UCL Centre for Climate Change and Sustainability Education

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Necessary but not sufficient: why science is only part of the answer to teaching our children about climate change

Parliamentary and Scientific Committee

1 December 2025

Welcome and opening remarks

Viscount Stansgate

Climate Change and Sustainability in Science Essential but currently not as visionary as it needs to be.

Professor Heather King

Co-chair of the Science and Technology, Engineering and Maths Education Research Group at King's College London
Vice President for Education at the British Science Association.

The science curriculum and climate change agenda: not well aligned!

Previously we have found:

- Content in science and geography **narrowly focused on technological fixes** rather than addressing social and environmental impacts
- Existing coverage is 'about' climate and sustainability, with a focus on facts and content acquisition. **There is limited emphasis on 'for' climate and sustainability: agency and ownership are not promoted**

The Review has recognized these shortfalls:

"The Science curriculum currently makes only limited reference to climate science and scientific work to combat climate change, and some content in the Programme of Study is outdated. This should be addressed'

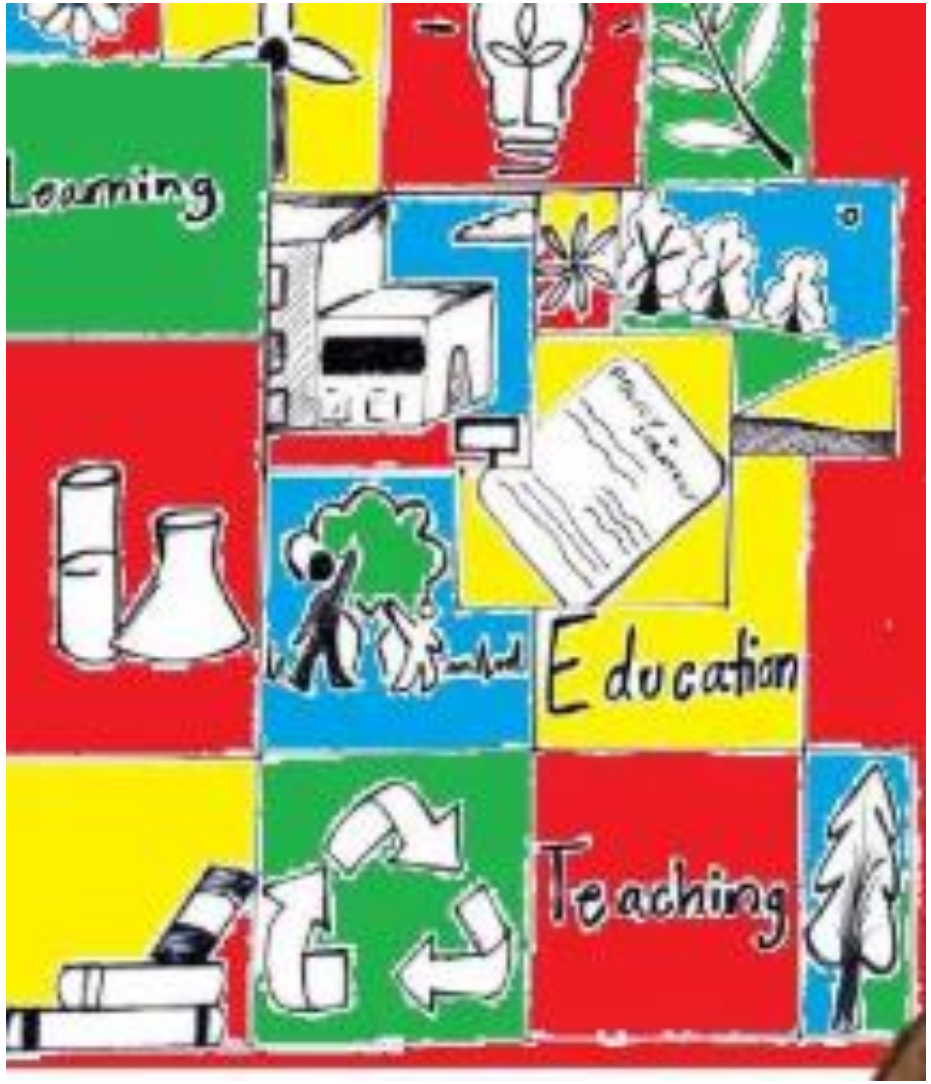
Greening the science curriculum

Science is invited to emphasise ‘climate science’ as the review argues it is ‘critical to supporting the wider economy, with the growth of the green economy expected to double the number of STEM jobs in the UK.’

But is this enough?

Climate science and sustainable approaches are acknowledged, but through the lens of economic and productivity agendas. Moral and ecological – more-than-human – imperatives are ignored.

‘Greening ‘ is a language device which can obscure the lack of a transformative approach.
‘Green-washing’ is ‘conservative reform’ : things are tweaked but essentially remain the same.



