



# Enacting Education for Sustainable Development (ESD) in Trinity:

## Problem Framing in Sustainability: Prevention, Mitigation and Adaptation

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## Background to the Module: Enacting ESD in Trinity

Trinity's '[Enacting Education for Sustainable Development in Trinity' Module](#), collaboratively developed by six Academic interdisciplinary Trinity Fellows in ESD and four student ESD interns, is structured around five integrated cross disciplinary themes as follows:

1. Exploring a sustainable existence.
2. Systems complexity and future forecasting in sustainability.
3. Exploring worldviews, perceptions, and values on sustainable development.
4. Problem framing in sustainability: prevention, mitigation, and adaptation.
5. Misinformation related to sustainable development.

Curriculum for Enacting ESD in Trinity is grounded in [UNESCO preferred pedagogies \(learner-centred approach, action-oriented learning and fostering transformative learning\)](#) (UNESCO, 2017:55), and learning outcomes therein target UNESCO's Key competencies (UNESCO, 2017:10) for sustainability.

Curriculum for 'Enacting ESD in Trinity' is structured around five themes, also referred to as Blocks, each of which includes 2 hours of lectorials developed by ESD Fellows, and one two-hour interactive workshop. Each theme is aligned with at least two of the 'shortfall' dimensions in Raworth's (2014) doughnut economics. Scenarios and templates as were co-designed by Fellows and Interns, including artifacts for use during workshops, are available separately. Recommended teaching practice(s) for workshops, as aligned with UNESCO preferred pedagogies, were also included in curriculum for staff undertaking this module.

This Resource Guide aligns with the lectorials for Misinformation related to Sustainable Development. Three short videos provide key content related to the theme and this resource guide provides context and suggestions for integrating these resources to teaching practice that is learner-centred and action-oriented, and potentially integrates to curriculum to foster transformative learning (UNESCO, 2017:55).

### Core references

- UNESCO (2017). [Education for Sustainable Development Goals Learning Objectives](#).
- Raworth, Kate.
  - [Doughnut economics: Seven ways to think like a 21<sup>st</sup> Century economist](#). Penguin Random House. (2014).
  - TedTalk : [A healthy economy should be designed to thrive, not grow](#). (2018).
  - Doughnut Economics [Action Lab](#)



## Background: Problem framing in Sustainability: Prevention, Mitigation and Adaptation.

This theme introduces the value of problem framing in sustainability. Practical steps that enable learners to identify risk and appropriately frame sustainability-related problems are outlined. Concepts related to prevention, mitigation and adaptation are explored to support the sustainable development goals. This informs strategies to address current and future challenges related to climate change.

Raworth's shortfall dimensions Housing-and-Shelter and Income-and-Work are aligned with the theme of Problem framing in Sustainability.

Video Resources are presented in three parts as follows:

- [Part 1: Characteristics of, and factors influencing, complex systems](#)
- [Part 2: Problem Framing and problem statements for sustainability challenges](#)
- [Part 3: Risk management strategies for solution-oriented approaches to prevention, mitigation and adaptation](#)

Recommended reading to support educators using the video resources in their teaching practice:

- **Part 1:** A health map for the local human habitat. ([Barton & Grant, 2006](#)). [READ: 10 minutes].  
Barton & Grant's presentation of *the relationship between health and the physical/ social/ economic environment* derives from Whitehead and Dahlgren's (1991) diagram of the social determinants of health, and from ecosystem theories and the principle of sustainable development. Their visualisation of health as a complex system will resonate with readers.
- **Part 2:** 'Why does 'framing' matter for sustainability?' Professor [Andy Stirling \(Video, 3 min\)](#).  
Stirling provides a holistic overview as to the importance of framing of sustainability challenges as part of ensuring the problem statement. He discusses the process of extracting the problem from a complex reality, and how a personal lens can influence your frame. He highlights the need for a systematic approach to ensure a problem statement supports a truly just transition.
- **Part 3:** Managing Risk. [Project Management: A Socio-Technical Approach](#), (Larson et al, 2024)  
This Chapter on managing risk provides an overview of an established risk management process that can be put in place to identify, assess, and plan a response to include: (i) first identify all risks related to the problem or challenge at hand, (ii) explore how to ensure such risks can be avoided, (iii) prepare a risk response that addresses mitigation and adaptation measures, and as a final step (iv) contingency plan to ensure positive outcomes in sustainability challenges.
- **Part 3:** Authentic sources of information – framing with integrity – A link to this resource will be added later in summer 2025.



