
University of Glasgow
School of Social & Environmental Sustainability
Educating Sustainability Change-Makers
Empowering the architects of change: Education for Sustainable Development in Teacher Training
WORLD CHANGERS WELCOME
A WORLD TOP 100 UNIVERSITY

Aims for today's session

1. Understand ESD and its role in SDG achievement
2. Recognise teachers as sustainability change-agents
3. Explore features of a co-created teacher education course incorporating the above understandings

Part 1: The Philosophy and Framework of ESD

The ‘Why’ and ‘How’ of Education for Sustainable Development (ESD)

The Sustainable Development Goals (SDGs)

Current climate and social crises demonstrate that standard education models are insufficient.

To address these challenges, we need to redefine the leaner as a Change-Maker - moving beyond simple awareness to possess true agency and the capacity for systemic thinking.

The Triple Bottom Line (TBL)

By mapping the 17 SDGs to specific educational outcomes, we can balance

Environment,

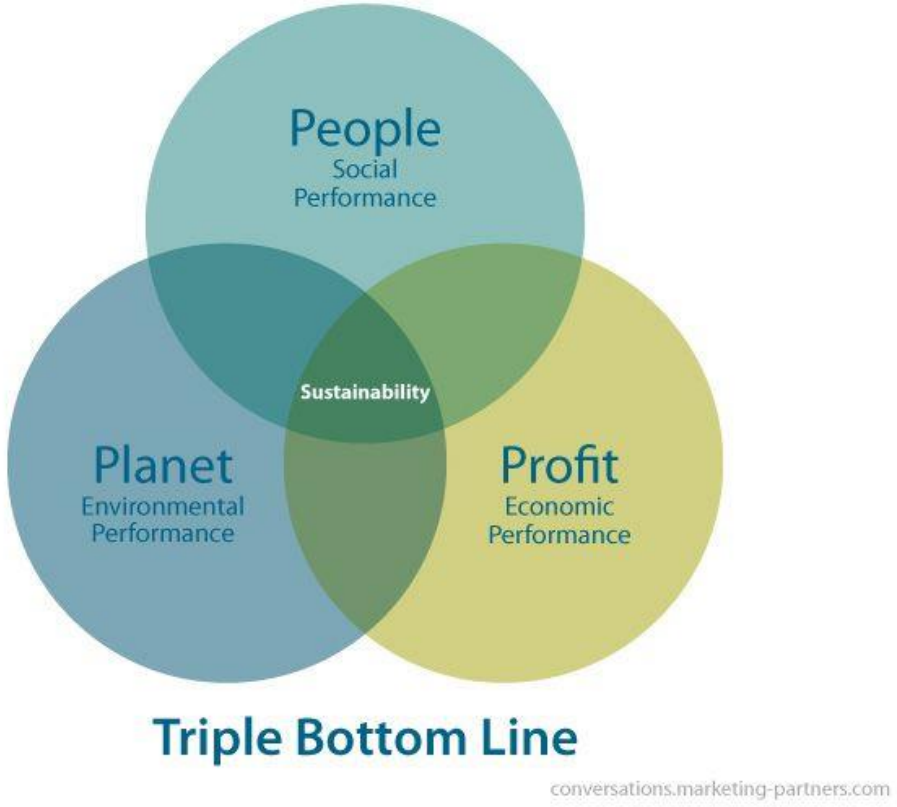
Equity/ Society, and

Economy

To define the sustainability aimed for in the curriculum.

This requires a shifting of the role of the teacher:

Sage on the Stage to **Facilitator of Transformation**.



