



# Education in Times of Climate Change



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# Education in Times of Climate Change

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# Foreword

The long and deep historical engagement with the environment in education has gained increasing attention recently, due to recognition of the contemporary climate emergency and its effects on people and societies, and therefore on education; whether in basic education or further and higher education, formal or informal learning, for children, youth or adults.

Climate and development actors frame education as a key contributor to overcoming what is increasingly framed as a climate crisis; in the Paris Agreement (UNFCCC, 2015), as well as in SDGs 13 and 4 (UNGA, 2015). At the [COP 26](#) UN Climate Change Conference, at least 17 events addressed climate change and education. As recognised in the Berlin Declaration on Education for Sustainable Development (UNESCO, 2021) education is central not only to achieving SDG 4, but also as an anchor of all other SDGs. [SDG 4.7](#) underlines the commitment of educators to contribute to building sustainable and just futures. Most importantly, young people care, and are reclaiming agency in building their own futures; as shown by school strikes, legal challenges to governments, and online and offline climate activism.

And yet, UNESCO-IBE's (2021) review of 100 countries' national curriculum frameworks revealed that nearly half (47 per cent) made no reference to climate change. Moreover, 95 per cent of teachers believe that it is important or very important to teach about climate change (UNESCO and Education International, 2021), but only 55 per cent of teachers had received training. This resulted in less than 40 per cent of teacher respondents feeling confident in teaching the cognitive dimensions of climate change (40 per cent), and only 20 per cent feeling confident in how to teach for positive action (20 per cent). Nevertheless, decades of rigorous research has shown that education "about" environmental and social issues is not enough (Kwauk and Iyengar, 2021).

How then, should education address the global challenge of climate change? How can we best support children, youth and adult learners to address what Michael Mann identified as the [new tactics of climate denial](#): deflection, division, doomism and delay. How are we to address the wider question of transforming the structures and functions of education systems to address these challenges? How are educational institutions responding to climate change in their buildings, meals, gardens, transport and more? How

can education support the building of social and economic systems for sustainable futures, without losing sight of its educational mission and purpose?

Education's role in the climate crisis is to address the immediate [emergency](#), and also extends to long term, holistic views of systems transformation; empowering local communities for adaptive and mitigation action. Rigorous research exists that examines how education can contribute to students' future building; indeed, education is seen as being [key to making that happen](#). Education provides ways to conceptualise futures; to recreate, transgress and transform imperfect presents by engaging learners in defining and meeting the needs of a future that they are reimagining (Dryden-Peterson, 2022).

At the same time, recognition has grown that it is not possible to address environmental challenges without taking social issues into account: the most marginalized are the most vulnerable to changes in climate at the same time as they are least responsible (what Fussler (2010) calls the double injustice of climate change). In addition, a triple injustice is visited on the same marginalised people when purely environmental protection policies cause them additional vulnerabilities (Cook, Smith and Utting, 2012). Education in times of climate change as described in the pages of this NORRAG Special Issue (NSI) does not fall into this trap. Instead, the contributors chart a course for educators (with their learners, institutions and society more broadly) to build towards more sustainable – and just – futures.

In this NORRAG Special Issue, Heila Lotz-Sisitka and Eureka Rosenberg have skilfully curated 28 contributions from 75 authors in 22 countries that showcase what is currently being done to close the gap between the potential of education to contribute to more a sustainable and just world and the experiences of those in education. Part 1 draws lessons across disciplines, issues and contexts. Part 2 addresses ways in which we can expand learning and agency across boundaries from three different continents. Part 3 goes beyond formal schooling to offer lessons in building transformative learning, activism and relations. Part 4 leads the reader past western, rational, techno-scientific ways of knowing to engage diverse knowledges in climate change responses. Parts 5-8 offer a range of perspectives on active engagement with and responsiveness to different learners and demographics for

sustainability and justice. Parts 5 and 6 challenge the reader to listen to and engage with young people and children's views and voices in climate action. Part 7 focuses on higher education responses and Part 8 concludes the NSI by considering other places and spaces relevant to education for sustainable and just futures.

All contributions emphasise the need for the transformation and transgression of current practices, policies and planning; for teaching practices to incorporate more participatory or *ubuntu* methods; for curricula to provide more integrated concepts of society, environment and economics – notions that have never been conceptually or practically separate in many Indigenous knowledge systems. As [Radhika Iyengar said](#), quoting a protest sign, education for climate change without a focus on justice is just gardening.