## UNESCO ESD Preferred Pedagogical Approaches (UNESCO, 2017:55)

UNESCO recommends	UNESCO Description (UNESCO, 2017:55)	Examples of <a href="#">Learning theories</a> * Teaching practices aligned with UN Preferred ( <a href="#">Millwood, 2021:v7</a> )
<b>Learner-centered approach (LCA)</b>	<i>"Learner-centred pedagogy sees students as autonomous learners and emphasizes the active development of knowledge rather than its mere transfer and/or passive learning experiences. The learners' prior knowledge as well as their experiences in the social context are the starting points for stimulating learning processes in which the learners construct their own knowledge base. Learner centred approaches require learners to reflect on their own knowledge and learning processes in order to manage and monitor them. Educators should stimulate and support those reflections. Learner-centred approaches change the role of an educator to one of being a facilitator of learning processes (instead of being an expert who only transfers structured knowledge) (<a href="#">Barth, 2015</a>)."</i>	<b>Learning Theories - examples:</b> <ol style="list-style-type: none"> <li>1. Discovery learning</li> <li>2. Individual Constructivism</li> <li>3. Mastery learning</li> <li>4. Instructivism</li> </ol> <b>Teaching practices – examples:</b> <ol style="list-style-type: none"> <li>1. Guided Reflection/prompts (<a href="#">Gibbs, 1998</a>)</li> <li>2. Force choosing through ambiguity e.g. ranking options (<a href="#">Roche et al, 2017</a>); comparison processes (<a href="#">Nicol, 2020</a>).</li> <li>3. Classroom assessment techniques (CATs) (<a href="#">Angelo &amp; Cross, 1993</a>).</li> <li>4. Teacher transfers knowledge directly.</li> </ol>
<b>Action-oriented learning (AOL)</b>	<i>In action-oriented learning, learners engage in action and reflect on their experiences in terms of the intended learning process and personal development. The experience might come from a project (in-service learning), an internship, the facilitation of a workshop, the implementation of a campaign, etc. Action-learning refers to Kolb's theory of the experiential learning cycle with the following stages: 1. Having a concrete experience, 2. Observing and reflecting, 3. Forming abstract concepts for generalization and 4. Applying them in new situations (<a href="#">Kolb, 1984</a>). Action-learning increases knowledge acquisition, competency development and values clarification by linking abstract concepts to personal experience and the learner's life. The role of the educator is to create a learning environment that prompts learners' experiences and reflexive thought processes."</i>	<b>Learning Theories - examples:</b> <ol style="list-style-type: none"> <li>1. Social constructivism: (Ideally sequence peer interaction and debate after individual constructivism).</li> <li>2. Experiential learning</li> <li>3. Situated learning</li> <li>4. Communities of practice</li> </ol> <b>Teaching practices – examples:</b> <ol style="list-style-type: none"> <li>1. Rank less-than-ideal options individually, then require the small group to agree ranking of options.</li> <li>2. Role-play/debate assigned perspectives</li> <li>3. Problem framing 'real-world' issues.</li> <li>4. Solutions focussed- from local to global: groups problem solve collaboratively.</li> </ol>
<b>(Fostering) Transformative learning (FTL)</b>  Learning theories that foster transformative learning are proposed.	<i>"Transformative learning can best be defined by its aims and principles, rather than by any concrete teaching or learning strategy. It aims at empowering learners to question and change the ways they see and think about the world in order to deepen their understanding of it (<a href="#">Slavich and Zimbardo, 2012</a>; <a href="#">Mezirow, 2000</a>). The educator is a facilitator who empowers and challenges learners to alter their worldviews. The related concept of transgressive learning (<a href="#">Lotz-Sisitka et al., 2015</a>) goes one step further: It underlines that learning in ESD has to overcome the status quo and prepare the learner for disruptive thinking and the co-creation of new knowledge."</i>	<b>Learning Theories - examples:</b> <ol style="list-style-type: none"> <li>1. Critical pedagogy</li> <li>2. Double-loop learning</li> <li>3. Conversation theory</li> <li>4. Connectivism</li> </ol> <b>Teaching practices – examples:</b> <ol style="list-style-type: none"> <li>1. Connect knowledge to power/action.</li> <li>2. Modify goals based on experience.</li> <li>3. Co-construct knowledge through dialogue – learning as a social process.</li> <li>4. Constructing and traversing networks.</li> </ol>