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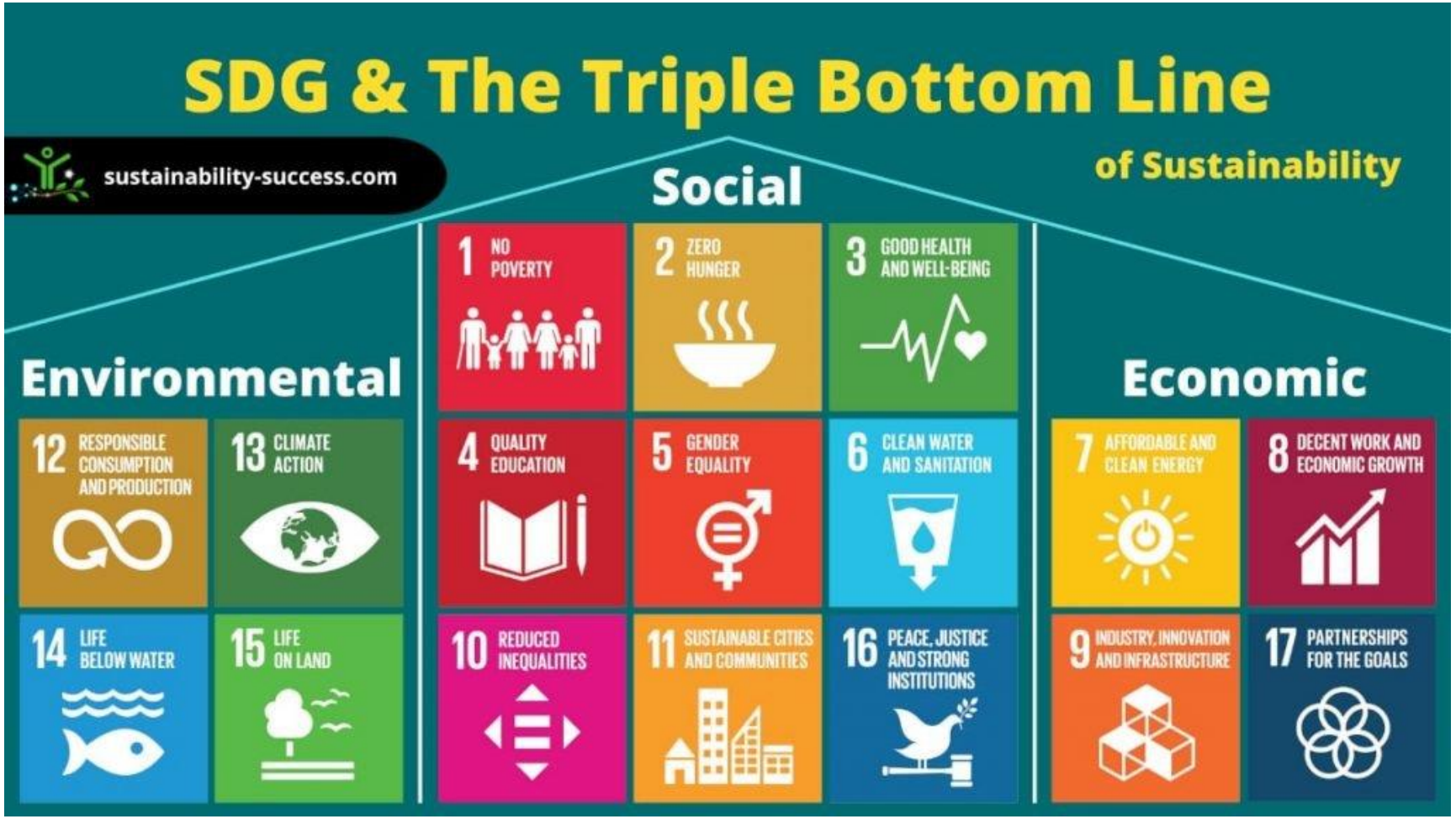
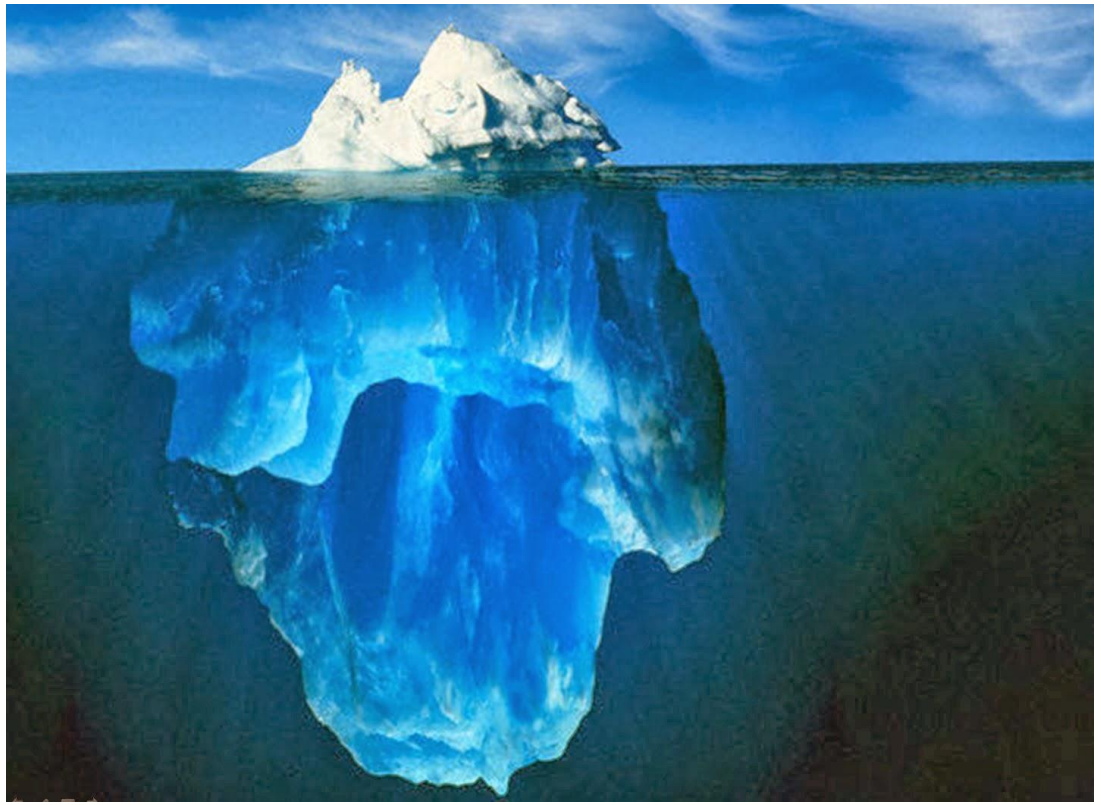
SDGs and the TBL



