

Education and Training for the Climate

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Editorial

At the time of writing, the Natural History Museum in London is displaying an exhibition titled *Fixing Our Broken Planet*:



Figure 1. *Fixing Our Broken Planet*, Natural History Museum, Photo Steve Puttick

The display next to the entrance title reads:

This is an emergency.

All hands on deck.

We are in a planetary emergency, an unprecedented period in our planet's history...We need a global response. Together, we have the power to make change...The Natural History Museum is at the heart of a growing global community uniting scientific expertise with advocacy for the planet. Together, we can build a future where people and planet thrive. Join us.

Large screens wrapped in a semi-circle display a seamless, mesmerising loop of curated video footage from around the world: beaches covered with more plastic waste than sand; construction workers in bright orange safety harnesses installing solar panels; bees pollinating lavender; a flock of sheep traversing a steep hillside; heavy rainfall on the canopy of a tropical rainforest; pedestrians hidden under umbrellas moving down an urban street in China; Jeju Haenyeo in South Korea harvesting seafood; a hyena carrying a carcass in its mouth; a robe-clad monk washing himself in a river; the crevassed surface of a glacier; slow-motion footage of a hurricane approaching; sped-up, time-lapse footage of clouds, sunlight and shadows chasing across mountains; the Palm at Dubai; a huge wave breaking on a beach; a nurse taking a child's temperature; fish swimming through a coral reef; a model on a catwalk; a man herding llama; a busy marketplace; ants carrying leaves much bigger than themselves. Energy, waste, plants, wildlife, people, food, habitats, cities and more illustrated through this visual representation that gestures towards the immensity, complexity, and wonder of life on this planet.

In some ways the montage jars against the fixing/broken framing; in other ways it illustrates and warns. The people represented hint of the 'global community' the exhibition invokes, locating the knowledge, expertise and action into two main and uncomfortably reductionist groupings: scientists and activists. These groups emerge through individual profiles introducing and explaining the displays in ways that raise interesting questions about the circulation, recontextualisation, and presentation of information about the deeply complex issue of climate change. The profiles of the activists present a wealth of biographical information. For example, one provides

details of someone who founded 'Youth Advocates for Climate Action Philippines, a student group that campaigns alongside communities such as marginalised fisherfolk. Her activism is guided by love, joy and collective world-building.' In contrast, all of the profiles and photographs of the scientists give only their name, followed by the same title: 'Scientist at the Natural History Museum'. The implication appears to be that scientists are clearly objective and so don't have or need personal biographies in the same sense. The activist's words are, in every case, presented in the first person; 'I used to...I was empowered...I now know...' Whereas, the scientist's words are (in nearly every case) universalised and imperative: 'In our desire for meat, we drove a wild species to extinction... We must find a way...'

The exhibition is carefully curated, includes some thoughtful explainers and striking visuals, and opens important questions about these massive global challenges. However, the positioning of 'scientists' in this way points towards a 'science first' epistemology that prioritises certain kinds of knowledges to frame climate change, and its solutions, in certain ways. This gets to the heart of some of the key issues that shape climate change education and the highly politicised nature of knowledge and communication related to the climate crisis. As such, it also offers a stark illustration of some of the issues that cut across many of the papers in this special issue. The exhibition might be seen as an example of informal education for the climate, but it is notable that education itself seems to be sidelined in the way that solutions are presented. As a child walking through *Fixing Our Broken Planet* announced (fairly loudly): "Dad, can we go and see the **actual dinosaurs** - this is just about litter and stuff!" Amid fierce competition for people's attention - and for curriculum space - a central thread running through all of the papers in this special issue is that education and training, understood broadly to cover a wide range of age groups (from primary to adult), sectors (primary, secondary, vocational, higher, and adult education), knowledges and skills, have a vital role to play in humanity's efforts to address climate change.

Research on education and training in the context of climate change has grown rapidly (Puttick, 2025), and education and training are increasingly positioned in global policy and public discourses as central to meeting net zero targets. Growing attention to the functions that education and training can play, the futures they make possible, the pathways leading to these futures, and enduring issues of equity and access, all raise multiple questions about exactly how education and training might fulfil these vital – yet complex and at times seemingly conflicting – roles. Disciplinary silos, the fragmentation of vocational training, and the weakness of links between education, training, industrial strategy and employment policy all present challenges which have limited the impact of education and training for the climate. The scale and complexity of these challenges means that these questions demand international, interdisciplinary collaboration in ways that engage deeply with multiple aspects of climate science while avoiding a reductionist scientism: the unavoidably political nature of climate change knowledge, mitigation and adaptation creates distinctive challenges for education and training to navigate. In Hulme’s (2018) terms,

In the current unstable climate (both atmospheric and political, and of course the two are connected) it is becoming ever more important to engage directly with the politics of knowledge. The pursuit of knowledge is inevitably a political act, if only because the sorts of knowledge that one chooses to create and to endow with authority carry political ramifications... (p.336)