## Guidance for Educators using this resource for teaching [Part 1of 3]

### Characteristics of, and factors influencing, complex systems.

Slide Title (time)	Teaching Practice(s): options for: <b>IP:</b> in-person/in classroom teaching <b>SO:</b> synchronous online teaching	<b>UNESCO pedagogical approaches*</b> <b>LCA:</b> Learner-centred approach <b>AOL:</b> Action-Oriented Learning <b>FTL:</b> (Fostering) <a href="#">Transformative Learning</a>
<b>Housing, Income and work: complex systems (2:54)</b>	Prompt learners to suggest examples of challenges related to e.g. housing/Income and/or complex systems. <b>IP:</b> use pen-and-paper if share and compare option to be used in-person. <b>SO:</b> use chat function - all post at one time. <b>IP/SO:</b> use polling tools.	<b>LCA:</b> Prompt individual reflection, on housing and shelter, and Income and Work, in the context of complex systems. <b>AOL:</b> Require learner to 'take a position'. Enable share-and-compare with peers. <b>FTL:</b> Peer-comparators helps expand learner's range of perspectives.
<b>Examples: Health and Food (10.45)</b>	Introduce health as a complex system: global, 'local', and individual determinants are impacted by environmental, social and economic factors. Similar conceptualization of our globalized food sector food chain.	<b>LCA:</b> Support knowledge acquisition and increase literacy in ESD concepts. <b>AOL:</b> Prompt deeper consideration of Health & Food as complex global systems <b>FTL:</b> Expand range of perspectives in ESD.
<b>Factors influencing (Complex) systems: (15:18)</b>	Visualisation of health, food, water and energy as organic systems, and their responses to spatial or temporal scales. Prompt learner understanding of how to simplify a complex problem, and the value of transdisciplinary skills to ESD.	<b>LCA:</b> Prompt individual reflection. Require learner to 'visualise' the future. <b>AOL:</b> Apply spatial or temporal scales to a defined challenge: Housing crisis. <b>FTL:</b> Enables learners to begin to develop skills underpinning 'futures thinking'.
<b>Complex Systems - Housing Crisis (17:15)</b>	Ask: what reasons have created this crisis? <b>Prompt consideration of scales and e.g.:</b> <i>-Imbalance of supply and demand?</i> <i>-Affordability and property prices?</i> <i>-Policy and planning barriers?</i>	<b>LCA:</b> Prompt individual reflection. <b>AOL:</b> Option to collaborate with peers. <b>FTL:</b> Enables learners to see themselves as 'solutions focused' agents of change.
<b>Problem framing (19:57)</b>	Teachers/educators could include prework /activities that familiarise learners with frameworks for problem framing and writing problem statements. Peer debate.	<b>LCA:</b> Support knowledge acquisition. <b>AOL:</b> Develop learner's ability to apply frameworks to real world challenges. <b>FTL:</b> Peers' discussion expands ability to critique policy in the public domain.
<b>Deforestation dilemma(s) (20:45)</b>	<b>Scenario choice(s) can adapt to support contextualization to learner's discipline</b> <i>-Identify key challenges to achieving sustainability</i> <i>-What is the core problem that you have identified?</i> <i>-Identify the risks by consulting with all stakeholders when planning a management strategy.</i>	<b>LCA:</b> Prompts reflection on their understanding of sustainability challenges. <b>AOL:</b> Practices identification of problems. <b>FTL:</b> Expands learner's ability to critique strategies to address climate change.