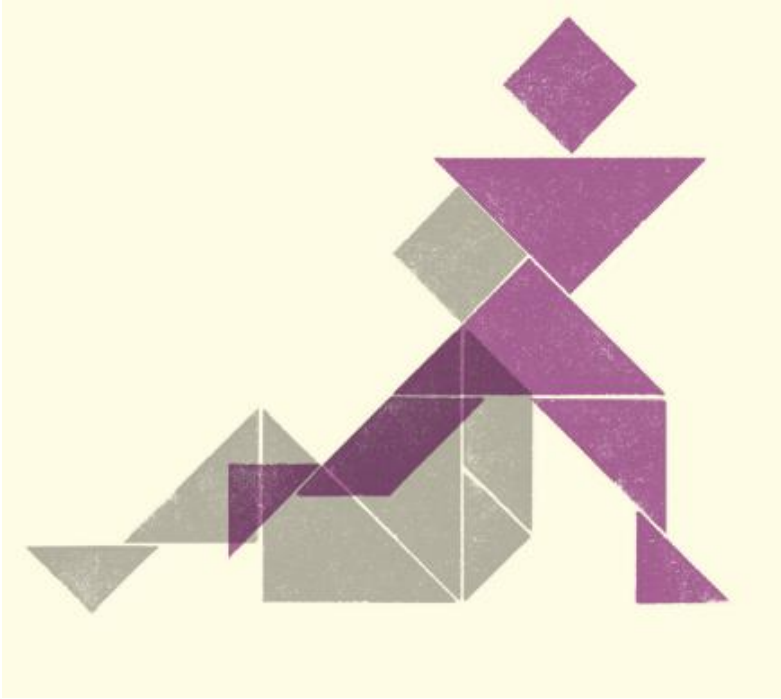
Coverage of climate change and sustainability is good…But we need pedagogical change and action

The CAR recommends that ‘in relevant areas, The Science curriculum explicitly develops students understanding of the scientific principles that explain climate change and sustainability and the global efforts to tackle them.’

We need a climate and sustainability agenda that not only teaches about the scientific processes of change, but also also **enacts change**.

We need a framework that envisions learners as co-creators of just and ecological futures, transcending the role of passive recipients of information. That is, we advocate for participatory, relational, and justice-oriented pedagogies.

This demands a reorientation from compliance to care, from growth to sufficiency, and from adaptation to justice.



Social and environmental justice-focused approaches within the science curriculum

- Consider local issues
- Acknowledge social impacts
- **Building capacities to take action**
- Developing skills to use scientific evidence, and interpret data to engage in societal debates

I think giving the alternatives, teaching students about the alternatives, instead of saying, all this is bad, don't do that, give them something to look at and say, well, I want to do this instead.

(Science teacher)

Implementing climate change and sustainability education across the whole school

There are numerous pedagogical opportunities to integrate content beyond STEM subjects.
But integration across the curriculum needs support (and to be officially mandated)

There is a need for Examination boards to develop and promote assessment processes that capture the genuine values of climate change and sustainability education across the whole curriculum as recognized by teachers:

- Knowledge **about** climate change and sustainability
- Skills **in** climate change and sustainability
- Social activism **for** climate change and sustainability

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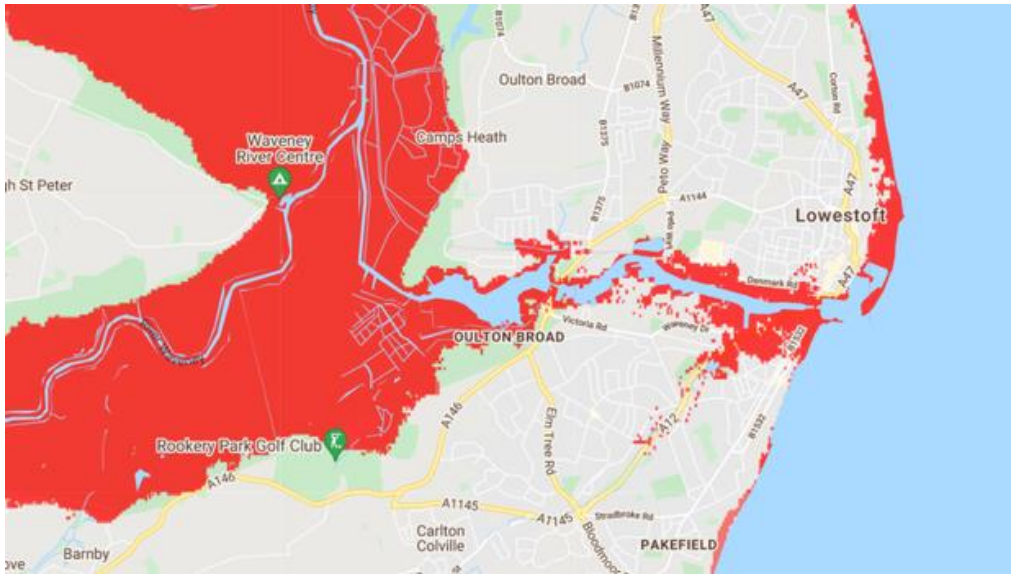
Reframing Climate Education for a Changing World