The papers in this collection bring together a diverse range of international contexts (Canada, the Galápagos, India, Ireland, and England), and the authors represent a wide range of career stages and research projects, from doctoral research through to large scale UKRI funded work, exploring a diversity of education and training contexts and phases. The papers engage with empirical and theoretical analyses to explore this diversity of education and training, drawing from a range of disciplinary and interdisciplinary perspectives including geography,

environmental science, literature, law, economics, and education. Together, they provide insights into the diversity of education and training for the climate and raise critical interdisciplinary questions that we hope will be generative for future research. In particular, the papers mark a shared move away from individualised framings of climate responsibility and towards deeper, more complex and more collective understandings of how education and training can engage social, economic, political and affective dimensions of climate change. Across the wide range of contexts, phases and disciplinary traditions, the contributions argue that education and training for the climate is not a single activity or curriculum item, but a contested field shaped by the different epistemologies, affects, institutions, cultures and places in which climate futures are imagined, produced and lived. We hope this special issue makes a case for expanding climate education not simply by adding more climate content, but through asking hard questions about purpose, systems, and agency. Several papers explicitly confront the risk that climate education becomes a form of individual responsabilisation that encourages individual behavioural change while leaving intact the structural drivers of the crisis. Others explore the ways in which climate education is mediated through language, myth, narrative, place attachment, law, and digital technologies; each shaping different possibilities and constraints for participation. Throughout, the papers return to the challenge of cultivating forms of education and training that hold together expansive epistemologies that are critical, hopeful and empowering.

Robson, Puttick and Finnegan offer a direct critique of individualised framings, arguing that education and training for the climate too often centres personal responsibility – a ‘pick up litter’ imaginary – and avoids sustained engagement with extractive economics and the political economy of unsustainability. They argue that such avoidance does more than leave gaps in students’ understanding of climate change; rather it reproduces the very systems that led to and continue to sustain the crisis. This theoretical paper makes normative arguments that are aimed at

stimulating discussion about rethinking the purposes of education and training for the climate in ways that empower students as agents of system-level economic transformation to bring about a just transition. The paper emphasises the role of narrative skills as a mechanism for system change, arguing that narratives actively shape collective imaginaries, coordinate action, and have historically underpinned major economic transitions. From this perspective, narrative skills – the capacity to interpret dominant stories, craft alternative futures, and build shared meaning – become central to the work of climate education across schools, further education, and higher education. The paper sets up a theme that returns across the issue: education and training for the climate is unavoidably also about power, justice, values, and social change.

Siebers and Ambreen’s analysis of the UKRI-funded *Treescapes* project *Voices of the Future* opens epistemological questions around science literacies and futures literacies by attending closely to children’s language as they talk, play, collaborate and record data during classroom dialogues and tree-planting workshops. The context of the research is timely: planned and expanding tree coverage as a mitigation strategy raises questions about what kinds of human-tree relations are being imagined and whose visions will shape future forests as lived places. Using discourse analysis, Siebers and Ambreen foreground a tension between science literacy (often associated with particular forms of empirical evidence, procedure and the rhetoric of expertise), and futures literacy (as a creative, agentive practice of imagining and remaking society-nature relations). Particularly striking is the paper’s attention to how science can function rhetorically not only as knowledge but as an organising myth or fantasy around catastrophe, and how fear and hope become structured through these competing literacies. The paper makes a strong case for seeing education and training for the climate as something affective and relational, and which comes to be known and engaged with through narrative. It also suggests that pedagogical attention to language and

interactions offer valuable insights into the epistemological assumptions students bring with them.

Shimray and Padmanabhan move the discussion into direct contact with policy and implementation through a study of teachers' perspectives on climate change education in India. Their paper locates climate change education within formal curriculum frameworks, which in this context includes the long-standing influence of India's 2005 National Curriculum Framework – developed in a period in which climate change was framed in very different ways and levels of importance and urgency to those shaping much of today's discourse – and the more recent National Curriculum Framework for School Education 2023. There are substantial differences between the frameworks, with the latter more strongly advocating for climate change education including through outlining related competencies that students should develop. A key contribution of the work is the emphasis on system readiness, and the centrality of teachers to the creation of students' experiences in the classroom. The paper's focus on teachers' beliefs about climate change, their awareness of curricular goals, their confidence and preparedness to teach about climate change, and their identified needs for effective curriculum 'transaction' offers an holistic account illuminating how policy ambition can falter without sustained investment in teacher development, professional support and coherent curricular integration. In doing so, it echoes a thread running through the special issue: capacity-building for climate education and training is not only about resources, but about the professional conditions and knowledge infrastructures that enables the work.

