case studies in the following table were designed, developed and trialled in the academic year 2024-25. More detailed descriptions of each of these four individual case studies can be accessed below in this document.

Table 1: Characteristics of four teaching and learning case studies developed as part of the Key Competencies in Education for Sustainable Development project at University College Dublin.

Case study #	Title	Author	Discipline	Programmes & modules	Real world problem	Number and level of students
CS1	ESD Competency Application in Clinical Nutrition Education	Nicola Dervan & Sarah Browne	Health & Welfare, Education	MSc in Clinical Nutrition and Dietetics Dietetics Prof Practice 1 (DIET40060)	Integrating systems thinking into clinical practice	26 Taught postgraduate
CS2	Theorizing Education for Sustainable Development: Exploring Its Role in Formal Education Systems	Olga Ioannidou	Education, Teaching & Learning	MA Education, MSc Education, Children & Youth Education for 21st Century	Integration of ESD into national curricula	10 Taught postgraduate, international students
CS3	Rural Placemaking – Critical Approaches to ‘Obvious’ Sustainability	Karen Keaveny	Agriculture Forestry, Fisheries and Veterinary, Social Sciences, Journalism and Information	MSc(Agr) in Sustainable Agriculture and Rural Development Rural Placemaking (RDEV40840)	Developing a sustainable place making strategy for a rural town	20 Taught postgraduate conversion course
CS4	Embedding ESD in Public Health Nutrition	Celine Murrin	Health & Welfare	BSc Human Nutrition Year Public Health Nutrition	Embedding systems thinking into public health at a population level	36 Undergraduate final year optional module

**In an educational setting,
competency has been
defined as, “a complex
combination of knowledge,
skills, understanding, values,
attitudes and desire which
lead to effective, embodied
human action in the world,
in a particular domain”**

— Hoskins, 2008

***Sometimes referred to as Head, Heart, and Hands.**

Collaboration, Partnerships & Student Participation

This project was a collaborative project involving multiple disciplines, with the overall aim of exploring the broad applicability of this approach. The disciplines represented included; Nutrition and Dietetics, Education, Rural Development, Human Nutrition, Veterinary Medicine, and Teaching and Learning.

The project team collaborated on the development of the case studies and reviewed them as they developed. Each of the case studies involved students as participants in the modules. Their feedback was gathered informally as part of the process in order to gain insight into their experiences of this approach to learning.

Colleagues from UCD Agile helped to facilitate a World Cafe discussion forum at a UCD community engagement workshop in March 2025, seeking to explore the experiences and views of educators around integration of ESD competencies and application of the approaches showcased in the case studies. The learning from this discussion is being used to frame recommendations for future development of ESD at the university.

Intended Learning Outcomes

This project represents a broad approach that was applied within different modules and programmes. In view of that, the intended learning outcomes were developed specifically for each of the individual case studies rather than for the project overall. The learning outcomes in each case study reflected the inclusion of competency development as a core goal.

The overall outcomes intended from this approach were;

- Firstly, to gain insight into how broadly applicable and adaptable the approaches were for use in a variety of disciplines.

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- Secondly, to create example case studies in varied disciplines to offer other educators the opportunity to envisage how the approach could be adapted.
 - Thirdly, to identify resources that might be required to facilitate a roll out of this approach more broadly.

Teaching and Learning Approach

The first step for the project was for the project team to examine together both the ESD competencies and the Metacognition Design Framework. The aim was to explore how new ways of learning will support adaptive capacity of graduates / professions to deal with complex problems in interdisciplinary and collaborative ways. Proposed case studies were presented and critically discussed at team meetings.

The exact strategy varied from case study to case study within this initiative; however pedagogical approaches were very similar. All prioritised a student-centred learning with a focus on action-oriented methodology with students working collaboratively on ‘real world’ problems or projects. A critically reflective learning style was encouraged and supported through use of methods, such as the ‘I-SEE’ learning strategies from the Metacognition Design Framework, to develop metacognitive skills in students.

Assessment Strategy

The assessment strategy varied for each of the individual case studies; however a key feature of each was that the assessment had sufficient complexity to require students to engage in metacognitive strategy use to successfully complete the assessment.

For example, the module, “Embedding ESD in Public Health Nutrition” required students to create a concept map highlighting and exploring all of the interrelated factors involved in a given real-world nutritional problem.