Eliška Gooch
Youth Sustainability Champion for the UK's Department for Education, and Master of Research in Environmental Science Student

Reflection on my own education

- Fragmented = in following a science/geography route I learned about the scientific mechanisms but far less about **policy, economics, social vulnerability or global justice**
- These gaps are not unique; they reflect **structural limitations** in the curriculum



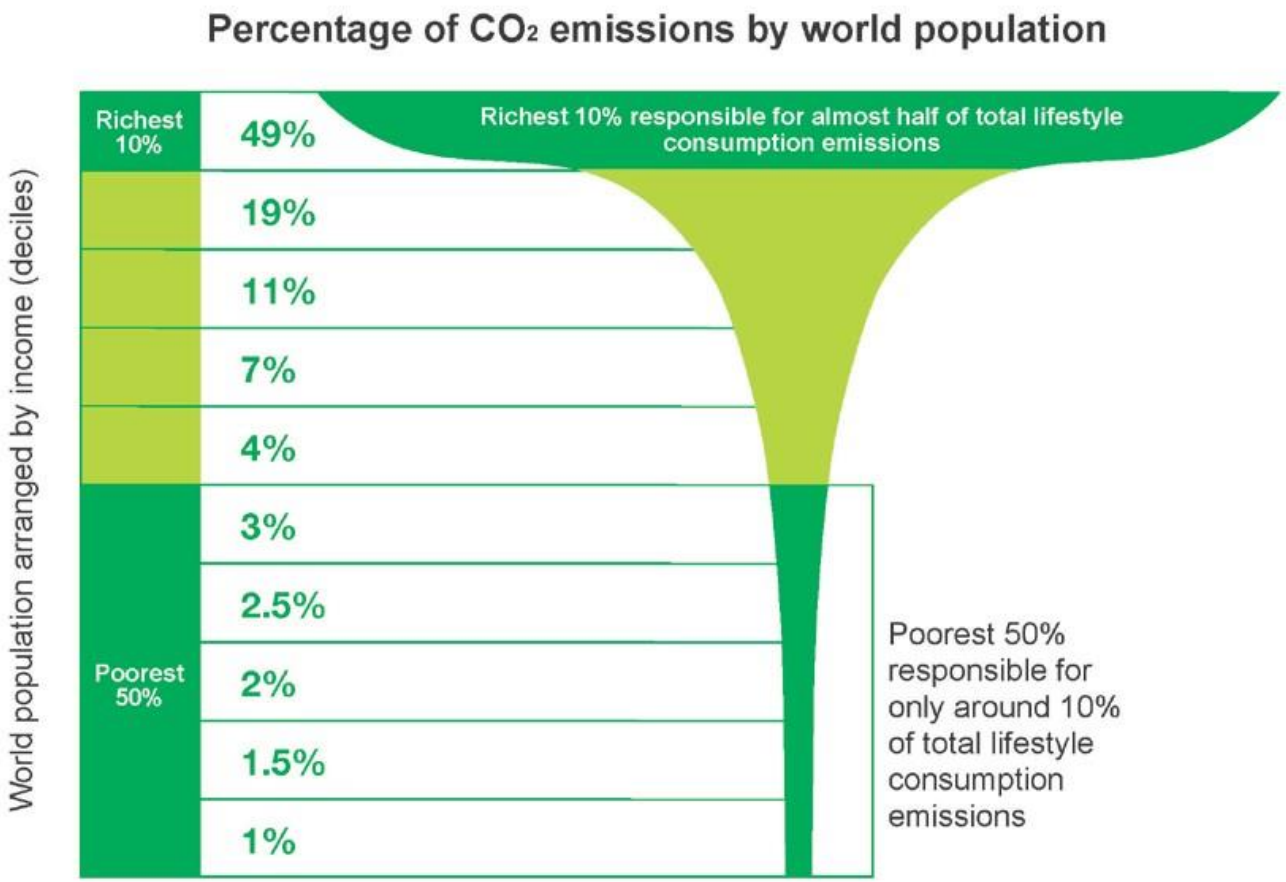
Lowestoft's predicted flooding issues by 2050 – Climate Central

Why Science Alone is Not Enough

- Science is **essential** for understanding the physical mechanisms of climate change, but on its own it cannot capture the full **complexity** of the crisis
- Climate change is not purely a scientific phenomenon, it is simultaneously **social, economic, political, cultural and ethical**
- When the curriculum positions it almost exclusively within science (and sometimes geography), we risk narrowing the conversation to measurements and models rather than the **societal transformations** required to address the problem

Distortions on Dialogue around Climate Change

- **Misinformation:** accidental errors in reporting or sharing information that is later found to be false
- **Disinformation:** intentional falsehoods spread to deceive, often for political, financial, or social gain
- **Shifting baseline syndrome/general amnesia:** where people gradually normalise environmental degradation and lose perspective on long-term change
- Facing **denialism** and **"delayerism"**