Table is aligned with [Milwood's Learning Theories Map](#): UNESCO ESD Preferred Pedagogical Approaches.



## Guidance for Educators using this resource for teaching [Part 2 of 3]

### Problem Framing and problem statements for sustainability challenges.

Slide Title (time)	Teaching Practice(s): options for: <b>IP:</b> in-person/in classroom teaching <b>SO:</b> synchronous online teaching	<b>UNESCO pedagogical approaches*</b> <b>LCA:</b> Learner-centred approach <b>AOL:</b> Action-Oriented Learning <b>FTL:</b> (Fostering) Transformative Learning
<b>Problem Framing (1:51)</b>	Prompt <b>What is framing?</b> include (i) where emphasis is placed, (ii) how we explain a problem and (iii) <u>what we fail to mention</u> . Prompt: <b>How do we avoid personal and/or disciplinary bias when framing?</b>	<b>LCA:</b> Prompt individual reflection on the framing process and potential for bias. <b>AOL:</b> Require learner to frame a problem for a given case 'and/or discuss bias risk.' <b>FTL:</b> Understanding risks of bias is likely to increase learner's management of risk.
<b>I-Frames and S-Frames (6:00)</b>	Key: Problem Framing aims to identify risk/resilience. Need multiple perspectives: - I-Frames – individual (behaviours) - S-Frames – system/governed by society Prompt: differentiate I-Frame and S-Frame in 'plastics' and smoking bans perspectives.	<b>LCA:</b> Support knowledge acquisition. Increase literacy linked to managing Risk. <b>AOL:</b> Application to cases promotes deeper consideration of the wide range of approaches necessary to frame problems. <b>FTL:</b> Increased understanding of frames helps learner's develop agency in ESD.
<b>Problem Statements - Sustainability (10:27)</b>	Prompt learners to learn the process:- <ul style="list-style-type: none"> <li>• <b>Who has the problem</b> – <i>identify stakeholders</i></li> <li>• <b>What is the problem</b> – <i>a systematic approach</i></li> <li>• <b>When/where does the problem occur</b> - focus</li> <li>• <b>Why is it important to address the problem</b> – principles of responsibility/advocacy.</li> </ul> All steps have an inherent level of risk.	<b>LCA:</b> Prompt individual reflection on each stage in problem statement development. <b>AOL:</b> Develop learner's ability in the use of a systematic approach to statements. <b>FTL:</b> Expand learner's understanding that risk is an inherent component of planning to address complex problems (in ESD).
<b>Problem Statements e.g. Homelessness (12:24)</b> <i>Scenario related to the crisis in Ireland.</i>	Prompt learners to apply the framework to this scenario as prework or in-class. Comparison with peers / discussion and debate will foster transformative learning. <b>IP:</b> use pen-and-paper if share and compare option to be used in-person. <b>SO:</b> use chat function - all post at one time. <b>IP/SO:</b> use polling tools. <b>IP/SO:</b> Discuss.	<b>LCA:</b> Support understanding - in the context of real-world complex systems. <b>AOL:</b> Guide learner to move from 'problem framing to problem statement' <b>FTL:</b> Peer-comparators helps expand learner's range of perspectives and ability to engage with public debate on ESD.
<b>Housing Crisis - example (15:53)</b>	Expand learner's options i.e. statements: (i) a summary of the current state (problem), (ii) the ideal state (goal) and (iii) the gap.	<b>AOL:</b> Develop learner's ability to actively address real-world challenges and policy. <b>FTL:</b> Expand ability to engage in debate.
<b>Conclusions (16:03)</b>	Messaging to empower learners: Problem statements should capture the problem and goal, which then informs how and what <b>we deliver as solutions</b> to the problem.	<b>AOL:</b> Develop learner's ability to prepare solutions-focused problem statements. <b>FTL:</b> Empower learners to believe they can drive solutions focused action for SD.