Impact & Outcomes

The complexities and extent of current global challenges dictates a transformational shift; there is an increasing acceptance that supporting transdisciplinarity in education is key (Binagwaho, 2022). In order to achieve this type of transdisciplinarity, mechanisms are needed to create opportunities for collaboration and co-creation of knowledge that transcend the disciplines, a situation that starts with common language and shared understanding.

The case studies resulting from this initiative provide accessible examples of ESD competency integration in broad academic settings, and allow other educators insight into how the same approach could be adapted to suit their own disciplines. By demonstrating that ESD extends beyond "green" subjects to encompass critical thinking, self-awareness, and collaborative problem-solving across all disciplines, the outcomes are a step towards transformational change in how sustainability is positioned within higher education curricula.





Best Practices & Resources

Top Tips

This competency-based approach offered an **adaptable and practical way to frame education for sustainable development** within disciplines not typically perceived as ‘green’ or where sustainability may initially appear less relevant. It offers an accessible starting point to initiate the conversation, with our experiences showing that this in turn provides clear areas for future expansion.

Underpinning this approach with student-centred teaching and learning techniques designed to support critically reflective learning and metacognitive skill development helps students to progress their competencies through actively strategising, evaluating their progress, and adjusting their approaches.

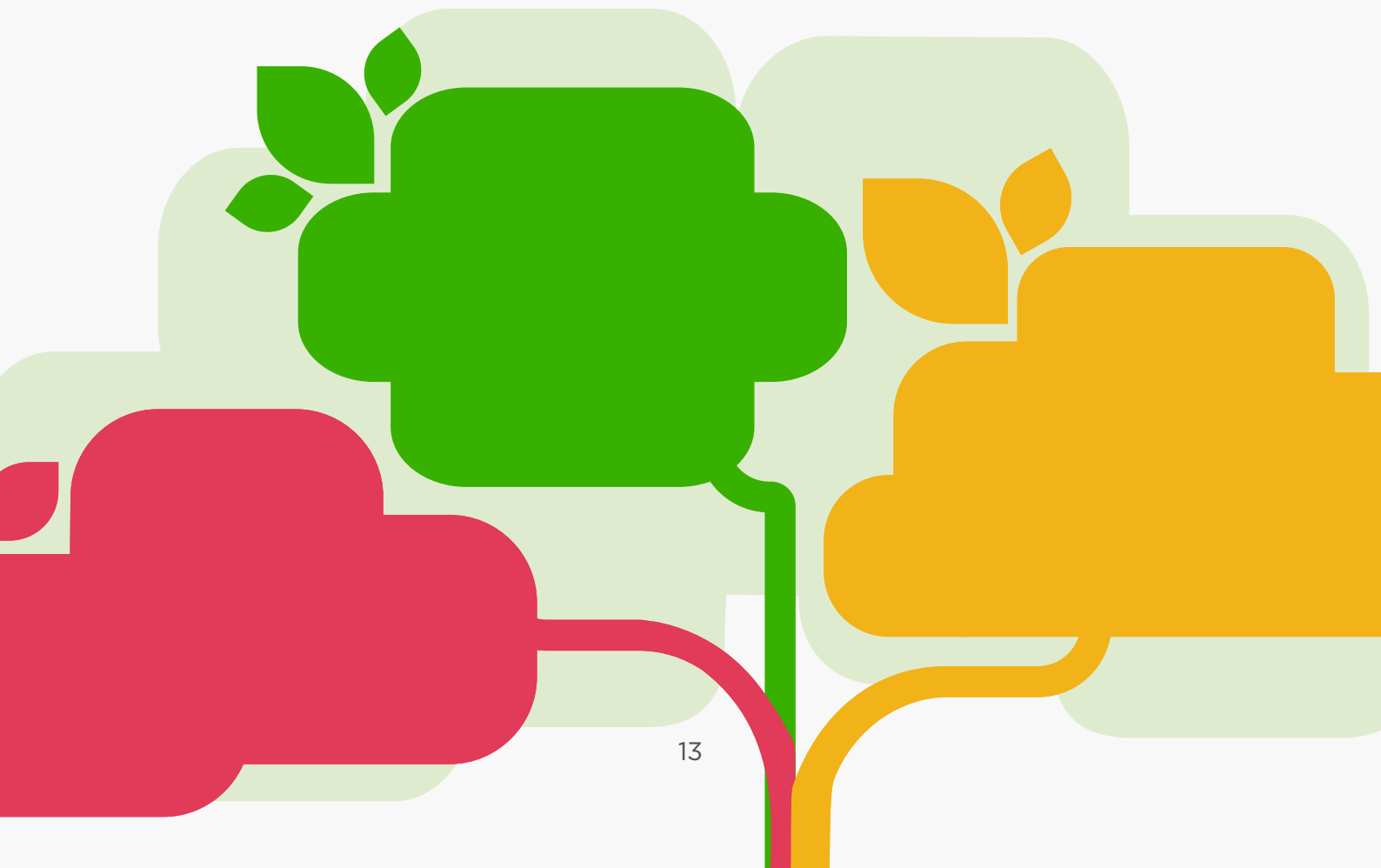
Useful Resources

- An **infographic from this project** can be accessed via UCD Teaching and Learning Resources: Education for Sustainable Development <https://www.ucd.ie/teaching/resources/resourcesa-z/>