- Less than 20% of the world's population consumes over 80% of its natural resources
- Around 92% of historical emissions originate from the Global North
- The Global South is forced to bear the greatest burden of adaptation

What Climate Change and Sustainability Education should include

Knowledge:

- Climate science fundamentals
- Governance, policy and global frameworks
- **Locally relevant** environmental and social issues, enabling young people to contextualise change within their own lives

Skills:

- **Critical thinking:** essential in a world where misleading climate narratives proliferate
- **Systems thinking:** understanding interdependencies across environmental, social and economic systems
- **Problem-solving:** evaluating trade-offs, feasibility and equity considerations

- Bridging the **knowledge-attitude-behaviour gap**

What Climate Change and Sustainability Education should include 2

Defining Green Careers and Skills:

- Research by SOS-UK shows significant **misunderstanding** of what a "**green career**" is where young people frequently imagine only **technical roles**, such as **solar installation**, and overlook the broader reality that sustainability cuts across every sector

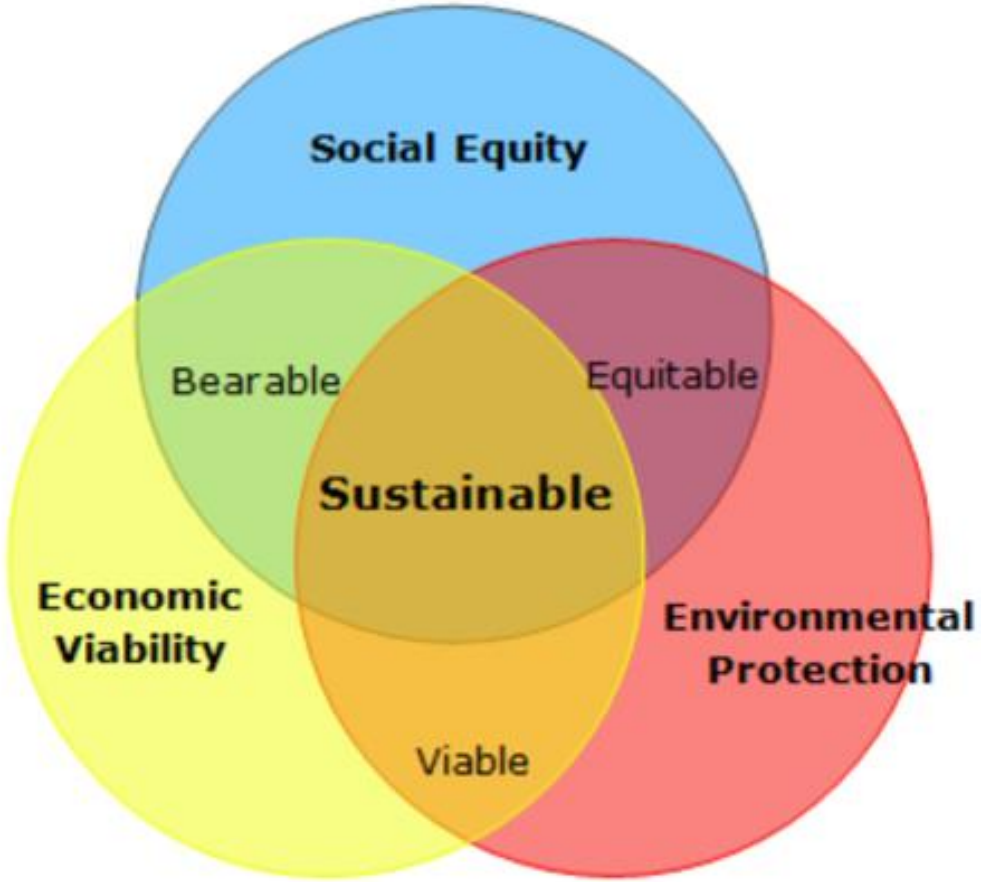
Communication:

- Peers now recognise change through lived experience: fewer snow days, warmer winters, seasonal anomalies
- Education must help young people **interpret** these **observations responsibly** and **meaningfully**

- We also need to cultivate **ethical reasoning**, **intergenerational justice**, **collaboration**, **resilience**, and **civic engagement** - the dispositions that underpin long-term climate action

The Societal Transformations We Need

- **Just transition** = "Greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind."



Pillars of Sustainability

Call to Action

- Embed CCSE across all subjects
- Align with green skills & national commitments
- Develop teacher confidence
- Strengthen key skills including digital literacy
- Position education within climate adaptation planning