Table is aligned with [Milwood's Learning Theories Map](#): UNESCO ESD Preferred Pedagogical Approaches.



## Guidance for Educators using this resource for teaching [Part 3 of 3]

### Risk management strategies for solution-oriented approaches to prevention, mitigation and adaption.

Slide Title (time)	Teaching Practice(s): options for: <b>IP:</b> in-person/in classroom teaching <b>SO:</b> synchronous online teaching	<b>UNESCO pedagogical approaches*</b> <b>LCA:</b> Learner-centred approach <b>AOL:</b> Action-Oriented Learning <b>FTL:</b> (Fostering) Transformative Learning
<b>Problem statement(s) - homelessness (4.15)</b>	<i>Prompt learners to draft a (discipline-specific?) problem statement as prework and/or Scenario review in teaching sessions</i> <b>IP:</b> use pen-and-paper if share and compare option to be used in-person. <b>SO:</b> use chat function - all post at one time. <b>IP/SO:</b> use polling tools. <b>IP/SO:</b> Discuss.	<b>LCA:</b> Prompt individual reflection. <b>AOL:</b> Learner completion of the template requires them to state their own position. <b>FTL:</b> Expand learner's agency/sense of empowerment as to what they can (plan to) do individually and collectively.
<b>(RM) - Risk Management (6.11)</b>	Prompt visualization of risk management as a process for analyzing complex systems, in which root cause analysis is an early stage.	<b>LCA:</b> develop literacy in risk management processes and learn how to recognize risk. <b>AOL:</b> Apply root cause analysis tool(s).
<b>Risk assessment/ Evaluation (Climate) (9:00)</b>	Demo a risk matrix by assigning numbers to <ul style="list-style-type: none"> <li>Probability (of an event occurring) vs</li> <li>impact (if the event did occur).</li> </ul> Explain how risk scores may change in time i.e. reflect on spatial and temporal changes. 'Future' variations need different solutions.	<b>LCA:</b> Prompt individual reflection on how to assess risk using appropriate methods. <b>AOL:</b> Learner calculates scores individually then compares in groups. <b>FTL:</b> Expand learner' agency: recognize what can be done individually/collectively. Link systems and focus on solutions.
<b>Prevention, mitigation and adaptation – (13:57)</b>	Prompt reflection on initiatives to prevent climate change, mitigation (e.g. to reduce emissions) and adaptation (to the climate change that has been inherited).	<b>LCA:</b> Literacy development: understand prevention, mitigation and adaptation. <b>AOL:</b> Develop learner's ability to review for vulnerabilities and/or plan solutions.
<b>Sustainability Risk Management (17:07)</b>	Introduce sustainability RM as the process of identifying, measuring, mitigating and reporting on environmental, social and governance factors affecting organisations.	<b>LCA:</b> Support knowledge acquisition and understanding of sustainability RM. <b>AOL:</b> Develop learner's ability to apply sustainability RM processes to challenges
<b>Do no significant harm (25:11)</b>  <b>Where the just transition fits (26.22)</b>	Prompt reflection on principled approaches likely to guide decision-making through ambiguity and competing vulnerabilities in climate crises. Remind learners: Prevention, mitigation and adaptation are effective, and interdependent, strategies that address challenges related to climate change. Ideally provide opportunity to share-and-compare, and discuss with peers.	<b>LCA:</b> Prompt reflection on their beliefs and values, such as just transition and do-no-harm, in addressing climate crises. <b>AOL:</b> Develop abilities supportive of risk management and decision-making through competing vulnerabilities. <b>FTL:</b> Empower learners to act responsibly individually and collectively in pursuit of effective and just transitions towards solving climate change & biodiversity loss.