- **Metacognitive Learning Resource (developed by Emma O’Neill):** Open access experiential learning resource showcasing use of the Metacognitive Design Framework and ‘I-SEE’ Learning Approaches was developed by Emma O’Neill can be accessed via: <https://www.ucd.ie/cshe/metacognitivelearning/>
- This webpage also contains links to video case studies and a description of the original UCD Fellowship in Teaching and Academic Development study.

Funding Details

The initiative presented received seed funding from UCD Sustainability Office Seed Funding for Sustainability Initiatives 2024.

The Veterinary Clinical Neurology case study referred to was part of a previous UCD Fellowship in Teaching and Academic Development study funded by UCD Teaching and Learning.





Project team at a UCD community engagement event, March 2025.
From left to right: Celine Murrin, Olga Ioannidou,
Leigh Graves-Wolf, Karen Keaveney, Sarah Browne,
Nicola Dervan, Emma O'Neill



B Introduction to the Case Studies

Initiative Description

The key competencies identified by UNESCO as essential for students to support education for sustainable development (ESD) include systems thinking, anticipatory, normative, strategic, collaborative, critical thinking, self-awareness, and integrated problem-solving competencies. These are all in turn underpinned by effective metacognitive skills and the ability to reflect and strategise. Exploring strategies that support staff and students from diverse disciplines in the development of these competencies, supported by metacognitive approaches, offers huge potential benefits, a clear narrative that transcends the disciplines, and valuable opportunity to develop meaningful interdisciplinary collaborations.

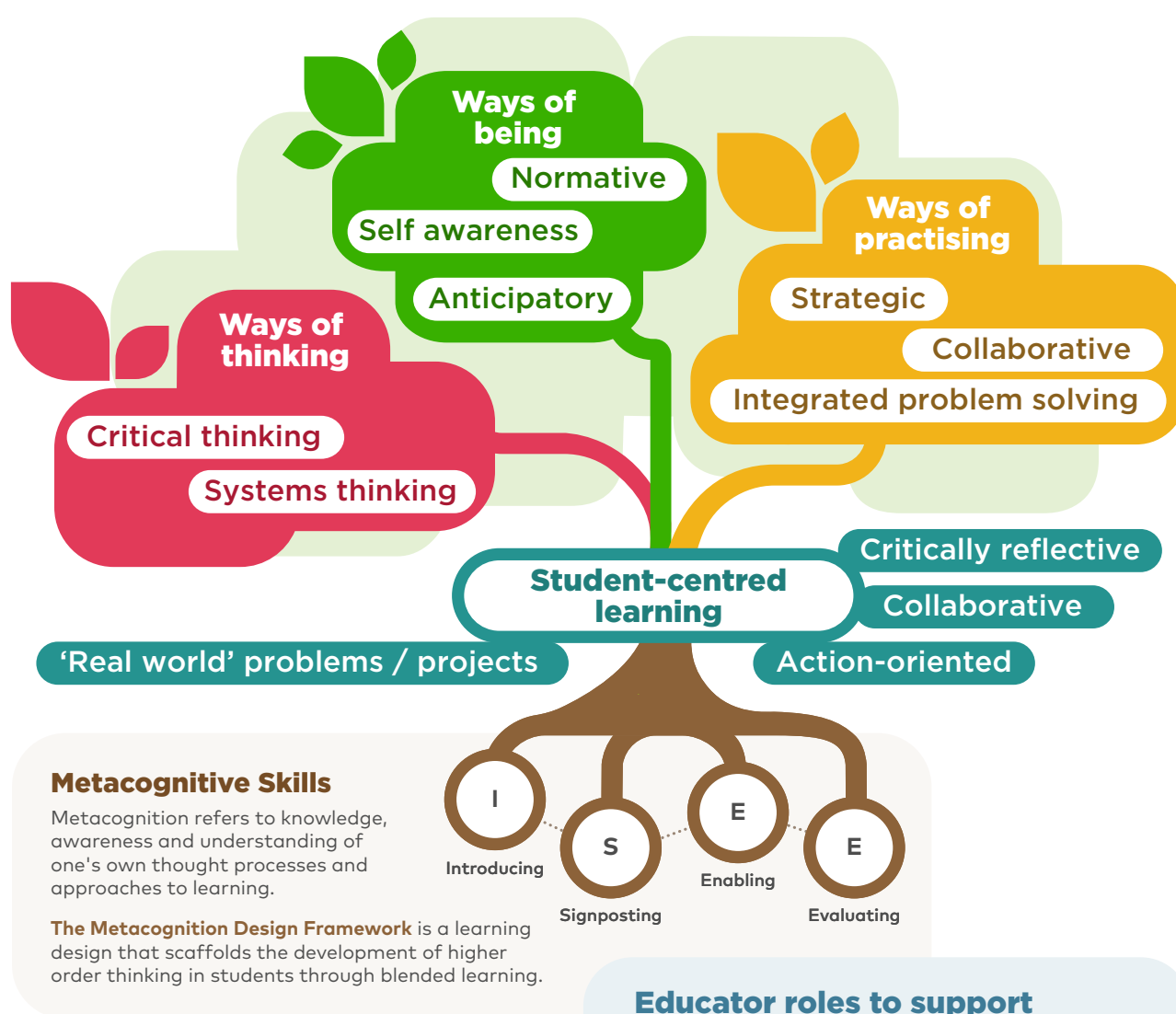
The following four case studies were developed at UCD in 2024/ 2025 to demonstrate the integration of key competencies for ESD.