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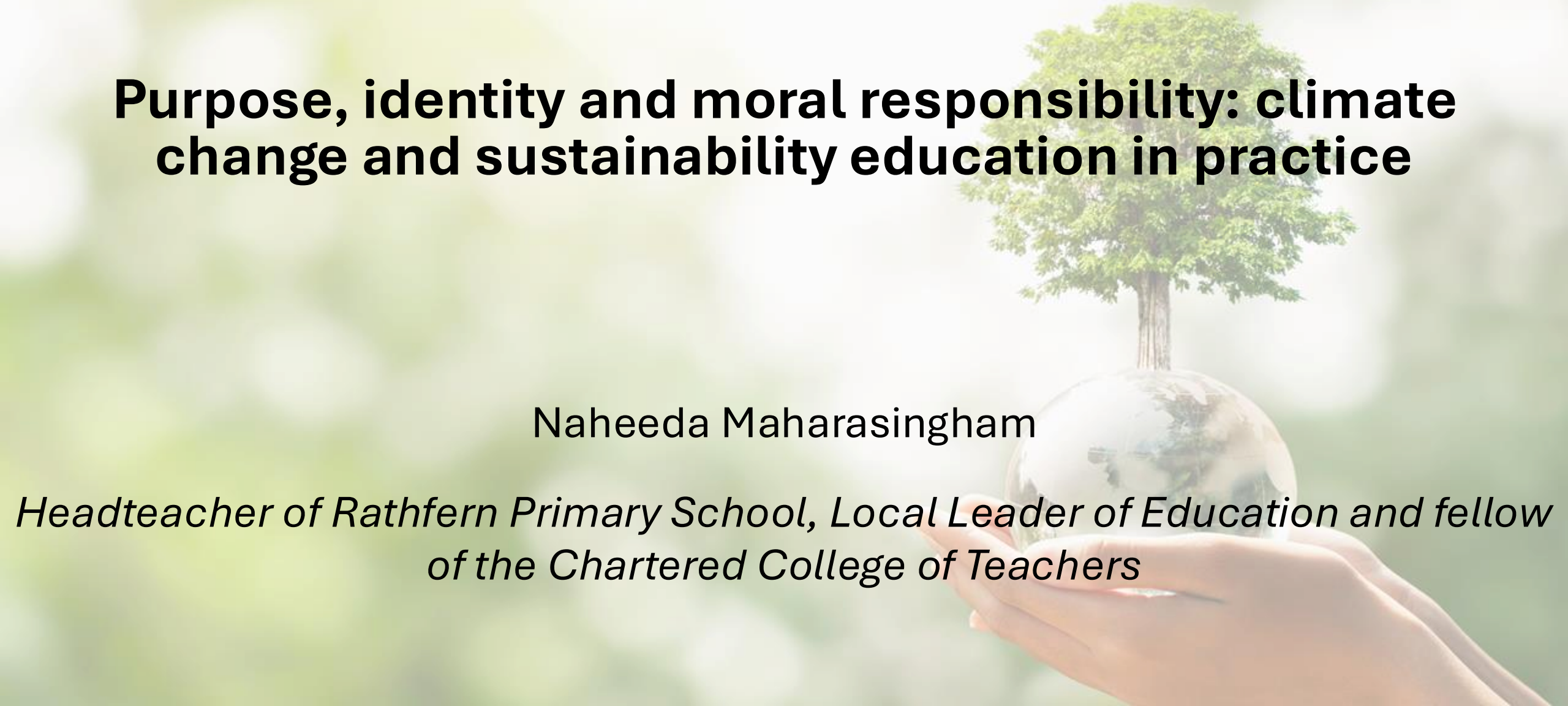
Purpose, identity and moral responsibility: climate change and sustainability education in practice



Naheeda Maharasingham

Headteacher of Rathfern Primary School, Local Leader of Education and fellow of the Chartered College of Teachers

Climate and Sustainability Education

Climate and sustainability education

- Is a part of our purpose, part of our identity and part of our moral responsibility.
- We are preparing children for tests, and for life—for citizenship, for justice, for interconnection, for stewardship of the earth.
- And what we are building is a community where children know their voice matters, their actions matter, and their future matters.
- Together, we are shaping responsible, hopeful, highly literate citizens who can—and will—make a difference.

RIGHTS RESPECTING SCHOOLS

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Science develops understanding & promotes action

- Primary climate education grounded in real contexts:
- - SUDS: rain gardens, biodiversity spaces, pollinator work.
- - Science: habitats, ecosystems, renewable energy, climate systems.
- - Science + creativity → informed, hopeful action.
- - **Article 29:** Education must prepare children to protect the planet.

Climate Education a Values-Led Whole-School Approach

- - Climate change is a defining challenge; children feel the precarity.
- - We begin with belonging , identity and contextual literacy.
- - Disrupting inequitable narratives through rights, justice and SDGs.
- - **UNCRC Article 29:** Education must develop respect for the environment.
- - Children as agents of change, not passive recipients of the curriculum
- **Embedding sustainability as a golden thread**:
- - Curriculum integration across science, art, literacy, geography and design and technology.
- - SDGs + Rights Respecting School framework.
- **UNCRC Article 29:** Education must develop respect for the environment.
- - **UNCRC Article 12:** Every child has the right to express their views.
- - The global is local: justice, interconnection, community voice

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Cultivating hope, Maintaining Momentum & Engaging the Whole Community

- Belonging → Identity → Agency:
- - Eco Council, Pupil Parliament, Senior Prefects.
- - Eco-Refill shop, anti-idling, Gorne Woods.
- - Dear Earth exhibition & Ode to Earth
- - **Article 12 in action:** Child voice shaping climate action. From school grounds to system change:
- - Grounds as living laboratory (SUDS, biodiversity).
- - Partnerships: Lewisham Climate Network, Trees for Cities.
- - Community engagement builds shared responsibility. Half termly Eco Newsletter
- - Climate education as empowerment, not fear.
- - Rights & SDGs guiding inclusive, justice-driven sustainability.