Why sustainability requires educational transformation

- Achieving the SDGs is not a technical challenge that can be solved with a fix.
- It is a societal and behavioural challenge.
- Knowledge ≠ behaviour change
- Simply knowing about the climate crisis does not automatically empower someone to act.
- We must address underlying values and norms that drive our choices.
- Education is our most powerful long-term lever.



Defining Education for Sustainable Development (ESD)

Education *for* transformation, not *about* sustainability

- SDGs provide the ‘what’ whereas ESD provides the ‘how’.
- To achieve the SDGs by 2030, we transformation in societal behaviours.
- ESD empowers learners to become active contributors rather than passive recipients of information

The 8 Key Competencies for Sustainability (UNESCO)

While the SDGs provide a ‘to-do list’, the competencies are the practical tools required to achieve them.

These are not isolated silos; they are a holistic set of tools than work together.

You cannot have effective integrated problem solving without self awareness to recognise your own biases or the collaboration skills to engage with diverse stakeholders.

Competency	Description for Learners
Systems Thinking	The ability to recognise and understand relationships and complex systems.
Anticipatory (Foresight)	The ability to deal with uncertainties and evaluate multiple futures.
Normative	The ability to understand and reflect on the values and norms that guide our actions.
Strategic	The ability to collectively develop and implement innovative actions.
Collaboration	The ability to learn from others and facilitate collaborative and participatory problem-solving.
Critical Thinking	The ability to question norms, practices, and opinions.
Self-Awareness	The ability to reflect on one’s own role in the local community and global society.
Integrated Problem-Solving	The ability to apply different problem-solving frameworks to complex sustainability problems.