The guiding theoretical sources are illustrated in the Figure developed for the project below:

How we teach and learn

Education for Sustainable Development (ESD) advocates for the development of 'key competencies' or higher order thinking that prepare learners to tackle interconnected global challenges, integrating economic, social and environmental sustainability

UNESCO Key Competencies for Engaging with ESD



Guiding Sources

UNESCO 2017 – Education for Sustainable Development Goals: Learning Objectives
Advance HE – Essential Frameworks for Enhancing Student Success
UCD Centre for the Study of Higher Education: [Metacognitive Learning Resource](#)

Educator roles to support competency development:

- Adopt effective teaching and learning strategies such as metacognitive approaches
- Globally inclusive and future-focused curricula
- Co-create with students
- Model collaboration
- Connect ESD to employability, global citizenship, civic responsibility, & EDI
- Evaluate education strategies

Case Study #1



Initiative Details

Title

ESD Competency Application in Clinical Nutrition Education

Authors

- **Ms. Nicola Dervan**
- **Dr. Sarah Browne**

School of Public Health, Physiotherapy and Sports Science

Discipline

- Health and Welfare

Programme

UCD MSc in Clinical Nutrition and Dietetics

Student Engagement

20 students registered to the module in Dietetics Professional Practice in Spring Trimester 2024/2025

Keywords

ESD integration, clinical education, systems thinking, critical thinking, collaboration



Initiative Description

Outline or Description

Dietitians, as the regulated nutrition experts in healthcare, can act as change agents in the transition to more sustainable food and healthcare systems and thus improving planetary health. Dietitians contribute to achieving the Sustainable Development Goals (SDGs), particularly SDG 2 Zero hunger, SDG 3 Good Health and Well Being and SDG 12 Responsible Consumption and Production. Universities must adequately prepare dietetic students so that they are workforce ready to deliver on these outcomes.

This teaching and learning case study was conducted within a 2-year master's programme in Clinical Nutrition and Dietetics at UCD as part of a professional practice module in year 1 semester 1 of the programme. The purpose of the teaching session was for students to learn about and apply the nutrition care process. The nutrition care process is a systematic approach that dietitians use to guide nutrition assessment and care. It provides a framework for critical thinking and decision making and improved clinical nutrition outcomes have been demonstrated. This approach is used as the backbone to all clinical case studies throughout the programme and then extends into professional practice in Ireland. The aim was to recontextualise the learning outcomes and teaching strategies for this aspect of clinical education through the lens of ESD. Given the cross-cutting application of the nutrition care process, this will ultimately support the development of dietitians who can provide high quality, patient-centred sustainable healthcare in diverse scenarios.