RIGHTS RESPECTING SCHOOLS
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13 CLIMATE ACTION

15 LIFE ON LAND

RIGHTS RESPECTING SCHOOLS

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Secondhand clothing sales

Sustainable Urban Drainage

Challenges for teachers and leaders

- Climate education is not part of the ECF
- Climate education is not part of the NPQH
- If it isn’t a golden thread, it becomes an add on that can be dropped with legitimate curriculum and assessment pressures

Rathfern Primary School

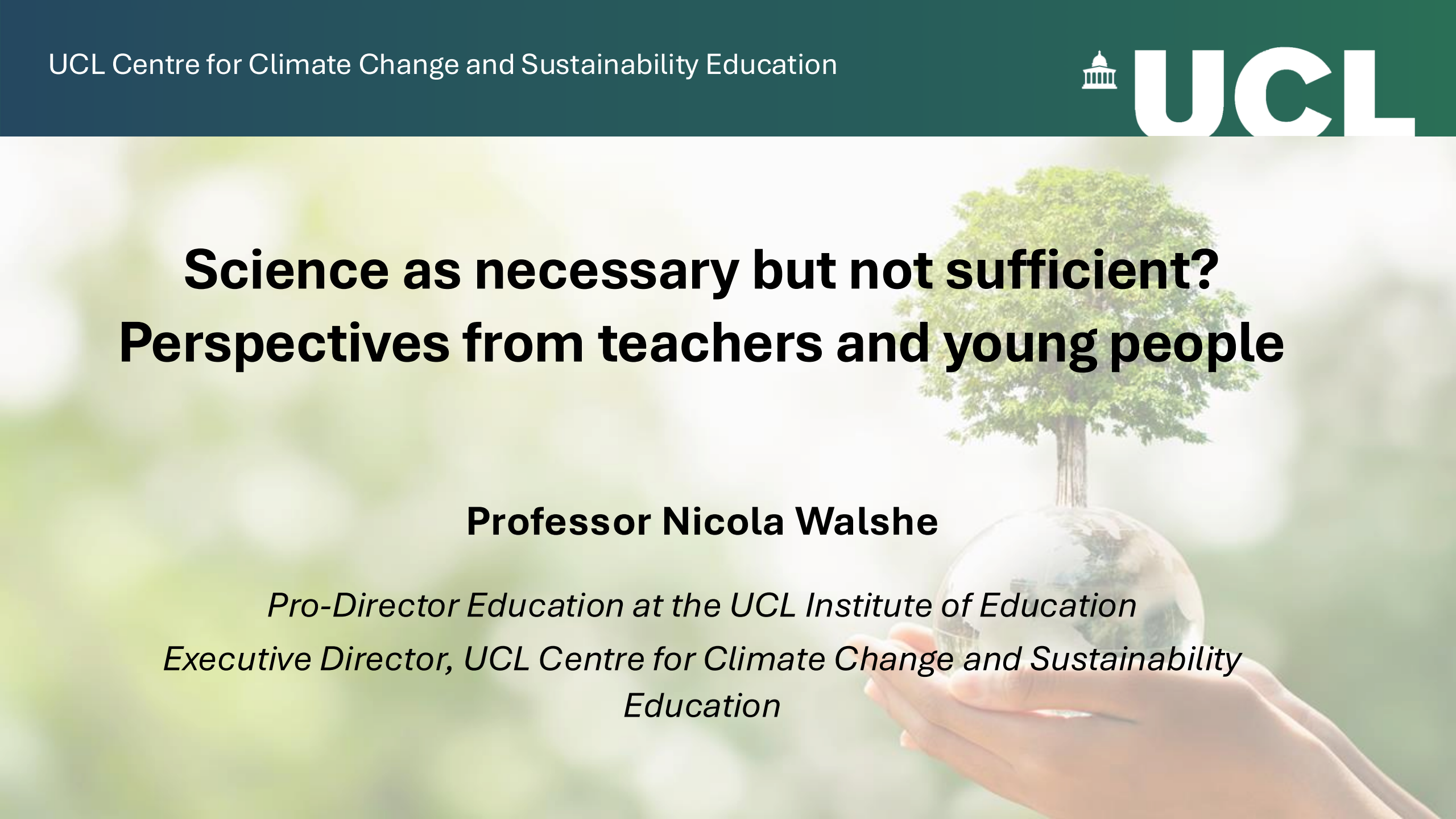
Art Exhibition

Science as necessary but not sufficient? Perspectives from teachers and young people

Professor Nicola Walshe

Pro-Director Education at the UCL Institute of Education

Executive Director, UCL Centre for Climate Change and Sustainability Education



What do teachers tell us?