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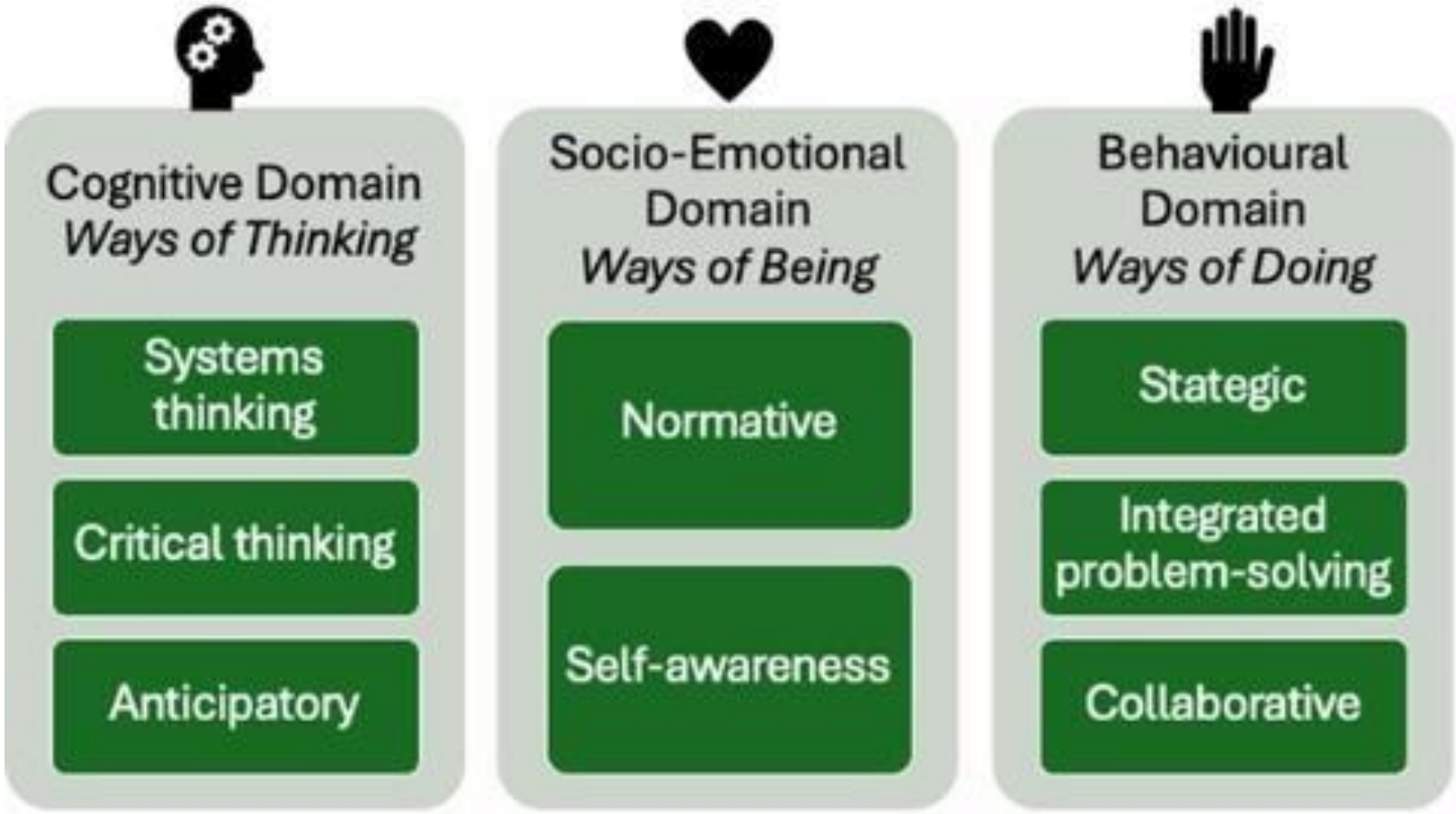
The 8 Key Competencies for Sustainability (UNESCO)



Pause for thought…

Which of these eight competencies was most present in your own education? Which was most neglected?"

The missing competencies

Anticipatory (Foresight) Competence:

- Most education systems focus heavily on history (the past) or current events.
- We are rarely taught to systematically envision multiple futures
- Students lack the tools to imagine a world that looks different from the one they currently see.

Normative Competence:

- Sustainability is not just a technical challenge; it is an ethical one.
- Traditional education often avoids deep dives into the conflicting values and norms that guide actions,
- Curricula prefer ‘facts’ over the messy work of negotiating justice and equity.

Educators as Change Agents

- To develop learners who are ‘Change-Makers’, we need to recognise that educators are the primary agents
- We need to move away from a narrow focus on curriculum delivery towards a broader social responsibility
- Educators are curriculum gatekeepers – they decide which values are highlighted and which perspectives are included in your classroom
- This role carries a significant ethical and civic responsibility because it involves navigating neutrality, professionalism, and advocacy.
- Teachers are role models of the competencies that sustainability requires.
- This has profound implications for teacher education programmes; it is no longer just training ‘transmitters of knowledge’

Activity

In small groups,

1) Choose one environmental SDG (e.g., Life Below Water)

Discuss how it impacts one social SDG (e.g., No Poverty).