Through the recontextualising process, opportunities to improve teaching pedagogy to support our goals in improving patient care and sustainability in healthcare became apparent. We identified opportunities to integrate a systems thinking approach and to facilitate growth in a systems thinking mindset, underpinned by the development of deeper problem solving and critical thinking competencies. Firstly,

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we introduced a new systems thinking introductory session with a case study application. Thereafter, we flipped the classroom to support students' learning on the nutrition care process integrating reusable resources including pre-recorded videos, case studies, a systems thinking checklist and reflective activities. Finally, we utilised our classroom to collaboratively tackle problem-based case studies which required the students to apply critical thinking, problem solving, and a systems thinking approach to provide high quality patient care. The learning activities were underpinned by the I-SEE approach to ensure a student-centred learning experience that supported metacognitive skill development and effective learning.

Collaboration, Partnerships & Student Participation

The initial concept was presented to a cross disciplinary group of educators at UCD with feedback provided through the lens of ESD. The learning initiative also utilised a strong student-educator co-creation approach by:

1-students providing feedback on their understanding of systems thinking and their ability to apply it in the context of nutritional care.

2-students providing feedback on the teaching and learning strategies employed to build knowledge and skills on systems thinking.

3-educator analysis of tasks allocated to the students as part of the initiative.

Intended Learning Outcomes

The case study was an exploration of the integration of the ESD competencies and the metacognition framework in dietetics clinical education. Exploratory learning outcomes were developed.

At the end of the case study the students should be able to:

- Apply a systems thinking approach in the provision of individualised nutritional care.
- Demonstrate critical thinking and collaboration in the provision of individualised nutritional care.
- Demonstrate metacognitive skill development.

Teaching and Learning Approach

To achieve the learning outcomes, the following strategies were employed:

- **Step 1:** Introduction of a teaching session on systems thinking with socio-ecological model integration and case study application.
- **Step 2:** Self-directed completion of recorded videos and activities on the early stages of nutrition care process and systems thinking integration. Students asked to complete reflective activities, resolve problems, and provided with a tool to aid the application of systems thinking.
- **Step 3:** Workshops which centred on the collaborative completion of complex case studies using the nutrition care process and systems thinking tool, reflection, critical thinking, and problem solving skills.

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- **Step 4:** Leverage the virtual learning environment to develop metacognitive skills across steps 1-4 by scaffolding learning and providing clear instructions, signposting, checkpoints, and evaluation tools.

Assessment Strategy

The assessment for our case study was formative as we were using exploratory learning outcomes for this activity. The formative assessment involved reviewing students' submissions of the completed clinical case study activity forms provided for independent study and at a group level documenting what they did competently and what they seemed to find challenging. We also captured students' responses in class to questions posed by the lecturer.

Impact & Outcomes

There was a positive impact on student learning, with students developing confidence to apply systems thinking to deliver individualised nutritional care in a clinical context.

The learning initiative is now embedded in year 1 of the dietetics programme and across case study templates in the placement modules. We plan to incorporate teaching and learning strategies on the ESD competencies of systems thinking, integrated problem-solving and anticipatory in year 2 of the programme to ensure continuity of skills and expectations.



Best Practices & Resources

Top Tips

- Reusable learning objects (e.g. videos, case studies, checklists) were essential to the implementation of the I-SEE method as part of the metacognitive design framework. They support students in transformational, active learning pedagogy, and competency development.
- Seek student feedback on the challenges they encounter in their learning. This will support the educator in planning for educational scaffolding and gradual exposure to more complex scenarios and competencies.

Case study #2



Initiative Details

Title

Theorising Education for Sustainable Development: Exploring Its Role in Formal Education Systems

Author

Dr Olga Ioannidou, School of Education

Disciplines

- Education
- Teaching and Learning

Programmes

- MA Education
- MSc Education, Children & Youth

Student Engagement

10 international, postgraduate students within the UCD School of Education in 2024/2025

Keywords

Critical policy analysis; curriculum; formal education; teacher education

Initiative Description

Outline or Description

This module aims to help learners develop the ability to understand and articulate the role of education in addressing future sustainability challenges, recognising its transformative potential at local, national, and global levels. The case study provides a theoretical framing of Education for Sustainable Development (ESD) and the Sustainable Development Goals (SDGs) in education, equipping future educators across multiple fields and levels with the knowledge to embed sustainability in their teaching practice. Students familiarise themselves with key theoretical frameworks and assessment approaches targeting sustainability competencies, enabling them to critically analyse existing educational practices. They also reflect on the importance of 21st-century skills—such as critical thinking, creativity, collaboration, and digital literacy—and evaluate their relevance to advancing sustainability goals. By applying ESD principles, students analyse and design curricula that integrate sustainability in contextually appropriate and coherent ways, building both conceptual understanding and practical capacity for action.

