

## Notes on sustainability change makers

### Slide 1

This session addresses you both as future classroom practitioners and as emerging curriculum leaders. I am presenting my experience of developing a Learning for Sustainability course for pre-service primary teachers at the School of Social and Environmental Sustainability. I start with the why and how of sustainable development education and in the second part will present a case study of the design and development of a sustainable development course for UG preservice teachers.

### Slide 2

This slide outlines the aims of the session.

First, it focuses on developing a clear understanding of Education for Sustainable Development and its central role in achieving the Sustainable Development Goals, particularly in shaping long-term societal change.

Second, it reframes teachers not simply as curriculum deliverers, but as sustainability change-agents whose values, pedagogical choices, and professional judgement influence learners' attitudes and actions.

Finally, the session explores how these ideas were embedded in practice through a co-created teacher education course, illustrating how collaborative design can support confidence, agency, and meaningful integration of sustainability across the curriculum.

### Slide 3

Introducing part 1 of my presentation: the why and how of sustainable development education.

### Slide 4

The triple bottom line is a business concept measuring social and environmental impact rather than solely focusing on generating profit, or the standard 'bottom line'

People, planet, profit - also referred to as environmental, social and economic goals.

Many years ago, in the move from didactic and passive teaching towards more active approaches, the common slogan was to change from 'sage on the stage to guide on the side'. The shift to ESD requires a change to 'facilitator of transformation'.

### Slide 5

By mapping the 17 Sustainable Development Goals (SDGs) to specific educational outcomes, we can pursue a 'Triple Bottom Line' approach. This ensures our teaching balances environmental integrity, social equity, and economic viability. However, this shift is only possible if we reimagine the role of the educator: moving away from being the 'Sage on the Stage' who transmits facts, to becoming a 'Facilitator of Transformation' who empowers students to act."

### Slide 6

This slide explains why sustainability requires more than technical fixes. Although technology has an important role to play, achieving the SDGs is ultimately a societal and behavioural

challenge. We know that simply increasing knowledge does not automatically lead to changes in behaviour. The iceberg image is helpful here: what we see above the surface is awareness, but underneath sit deeper values, norms, and assumptions that shape how people act. This is why education matters so much. It is one of our most powerful long-term levers for supporting reflection, reshaping values, and enabling people to act differently.

#### Slide 7

If transformation is our goal, then Education for Sustainable Development (ESD) is our methodology. Under the UNESCO framing, ESD is not just a subject to be added to the timetable; it is a holistic approach to learning that shifts the focus from being about sustainability—a mere transfer of facts—to being for transformation. This distinction is vital. In this model, learners are no longer passive recipients of information about global crises; they are active contributors who develop the systems thinking, critical thinking, and futures thinking needed to solve them. By focusing on these competencies, we move away from 'instruction' and toward 'facilitation,' allowing students to explore their own values and build the agency required to drive societal change.

#### Slide 8

This slide summarises UNESCO's eight key competencies for sustainability. The SDGs tell us what needs to be achieved, but these competencies describe the capabilities people need in order to act. Crucially, they are not isolated skills. They work together as a holistic set: systems thinking, values awareness, collaboration, and critical reflection all underpin effective problem-solving. This has important implications for education, because it suggests sustainability cannot be taught through content alone. In the next section, I will show how we attempted to operationalise these competencies within a co-created teacher education course.

#### Slide 9 **HIDE this slide**

Slide 10: Pause for thought

#### Slide 11

Usually, people find that Critical Thinking / collaboration / problem-solving was encouraged, but Anticipatory or Normative competencies almost entirely absent.

The primary reason these are missing is that these competencies require a shift from Instruction/transmitting facts to Facilitation /supporting discovery. Traditional high-stakes testing and rule-following often punish the very experimentation and critical questioning these competencies require.

#### Slide 12

This slide shifts the focus from learners to educators. If we want to develop learners who are capable of acting as sustainability change-makers, we first need to recognise that educators themselves are the primary change agents. This requires moving beyond a narrow focus on curriculum delivery towards a broader sense of social and civic responsibility. Educators act as curriculum gatekeepers: through their everyday choices, they decide which values are foregrounded and which perspectives are included or marginalised. This role carries

significant ethical responsibility, particularly in navigating professionalism, neutrality, and advocacy. As a result, teachers must also model the very competencies that sustainability requires. This has profound implications for teacher education, which can no longer focus solely on transmitting knowledge, but must support educators to develop agency, reflexivity, and confidence in this role.