- Survey of teachers in England
- 870 responses

Greer et al. (2023)

What do teachers tell us?

Greer et al. (2023)

Hargreaves et al. (2025)

Rushton et al. (2025)

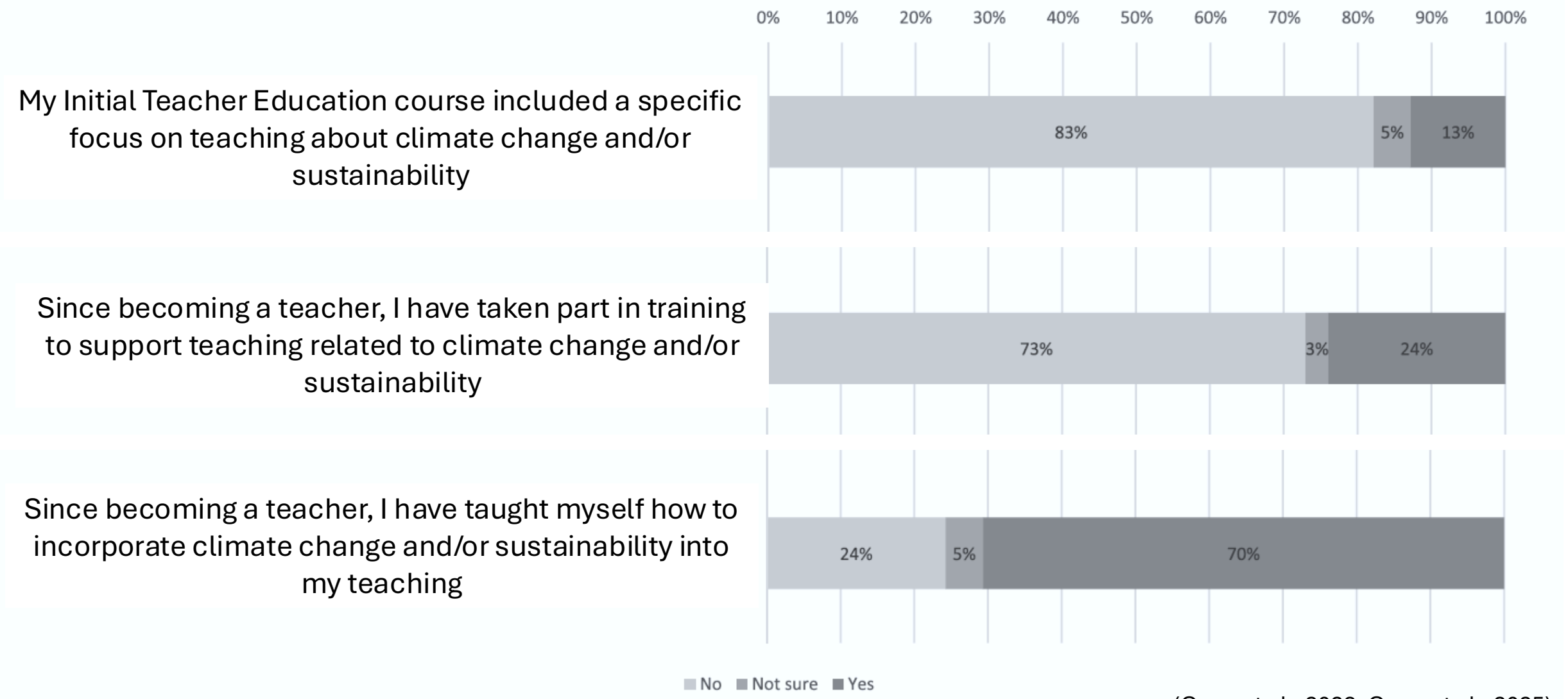
Barriers and Enablers

- Curriculum constraints
- Exam board specifications
- Limited access to professional development
- Teacher Confidence

(Rushton and Walshe, 2025)

- Education Policy, particularly National Curriculum
- Communities of practice (e.g. subject associations)
- School leadership which creates spaces of agency for teachers
- High quality, career-long professional development, from Initial Teacher Education
- Teacher Motivation and Commitment

Professional Development for Teachers



(Greer et al., 2023; Greer et al., 2025)