Collaboration, Partnerships & Student Participation

Describe how students, external partners, or community groups contributed to this initiative. Highlight collaborations across disciplines, institutions, industry, or local organisations, as well as ways in which students played an active role in shaping, leading, or engaging with the initiative. (max. 150 words).

Students actively shape the module through group discussions, independent assignments, and case analysis. Assignments encourage local-global application of concepts. While this initiative is primarily institutional, it is informed by global sustainability policy frameworks (e.g., SDGs, UNESCO, OECD).

Intended Learning Outcomes

At the end of the case study the students are able to:

- Understand and articulate the role of education in addressing future sustainability challenges.
- Familiarise with theoretical frameworks and assessment methods targeting sustainability competencies.
- Critically reflect on the role of 21st-century skills in Education and their relevance to sustainability.
- Apply ESD principles in curriculum analysis and design.

Teaching and Learning Approach

The module adopts experiential learning, inquiry-based approaches, and student-centred methods. It incorporates real-world problem analysis, metacognitive skill development, and constructivist engagement with sustainability. Given that this module included postgraduate international students, their experiences and expertise are used as a basis for critical reflections, whole class presentations and discussions, as well as debates. Their reflexivity is also highlighted in a position paper produced by students as an individual task.

Assessment Strategy

The central assessment is a reflexive position paper where students critically examine one 21st-century skill (e.g., sustainability, digital literacy) and design a plan for its integration into national curricula. Assessment criteria include critical analysis of relevant theoretical frameworks, policy alignment, feasibility of implementation, and engagement with ESD theory.

Impact & Outcomes

Student reflections reveal a transformation in their understanding of sustainability—moving from a limited, environmentally-focused perspective to a broader, systemic and critical engagement with the concept. Through the module, students develop the capacity to interrogate how national curricula define and incorporate ESD, sustainability, and related competencies.

They become adept at articulating well-informed arguments for and against the integration of sustainability competencies within specific national and cultural contexts. The assignment design—which invites students to analyse education policies from their home countries—is a unique and empowering aspect of the module. It fosters a deeper connection to their own educational systems and encourages them to reflect on both global frameworks and local realities.

This reflective, comparative, and policy-oriented approach enhances students' confidence in navigating complex educational debates. Feedback indicates that students value the space provided for critical thinking and self-reflection, and come away with a greater appreciation of how education can serve as a transformative force for sustainable development at multiple levels—individual, institutional, and societal.



Best Practices & Resources

Top Tips

- Clarify that ESD theory is complex and open to interpretation.
- Make content relevant to students' lives, practices, and national contexts. Emphasise participation and students' role in shaping the dialogue.
- Discuss critically the origins and implications of UN and EU ESD policies.

Case study #3



Initiative Details

Title

*Rural Placemaking – Critical Approaches to
'Obvious' Sustainability*

Author

Dr Karen Keaveney, School of Agriculture
and Food Science

Disciplines

- Agriculture Forestry, Fisheries and Veterinary
- Social Sciences, Journalism and
Information

Programme

MSc(Agr) in Sustainable Agriculture and Rural
Development

Student Engagement

20 students registered to the module in Rural
Placemaking 2024/2025

Keywords

*Placemaking, Rural Development, Rural
Sustainability, Critical Thinking, Community
Engagement*



Initiative Description

Outline or Description

The Master of Science (Agr) in Sustainable Agriculture & Rural Development at UCD School of Agriculture & Food Science focuses on current and future transformations in agriculture and rural development. This programme adopts a place-based approach to rural change and futures, exploring how agriculture can contribute to sustainable development, and how communities and governments can address challenges and opportunities in changing rural areas. The Masters aims to foster a holistic understanding of sustainable development, moving beyond a singular focus (e.g., environmental only) to an integrated approach encompassing environmental, economic, social, and cultural aspects. It serves as a 'conversion course', accepting students from diverse academic backgrounds, including agriculture, humanities, business, music, literature, arts. It encourages peer learning and promotes a broader perspective on sustainability.

A new module within this Masters called, 'Rural Placemaking', emphasises the integration of various disciplines like urban design and planning, economic development, community development, arts, culture and activation, engineering and infrastructure, and sustainability and caring for place. This module addresses 'real-world' problems and projects, aiming to equip students with strategic, collaborative, and integrated problem-solving competencies.