\*Table is aligned with [Milwood's Learning Theories Map](#): UNESCO ESD Preferred Pedagogical Approaches.



## References and Recommended Resources

### UNESCO Preferred Pedagogical Approaches (UNESCO, 2017:55)

- Barth, M. 2015. [Implementing sustainability in higher education: learning in an age of transformation](#). London, Routledge.
- Kolb, D. A. 1984. *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs, N.J., Prentice-Hall
- Lotz-Sisitka, H.; Wals, A. E.; Kronlid, D. & McGarry, D. 2015. [Transformative, transgressive social learning: rethinking higher education pedagogy in times of systemic global dysfunction](#). *Current Opinion in Environmental Sustainability*, Vol. 16, pp. 73–80.
- Mezirow, J. 2000. [Learning as transformation: critical perspectives on a theory in progress](#). San Francisco, Jossey-Bass.
- Slavich, G. M. and Zimbardo, P. G. 2012. [Transformational Teaching: Theoretical Underpinnings. Basic Principles, and Core Methods](#). *Educational Psychology Review*, Vol. 24, No. 4, pp. 569–608

### ESD Teaching Practice(s)

- Angelo, T.A. & Cross, P.K. (1993). *Classroom Assessment Techniques* and Davis, B.G. *Tools for Teaching*.
- Gibbs, G. (1998). *Learning by doing. A Guide to Teaching and Learning Methods*. Oxford: Further Education Unit, Oxford Polytechnic.
- Mezirow, J. & Taylor, E. (Eds) (2009). [Transformative Learning in Practice: Insights from Community, Workplace, and Higher Education](#). Jossey-Bass.
- Nicol, D. (2020). [The power of internal feedback: exploiting natural comparison processes](#). *Assessment & Evaluation in Higher Education*, 46(5), 756–778.
- Roche, C.; Thoma, S.J.; Grimes, T. & Radomski, M. (2017). [Promoting peer debate in pursuit of moral reasoning competencies development: Spotlight on educational intervention design](#). *Innovations in Pharmacy*. 8(2).

### Enacting Education for Sustainable Development: recommendations as general resources.

- [Centre for Sustainable Healthcare \(UK Charity\)](#) : e.g. Four principles of sustainable healthcare.
- [Climate Migrants – an Introduction](#) (ESRI): Rising seas, Extreme Heat, Water Woes & Climate and Conflict.
- [Doughnut Economics Action Lab](#) : e.g. A safe space for humanity.
- [Stockholm Resilience Centre](#) : e.g. Planetary Boundaries.
- [United Nations Framework Convention Climate Change](#) (UNFCCC).





## Version Information & Acknowledgements

### Version Information:

Version 1.04 – 11/11/25

[Centre for Academic Practice](#)

Trinity Teaching and Learning

Trinity College Dublin

### Acknowledgments:

Many of the resources on our [ESD Teaching Materials page](#) were developed collaboratively by six ESD Fellows (Carlos Rocha, Cicely Roche, Sarah-Jane Cullinane, John Gallagher, Clare Kelly, and Felix Mezzanotte) and four student interns (Freddie Fallon, Maryam Yabo, Tom Hegarty and William Reynolds) as part of Trinity's 'Enacting Education for Sustainable Development in Trinity' Module. [Click here to find out more about this module and its development.](#)

This work was funded by the National Forum/Higher Education Authority under the Strategic Alignment of Teaching and Learning Enhancement Fund.

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### Further Information:

For further links and resources, please visit [the Centre for Academic Practice's ESD Hub](#).



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