#### Slide 13

This slide shows a simple example of an activity we used with our student teachers. Working in small groups, we asked students to select one environmental SDG and explore how it connects to a social SDG. The task is deliberately open, with no single correct answer. Its purpose is to make visible the interdependencies between environmental and social issues, and to move students away from thinking about sustainability goals in isolation.

Pedagogically, the activity is designed to develop systems thinking by encouraging dialogue, multiple perspectives, and collaborative sense-making. Importantly, it also models an approach that student teachers can readily adapt for use in their own classrooms.

#### Slide 14

From theory to practice

#### Slide 15

We ended the first half of this lecture by identifying educators as the gatekeepers of the curriculum and the primary agents of societal change. But a question remains: How do we actually train someone for that responsibility?

If we want teachers to move away from mere curriculum delivery and toward social responsibility, we cannot simply give them a textbook. We must transform the way they are trained.

In this session, we are going to look at a year-long experiment in radical co-creation. We didn't just teach pre-service teachers *about* the SDGs; we invited them to build the course alongside us. By treating them as active contributors from day one, we modelled the exact Facilitator role they will eventually play in their own classrooms.

#### Slide 16

Co-creation sets the stage, but the daily reality of a sustainability classroom requires a specific pedagogical toolkit. We moved away from siloed subjects and toward interdisciplinary and inquiry-based approaches. This means instead of a standalone 'sustainability lesson,' we embedded the SDGs across the entire curriculum—using statistics to analyse climate data or persuasive writing to advocate for local social equity.

In terms of assessment, to develop change-makers we cannot simply use multiple-choice tests. We used assessment for learning, with reflection as a core component. This allows pre-service teachers to track their own growth in competencies like systems thinking and collaboration, ensuring they aren't just learning about sustainability, but are actively becoming the agents of transformation we discussed earlier.

#### Slide 17

To teach the SDGs effectively, we must move beyond the list of 17 SDGs and into the **Triple Bottom Line (TBL)** framework. We emphasised interconnectedness by getting students to play a game involving fishing from a lake. They were given different scenario cards such as family with six children, restaurant owner, elderly couple to see how over-fishing would

impact each scenario. Through this game, we teach students to see dependencies: the biosphere is the foundation that supports society, which in turn supports the economy. Without a healthy planet at the base, the entire structure of economy collapses. environmental degradation harms people, and social inequality hinders economic stability

#### Slide 18

This slide illustrates how we supported pre-service teachers to practise a facilitative, rather than transmissive, teaching role. We start with a familiar curriculum topic, in this case the water cycle, to ensure disciplinary integrity. We then ask students to identify a meaningful SDG connection, such as clean water or responsible consumption, positioning sustainability as an extension of existing content rather than an add-on. The focus then shifts from testing knowledge to developing competencies, for example by using systems thinking to map where local water comes from and where it goes. Finally, we ask student teachers to design a small, realistic action that learners could take, reinforcing the link between learning, agency, and real-world change. This structure helps future teachers see how sustainability can be embedded through facilitation, dialogue, and action, without compromising curriculum demands.

#### Slide 19

This slide provides further examples of how we used *wicked problem* scenarios within the course. Each scenario deliberately brings together multiple SDGs and highlights the tensions and trade-offs that characterise real-world sustainability challenges. Rather than asking students to identify a single correct solution, these tasks are designed to surface competing values, unintended consequences, and questions of social justice. Each scenario is also aligned with a specific sustainability competency, such as systems thinking, normative reasoning, critical thinking, or anticipatory thinking. Pedagogically, this allows pre-service teachers to experience what it means to facilitate discussion around uncertainty and disagreement, while modelling approaches they can later adapt for their own classrooms.

#### Slide 20

Students consistently reported that these scenarios helped them recognise that sustainability decisions are rarely clear-cut and often involve competing social, economic, and environmental priorities. In discussion, they naturally drew on several of UNESCO's key competencies, particularly systems thinking, normative competency, critical thinking, and anticipatory thinking. Importantly, many students commented that working through these dilemmas increased their confidence in facilitating open-ended discussion, rather than feeling they needed to provide definitive answers. This was a key outcome of the course, as it supported their development as reflective facilitators of sustainability learning.