The assessment for this module involves a problem-based learning project where students develop a comprehensive placemaking strategy for a rural town, applying key concepts of placemaking and sustainable development to address specific local challenges and opportunities. The initiative seeks to empower students to facilitate future change by bringing together different stakeholders and promoting a bottom-up approach to community development.

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Ultimately, the module and wider programme strives to help students understand the multifaceted meaning of sustainability, ensuring that social, economic, cultural, indigenous, and local considerations are integrated with environmental goals.

Collaboration, Partnerships & Student Participation

Rural Placemaking includes Local Development Companies (agencies responsible for social inclusion and local development across Ireland), the respective Local Government where the town in question is based, and community groups through its practical, problem-based learning approach. Students are tasked with developing placemaking strategies for real or imagined rural towns, which necessitates engaging with the types of challenges and opportunities faced by these communities through active listening and research. This project assessment demands a holistic approach, requiring students to consider various elements that make a place function well, such as infrastructure, economics, and community engagement. It also requires students to lead on learning, and take responsibility for the outcome of the project.

The module's design, which also caters to part-time students working in government/state agencies/private practice, further strengthens this connection, as these students bring direct experience from these organisations into the learning environment. The curriculum aims to move students toward a holistic understanding of sustainable development, preparing them to work with communities and facilitate future change. The Master's emphasis on bottom-up approaches and engaging with stakeholders ensures that students are equipped to work alongside these local entities to address community decline and build positive momentum.

Intended Learning Outcomes

The learning outcomes intended for those engaging with this initiative are focused on developing a holistic understanding and practical application of sustainable rural development and placemaking. At the end of the module students will be able to:

- Apply key concepts of placemaking and sustainable development to address challenges and opportunities in rural communities.
- Develop comprehensive placemaking strategies for rural towns, demonstrating a holistic approach while integrating their individual expertise.
- Utilise critical thinking to understand how different elements of sustainable development (environmental, economic, social, cultural) work together.
- Engage in strategic, collaborative, and integrated problem-solving approaches to address 'messy problems' in rural areas.
- Recognise and integrate social, economic, cultural, indigenous, and local considerations as key components alongside environmental goals in sustainable development initiatives.

Teaching and Learning Approach

A key pedagogical strategy is problem-based learning (PBL), exemplified by the 'Revitalising a Rural Town' assessment where students develop a comprehensive placemaking strategy for a rural town. The approach emphasises developing:

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- **Ways of thinking**, in particular critical thinking, and the ability to analyse and evaluate information objectively, identify biases, and form reasoned judgments. Students are encouraged to question assumptions, scrutinise various perspectives on sustainability, and assess the effectiveness of different interventions.
 - **Ways of practising**, such as strategic, collaborative, and integrated problem-solving. The module requires students to think strategically how to address specific challenges and opportunities within a locality, considering long-term goals for sustainable development. During the module, they identify priorities, allocate resources, and envision the steps needed to revitalise a community. Collaboration is key to this and emphasises working effectively with others to achieve shared goals. This approach recognises that sustainable development and placemaking are not solitary endeavours, but complex ones necessitating meaningful involvement of and collaboration between diverse stakeholders. The placemaking framework itself integrates and builds on the expertise of a range of disciplines, highlighting the collaborative nature of the work.

Assessment Strategy

The assessment strategy Rural Placemaking module is centred around a Problem-Based Learning (PBL) project. The core assessment involves students developing a comprehensive placemaking strategy for a real or imagined rural town. This project requires them to apply the key concepts of placemaking and sustainable development to address the unique challenges and opportunities faced by such communities.

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Key assessment methods include:

- **Groupwork** – final report is produced by the group
- **Reflective practice** – individual student reflection on their experience of the project that emphasises how they developed their ‘ways of thinking’ and ‘ways of practising’
- **Presentation** – group presentations with stakeholders.

Impact & Outcomes

Competency Development: Students develop key competencies for sustainable development, directly connecting ESD to employability. They gain practical skills in strategic planning, collaboration, and integrated problem-solving, essential for careers in rural development, planning, and community work.

Holistic Understanding of Sustainability: Students move beyond singular disciplinary perspectives (e.g., environmental only) to embrace a holistic understanding of sustainable development, integrating economic, social, cultural, and indigenous considerations. This broadens their capacity to contribute effectively to diverse sustainability challenges.

Confidence and Action-Orientation: By engaging in ‘real world’ problems, students gain experience in applying their knowledge, which can increase their confidence in facilitating change and taking action. They learn to initiate a change by identifying opportunities for small wins with communities and building momentum.