Farber and Puttick's case study of fifth-grade children in the Galápagos Islands explores the relationships among local ecological knowledge, place attachment and pro-environmental behaviour. The Galápagos context brings distinctive features into view: a globally iconic ecology, formal conservation designations (UNESCO World Heritage Site and National

Park), and intensifying climate impacts. Their research draws on multiple methods including surveys, walking interviews and focus groups to develop our understandings of children's local ecological knowledge in ways that are carefully attentive to place-based meanings produced through movement and dialogue in the environment. The findings suggest positive relationships between place attachment and local ecological knowledge, and between these and increased pro-environmental behaviours. The paper also highlights aspects of children's pro-environmental behaviours that are often absent in the adult-focused literature, suggesting the need for conceptual and methodological approaches which are sensitive to forms of agency that might not neatly fit adult models of activism. In the context of the special issue, the paper contributes to the argument that education and training for the climate is not only about knowledge acquisition but is also rooted in place, lived experience, and the culturally specific ways in which children and young people come to care for and act within and for their environments.

Fuchs and colleagues examine climate change litigation as a pedagogical resource for climate change education in schools. Their starting point is a significant convergence: as the climate crisis intensifies, climate change education faces pressure to become more rigorous, justice-orientated and holistic, while young people increasingly engage in climate litigation to compel stronger mitigation and adaptation by governments and corporations. The paper analyses three youth-led cases through a climate change education learning dimensions framework, drawing out the kinds of learning each case might support, and the pedagogical issues that might arise. Their contribution expands what education and training for the climate might involve, positioning litigation not as a specialist legal topic but as a powerful site through which students can explore accountability, rights, evidence, governance and intergenerational justice. The paper offers support for arguments about the inherently political nature of climate education because of the way in which it illustrates that

'solutions' are not only technical; they are institutional, legal, and contested.

Martinez Sainz and colleagues present an analysis of game-based learning as a tool for engaging primary school students with climate scenarios grounded in real-world data. A key contribution is the articulation of 'pedagogical affordances' that connect climate literacy with skills for action: problem-solving, collaboration, systems thinking and participation in local, tangible action. The paper emphasises the deeply collaborative nature of their work, and the role of co-construction involving children, teachers and local authorities alongside interdisciplinary expertise spanning environmental science, education, computer science, architecture and urban planning. It offers an inspiring account of digital pedagogies that are engaging, purposeful and socially situated. In the broader landscape of education and training for the climate, their paper speaks to motivation and participation while also raising questions about the kinds of agency that digital environments foster, the relationships between simulated and material action, and the conditions in which engagement becomes transformative rather than performative.

Hirons' paper then draws the issue together around a compelling claim: building inclusive communities of hope is the central task of climate educators in the twenty-first century. Situating education and training for the climate within overlapping crises of climate change, inequality and biodiversity loss, Hirons argues that pedagogies must be sensitive to contexts of doubt, despair and hopelessness, and must respond not only with content but with community. By synthesising literature across three areas, the paper foregrounds: the need for communities that are critical and creative, capable of engaging generatively with the politics of climate change; interdisciplinarity as necessary yet challenging, including risks of 'overreach' that can alienate students and leave teachers feeling powerless, and; relational pedagogies centred on trust, reciprocity, recognition and respect, while making space for doubt and confusion. The

contribution resonates with other attention to affect, narrative and participation, and offers an ethical-pedagogical framing that helps to articulate what education and training for the climate might look like when it takes seriously the emotional and relational conditions for sustained engagement.

Directions for research and practice

Across these papers, five cross-cutting implications stand out to us. Firstly, education and training for the climate benefits from being explicit about purpose and scale. This involves shifting attention from changing individual behaviour towards generating system-level understanding and collective agency. This has implications across curriculum, pedagogy, and policy. Secondly, the politics of knowledge is unavoidable. Whether through museum curation, teachers' choices about which sources of information to use, curriculum frameworks, place-based knowledges, legal cases, or digital environments, education and training for the climate is deeply shaped by what knowledges are legitimated, whose voices are centred, and how responsibility and action are narrated. Thirdly, education and training for the climate is affective and relational work. Hope, fear, imagination and despair are not potential add-ons, but are entwined with teachers' and students' engagements with climate change. Fourthly, the relational aspects of education and training for the climate include connection to place and relationships with the more-than-human world, with different forms of knowledge expressed through place connection and local ecological knowledge. And, finally, education and training for the climate intersects with a number of other educational agendas – digital literacies, problem-solving competencies, navigating uncertain futures – with opportunities for collaboration across research and practice. We hope that together these papers and their implications function as an invitation to further interdisciplinary research that grapples with the structural conditions through which education is shaped and enacted.

Returning to *Fixing Our Broken Planet*, the exhibition's call to get 'all hands on deck' is evocative, but the papers in this special issue argue that the question is not only *whether* we respond, but *how* we learn to respond, *whose* knowledge and narratives shape what responses look like, and *what* scales of action this education and training makes possible. If education and training for the climate is reduced to 'litter and stuff', it risks reproducing the logics and systems that drive the crisis. Together, these papers insist that education and training for the climate must do harder and more hopeful work: cultivating critical understandings of systems, enabling imaginative and deeply place-based futures, building civic and professional capacities, and sustaining communities of hope with the resilience and creativity to stay with the struggle for the long haul.

References

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