Goal:

To practice systems thinking—recognising that sustainability issues do not exist in vacuums.

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Part 2: From Theory to Practice

The design and development of a course for future teachers

Application to an Undergraduate Initial Teacher Education (ITE) Course

The context:

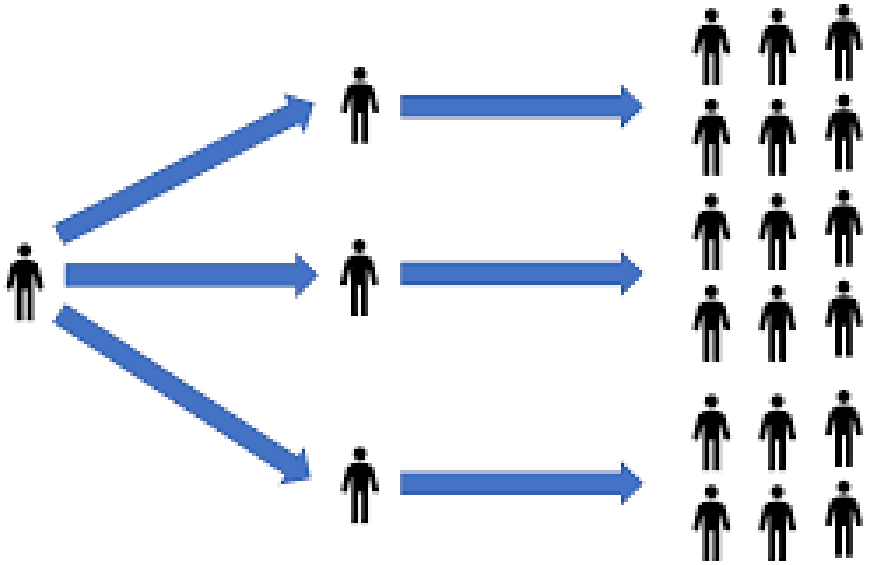
- Year-long sustainability module for pre-service teachers
- Why target pre-service teachers?

The pedagogical shift:

- From top-down to co-creation
- Prioritising student voice to build relevance, ownership, and professional motivation

Collaborative design in practice

- Shared development of learning objectives and module topics
- Directly aligning curriculum content with the SDG framework



Transformative Pedagogy in Action

Inquiry-Based Learning: Using wicked problems as the starting point for student exploration rather than delivering pre-packaged answers.

The Interdisciplinary Lens: Demonstrating how the SDGs function as a common language that connects Mathematics, Literacy, and Science.

Assessment for Learning: Shifting from testing memory to assessing the development of sustainability competencies through reflective practice.

Developing systems thinking using the Wedding Cake Model

Interconnectedness:

- The three pillars – Environment, Society, and Economy aren't separate.

Systems thinking:

- Teaches students to understand the complex relationships and dependencies in the different layers.

Helping pre-service teacher practice the facilitator role

1. **The standard topic**
   The water cycle

2. **The SDG link**
   Which SDG naturally fits here? (could be SDG 6: clean water or SDG 12: responsible consumption)

3. **The competency focus**
   Instead of a quiz, which ESD skill will students use (eg systems thinking: Mapping where their local water comes from and goes).

4. **The Change-Maker action**
   What is one small, real-world action the students can take based on this lesson?

Wicked Problem Scenarios

The School Canteen Dilemma (SDG 12 & SDG 2):

The school wants to reduce plastic waste by banning single-use water bottles. However, the local community relies on the income from the plastic recycling plant nearby, and some families cannot afford reusable metal bottles.

Competency Focus: Systems Thinking—How do environmental choices impact local economies?

The Green Energy Windfall (SDG 7 & SDG 15):

A local council proposes building a wind farm on a site that is a protected habitat for an endangered bird species. The wind farm would provide clean energy for the whole town, but it might lead to the extinction of the local bird population.

Competency Focus: Normative Competency—Which good takes priority? Environmental preservation or carbon reduction?

The Fast Fashion Paradox (SDG 8 & SDG 12):

Students learn about the environmental damage of fast fashion. However, they also discover that many families in their own neighbourhood rely on low-cost clothing to stay within their budget, and a boycott could harm garment workers in developing nations.

Competency Focus: Critical Thinking—Questioning the status quo of consumption while considering social equity.