Interdisciplinary Collaboration: Working on complex placemaking projects encourages students from diverse academic backgrounds (agriculture, arts, humanities, business) to collaborate, fostering peer learning and the ability to work effectively in interdisciplinary teams.

Top Tips

- Apply a 'place-based' lens to studying sustainability. This can support a holistic understanding of sustainable development and facilitate student learning to appreciate the complex dynamics involved in terms of agencies, organisations and individuals involved.
- Openly challenge student understanding of sustainability. If students come from different academic and professional backgrounds, they may have a singular or narrow perspective on what it is. Through class discussions and debate, assist students to gain perspectives from other disciplines and experiences by asking them to role play and 'put themselves in other people's shoes'.

Case Study #4



Initiative Details

Title

Embedding ESD in Public Health Nutrition

Author

Dr Celine Murrin, School of Public Health,
Physiotherapy and Sports Science,

Discipline

- Health and Welfare

Programme

BSc Human Nutrition

Student Engagement

36 students registered to the module in Public
Health Nutrition Autumn Trimester 2024/2025

Keywords

*Problem-based learning, systems thinking, concept
map, public health*



Initiative Description

Outline or Description

Public Health Nutrition is defined as ‘The art and science of promoting population status via sustainable improvements in the food and nutrition system. Based on public health principles, it is a set of comprehensive and collaborative activities, ecological in perspective and intersectoral in scope, including environmental, educational, economic, technical and legislative measures’.

In this final year module, students build on their learning from the first three stages of their degree which provides a scientific understanding of how nutrients are derived from food and utilised by the body to maintain human function. They learn how nutritional imbalance can cause or lead to disease or ill health and the diets that can contribute to good health outcomes.

Public Health Nutrition provides a wider perspective for students to understand what leads to nutrition imbalances in a population. The subject applies core public health skills such as epidemiology to explore the ‘causes of the causes’ of nutrition-related health. Through the learning and assessment, students begin to recognise the complexity of nutrition problems in the population which are rarely straightforward and require multilevel, multicomponent interventions and policy solutions. It is designed to foster a systems thinking approach to understanding complex problems and working within the system to identify potential solutions.

Collaboration, Partnerships & Student Participation

This case study was developed with the support of colleagues within the UCD Education for Sustainable Development project. Students registered to the module were invited to reflect on whether they recognised the ESD competencies.

Intended Learning Outcomes

The learning outcome associated with this case study was for students to demonstrate the ability to critically analyse current findings from nutritional epidemiological studies on the determinants of nutritional health problems.

Teaching and Learning Approach

The module uses a problem based learning approach to learning for students. Students are introduced to key concepts in epidemiology and learn to apply them in a practical setting by solving a real world problem through critical review of health research evidence. Whilst the module was not specifically designed with an ESD focus, the core competencies were implicitly embedded in the module. The aim was to explore how this approach could be used as a base to create a meaningful linkage ESD that could be further developed.

Assessment Strategy

Students are divided into groups of 4 and assigned a **real world public health problem** in a particular region, such as Vitamin A deficiency in India. They then use a **collaborative** approach to look for evidence to describe the problem and to **critically identify** the determinants of the problem with evidence from peer reviewed literature. The evidence must be presented in the form of a concept map with linkages identified to illustrate the complexity of the problem, the 'causes of the causes' and to introduce the concept of **systems thinking**.

Impact & Outcomes

A sample of n=36 students completed a Google Form survey. The following proportions of students agreed that the assessment helped them to understand the respective competency: Systems thinking (89%); Collaboration (92%); Critical thinking (81%); Integrated problem solving (67%); Self-awareness (58%); Strategic (58%); Normative (53%); Anticipatory (75%). The students also provided comments which overall reflect a different way of thinking as an impact of their learning including 'thinking upstream' and 'outside the box'.

Student feedback demonstrated an awareness of the core competencies, albeit without explicitly framing them as ESD competencies. Subsequent iterations of the module will articulate the learning objectives more explicitly, ensuring their alignment with these core competencies.



Best Practices & Resources

Top Tips

- Consider how one or more of the sustainable development goals aligns with the content of your module.
- Use current and past 'real world' problems as a way of developing the competencies.
- Encourage students to view the problem with the perspective of the 'real world' decision maker or stakeholder e.g. a government minister, a company manager.

Useful Resources

- An example of the Public Health Nutrition Concept Map Group Assignment is provided on the next page. Students used one of the freely available online 'mapping' resources available. (*Student consent has been obtained for the sharing of this assignment.*)



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