Professional Development for Teachers

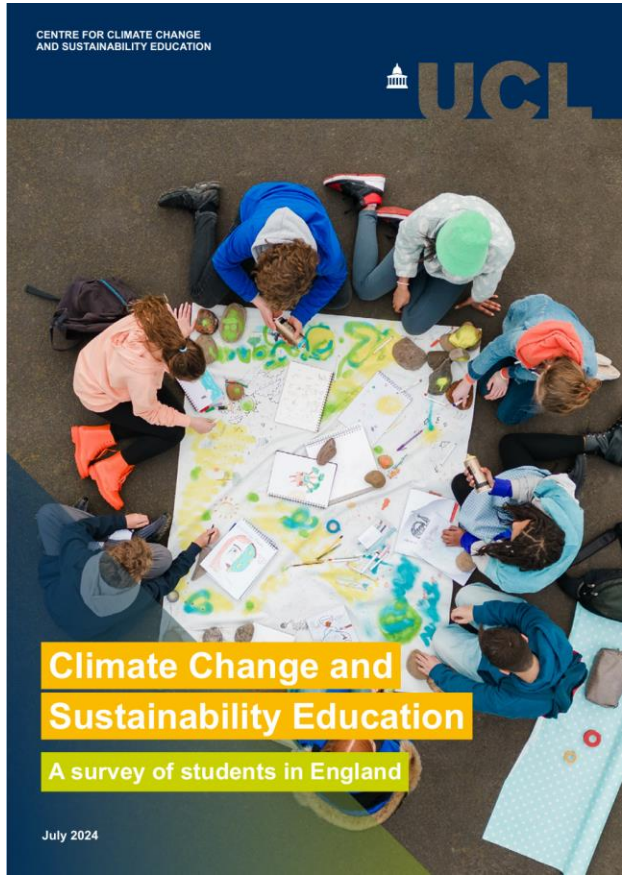
Teachers want professional learning that is:

- In-person
- During school hours
- At their school or self-paced
- Subject-specific and linked to their real teaching context

However, these preferred modes are currently difficult to access within existing policy and economic constraints.

(Greer et al., 2025)

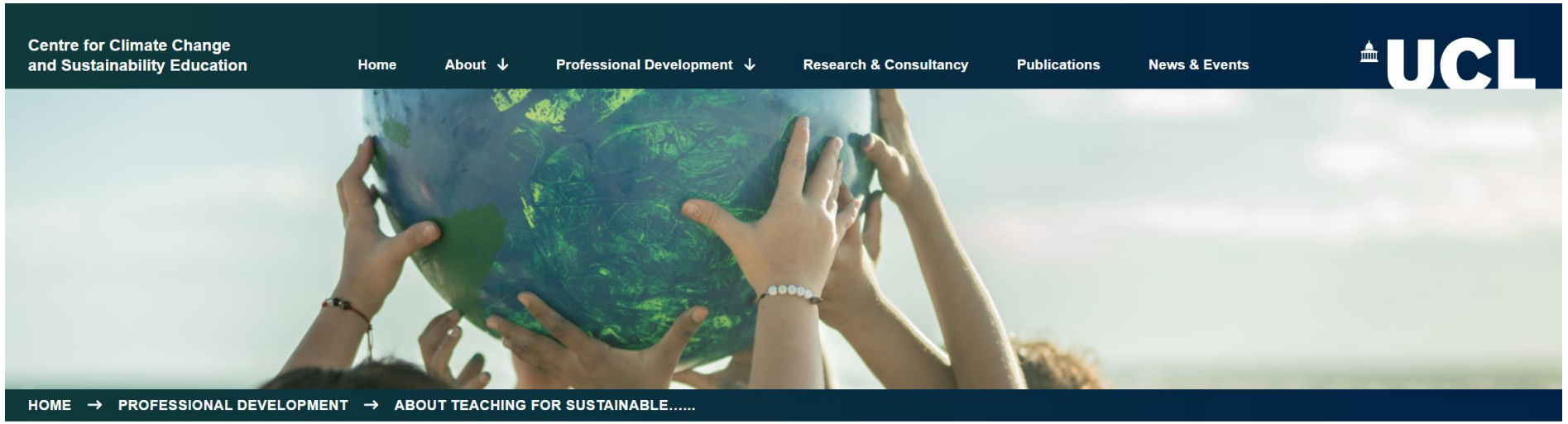
What do students tell us?



Walshe et al. (2024)

- Survey of 2,429 students (ages 11–14) in England.
- Climate change evoked many negative emotions, particularly sadness, anxiety, guilt and shame.
    - Girls and students from more advantaged socio-economic circumstances being more likely to feel negative emotions (Edwards et al., 2025).
- A curriculum that frames climate change only as a scientific problem risks exacerbating this anxiety by failing to provide hope, agency, and pathways to action.
- Students want more comprehensive and engaging climate education, including practical solutions and opportunities for participation (Rushton and Walshe, 2025).

Science as Necessary but Not Sufficient?



Teaching for Sustainable Futures

Our landmark programme of free professional development supports teachers to incorporate issues of climate change, nature and sustainability into their lessons in relevant, engaging and hopeful ways. It is research-informed, quality assured by UCL and tailored by subject and age phase.

"I have been a teacher for 16 years and feel more engaged and refreshed in perspective than I have about anything for ages…. thank you for such an inspiring and thought-provoking module." – History teacher

While science education is essential for understanding the mechanisms of climate change, **well-being, resilience and agency require contributions from across the curriculum**. This holistic approach can help mitigate anxiety and foster empowerment.

Thank you for attending. To contact us, please email climateeducation@ucl.ac.uk or visit www.climateeducation.org.uk to find out more about what we do.