#### Slide 21

This slide shows a simple systems-thinking activity we used with student teachers. We start with a familiar action—putting a bottle in the bin—and then model the kinds of questions teachers can use to develop systems thinking. For example: *What happens next if we do this? Who or what else might be affected? How does this link to our local community or the wider world?* What begins as an everyday behaviour quickly opens up discussion about production, waste systems, environmental impact, and social responsibility. Students

reported that these prompts helped them move beyond individual actions to see sustainability as a set of interconnected systems, and many felt confident adapting this questioning approach for their own classrooms.

The next slides shows some of the points they discussed in class...

#### Slide 22

By tracing the bottle from production through use and disposal, they begin to see how a single everyday action connects to wider systems of energy use, pollution, biodiversity loss, and human health. It reinforces the core message of systems thinking: small choices sit within much larger, interconnected systems.

#### Slide 23

This slide outlines what we describe as our *Change-Makers Toolkit*. To support students in moving from linear to systems thinking, we deliberately combined several pedagogical approaches. We modelled systems thinking explicitly in class, for example by showing how transitions in clean energy connect to health and economic outcomes. We then used project-based learning to require students to balance environmental, social, and economic considerations within a single task, rather than treating them separately. Finally, we drew on case studies, including analyses of our own institutional practices, to help students evaluate real-world initiatives through a holistic lens. Together, these approaches provided students with practical tools for engaging with sustainability in integrated and applied ways.

#### Slide 24

To understand the impact of this module, we have to look at how we shifted the focus from static knowledge to active competency. Instead of asking our pre-service teachers to list the 17 SDGs on an exam, we challenged them with a practical design task: 'How would you build a lesson that makes Systems Thinking visible and accessible to a 10-year-old?'

This required a fundamental Assessment Shift – moving away from traditional grading and instead evaluating their Strategic Competency—their ability to actually organise and lead tangible change, such as a school-wide sustainability audit or a community garden project. Finally, we recognised that to be a change-maker, one must first be a Reflective Practitioner. We used self-awareness exercises to help future teachers explore their own environmental identity, making sure they understood their own values before they attempted to shape the identity and purpose of their pupils.

Through modelling, we also acknowledged that change-making can be overwhelming—and that teachers need to support students' emotional well-being as a vital part of sustainability education.

#### Slide 25

Through data sources (reflections, artefacts, surveys) we have observed a transformation in three key areas. First, there was a significant increase in **professional agency**; these teachers didn't just feel more knowledgeable—they felt *empowered* to lead.

Their personal and professional identities merged into a single 'sustainability identity,' meaning they no longer saw these goals as separate from who they are as educators.

we saw a shift in attitudes. Sustainability moved from being a 'scary' or 'dense' topic to a source of professional purpose.

However, this is based on a small cohort of Scottish primary teachers so findings should be taken with a pinch of salt.

#### Slide 26

And when we analysed what worked well, the answer was clear: **authenticity**. Because the learning was tied to real-world co-creation, engagement remained high. Most importantly, it proved that this knowledge is transferable—they could see exactly how to weave these threads through maths, literacy, and art, breaking down the silos that often hold sustainability back in the primary classroom.

#### Slide 27

Finally, we must acknowledge that moving from traditional education to transformative ESD is not without its tensions and challenges.

#### **Time, workload, resource and curriculum constraints**

- LfS requires time to engage with complex sustainability issues and local contexts.
- Lack of protected planning time or integrated resources leads to pedagogy becoming episodic rather than sustained.
- Teachers report lack of space in the curriculum with other priorities dominating.

#### **Conceptual ambiguity**

- Addressing the vast spectrum of eco-literacy and emotional readiness among pre-service teachers and their pupils.
- Ensuring content is accessible without being reductive.
- Teachers worried about confusing pupils or increasing eco-anxiety.

#### **Institutional expectations**

- Moving from top-down to co-creation requires the lecturer to give up control in a power dynamic shift.
- The challenge of being a change agent within hierarchical or conservative school structures.
- Reliance on individual champions rather than system-wide routines

#### Slide 28

We began by acknowledging the urgency of the climate and social crises, and we conclude with a clear solution: the educator.

Teacher education is not just a part of the system; it is the primary lever for shaping a more just and sustainable future.

As the case study illustrates, meaningful change requires intentional design. Effective ESD is not an add-on, but a carefully structured, collaborative endeavour.

Through co-creation, sustainability education moves beyond content transmission to build agency, confidence, and professional commitment.

A teacher's role is to move beyond the delivery of a curriculum. By positioning themselves as agents of transformation, they can equip future generations not merely to live with crisis, but to understand, challenge and respond to it systematically.