The Smart City Future (SDG 9 & SDG 11):

A city decides to automate all public transport to reduce emissions and improve efficiency. This makes transport cheaper and cleaner, but it results in all local bus and train drivers losing their jobs.

Competency Focus: Anticipatory (Foresight)—What are the long-term social consequences of a technological green fix?.

The Facilitator Approach

Students are guided through these steps:

1) Stakeholder mapping: Students list everyone affected (the birds, the council, the bus drivers, the families).

2) SDG alignment: Identify which SDGs are in conflict (e.g., SDG 7 vs. SDG 15).

3) Collaborative solution-building: Students to design a compromise project – moving the wind farm be elsewhere; retraining bus drivers for the new system etc.,

Activity: Systems thinking

Once you have finished your drink, you put the bottle in the bin.

Where did the bottle come from and where will it go?

Discussion

- **Production:** Oil is used to make plastic.
- **Use:** The bottle is transported and sold (using energy).
- **Disposal:** If not recycled, it goes to landfill or the ocean, harming wildlife.
- **Impact:** Marine animals eat plastic → ocean ecosystems are damaged → food chains are affected → humans are impacted too.

So, one small act connects to **energy, pollution, biodiversity, and human health**.

The Change-Makers Toolkit

To move students from linear thinking to systems thinking, we used:

Classroom Modelling

Showing how a shift in clean energy (SDG 7) impacts local health (SDG 3) and the economy (SDG 8).

Project-Based Learning:

Students are not just solving a worksheet but are balancing real-world social, environmental, and economic outcomes in one project.

Case Studies:

Analysing corporate case studies or conducting sustainability assessments of our own School's waste management and community initiatives, through the lens of Environment, Equity and Economy to evaluate their holistic impact.

Shifting from knowledge to action

From knowledge to competency:

Instead of just testing teachers on ‘What are the SDGs?', they are asked to ‘Design a lesson that builds systems thinking in 10-year-olds’

Assessment shift:

Pre-service teachers are assessed on their strategic competency—for example, by their ability to organise a school-wide sustainability audit or a community garden project.

The reflective practitioner:

Using self-awareness exercises to help teachers understand their own environmental identity before they try to shape the identity of their students.

Impact and Learning

Professional growth

Developing the confidence and agency required to leas sustainability initiatives

Identity transformation

Moving from learning about to possessing a stronger sustainability identity

Attitudinal shift

Reimagining sustainability teaching as a core pedagogical purpose rather than an additional burden

Why it worked

Critical success factors:

Authentic learning

High student engagement driven by real-world, purposeful tasks rather than abstract theory.

Interdisciplinary Transfer

Successful integration of sustainability concepts across diverse primary school subjects.

Challenges and Tensions

Time, workload, resource and curriculum constraints

Conceptual ambiguity

Institutional expectations

Conclusion and key takeaways

- Educators are central to sustainability transitions: teacher education is a primary lever for systemic change.
- Effective ESD is intentional, not additive: it requires careful design, time, and collaborative pedagogy.
- Co-creation builds agency: enabling teachers to act as confident agents of transformation, not just curriculum deliverers.
- The approach moves beyond ‘switching off lights’ towards ethical, systemic reasoning.

Recommended Reading & Resources

Books and articles:

- Gaia Education's Design for Sustainability E-learning Programme http://www.gaiaeducation.org/index.php/en/online
- Green Pack: Teaching material on sustainability issues http://education.rec.org/green-pack.html
- OXFAM: A selection of suggested teaching ideas around the SDGs https://www.oxfam.org.uk/education/resources/sustainable-development-goals
- Sterling, Stephen R. Sustainable Education Re-Visioning Learning and Change. Cambridge, [England: Green Books for The Schumacher Society, 2015. Web.
- UNESCO (2012) ESD Sourcebook. Available https://unesdoc.unesco.org/ark:/48223/pf0000216383 a
- UNESCO (2017): Education for Sustainable Development Goals. Available https://www.unesco.org/en/articles/education-sustainable-development-goals-learning-objectives

Videos and blogs:

- Annie Leonard, The Story of Stuff (short film). URL: https://www.storyofstuff.org/movies/story-of-stuff/
- The story of plastic: https://www.youtube.com/watch?v=O4YzWDp3f_E
- The Lorax: https://www.youtube.com/watch?v=EdWesdMfyd4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