NORRAG Special Issue was launched in 2018 with the ambition to be an open-source periodical giving prominence to authors from a variety of countries and with diverse perspectives. In line with NORRAG's strategy, and seeking to bridge the gap between theory and practice, each issue focuses on current debates that frame global education policy and international cooperation in education. The [first NSI](#) was on the Right to Education Movements and Policies: Promises and Realities, [the second edition](#) on Data Collection and Evidence Building to Support Education in Emergencies, [the third edition](#) focused on Global Monitoring of National Educational Development: Coercive or Constructive?, [the fourth edition](#) examined New Philanthropy and the Disruption of Global Education, [NSI 05](#) addressed Domestic Financing: Tax and Education, and the most recent, [NSI 06](#) considered [States of Emergency: Education in the Time of COVID-19](#).

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# Reimagining the Place of Nature in Education: Photographic Provocations for Relational Becoming



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*This essay draws on the work of the “nature relations” group, which is part of the Climate Change Education Research Network (CCERN), funded by the GW4-Alliance Generator Fund, UK: <http://ed-climate.net/>*

## Summary

This essay advances a posthuman relational approach to climate change education by using eight images as provocations. We argue that an embedded, holistic and interdisciplinary nature relations approach is a fundamental element of the educational response to the climate emergency; one which is based in the natural world and that is creative, embodied and transformative.

## Keywords

Becoming Relational  
Making Kin  
Nature Relations

## Introducing Nature Relations

This photo essay advances a “nature relations” approach to climate change education. We reimagine nature’s place in education, here by decentering humans. This approach rejects anthropocentrism (which views humans as exceptional) instead adopting an ecocentric, relational view where human-nonhuman nature is inseparable. This aligns with a new concept “childhoodnature” (Cutter-Mackenzie-Knowles et al., 2020), which disrupts understandings of childhood and nature, favouring a more entangled view of the child *as* nature.

A nature relations approach involves becoming relational with ourselves, other humans and nonhumans and the material world (Barratt Hacking & Taylor, 2020). Engendering individual and collective shifts in human behaviour is urgent as we strive to live less destructively. This essay opens up the space for thinking differently about education, focusing on opportunities to promote social and environmental justice.

This interdisciplinary essay combines biology, geography, ecology, ocean literacy, critical ecopedagogy, environmental education, school teaching and research expertise. Through the “relational becoming” lens (Barratt Hacking & Taylor, 2020), we present climate change education provocations from research and practice, using eight images (Figures 9–16). Provocations utilise emerging theory-in-practice, drawing on the posthuman concepts of childhoodnature and relational becoming and the growing evidence of effective climate change education (Barratt Hacking et al., 2010; [Monroe et al., 2019](#); [Rousell & Cutter-Mackenzie-Knowles, 2020](#)). The images bridge the gaps between the current article’s theoretical underpinnings and its practical manifestations.

**Figure 9.** Just a walk



Most photographs taken during a geography fieldtrip to Dorset, Southwest England, featured impressive Jurassic Coast rock formations, bringing textbook diagrams to life. Comparatively, Figure 9 was taken on arrival while on a walk to shake off London’s busyness. No clipboards, no preamble, just a walk. Spirits were high, as was the sun.

Although formal classroom instruction and fieldtrips are essential aspects of CCE, informal green and blue space experiences must be part of children’s lives. Research shows those who spend recreational time in natural settings are more likely to enact proenvironmental behaviours (Alcock et al., 2020). This supports arguments for active and engaging approaches towards learning in climate change education ([Monroe et al., 2019](#)). This uncomplicated photograph reminds us CCE is not only developed through the formal curriculum but that it should be embedded in the hidden and extra curriculum. Allowing children time and space for relational becoming within nature can inspire meaningful learning.

Educational experiences prioritising outdoor play, including forest schools and outdoor nurseries, resist dominant educational approaches, which place children indoors with predetermined human-centred outcomes. Time and space to play outdoors have declined, particularly during the COVID-19 pandemic. Green space access is a privilege

that is often ignored in attempts to address inequalities. Yet all children need childhood nature experiences that foster relational becoming. Climate change education requires transforming how we see ourselves as “part of the world in its differential becoming” (Barad, 2007, p. 185).

**Figure 10.** Playful nature entanglements



Figure 10 captures a playful childhoodnature encounter, where human–nonhuman is indivisible. Sunlight reflects trees on water, leaves stick to muddy boots, ripples fling across puddles, and two children shriek with glee. Climate change education is developed through meaningful relationships. Humans and nonhumans emerge through entangled encounters, making the more-than-human nature personally relevant ([Monroe et al., 2019](#)). Figure 10 highlights the joy of mutual connections through relational becoming in, with and for more-than-human worlds.

**Figure 11.** Meeting watery neighbours



The ocean governs life in unimaginable ways, influencing climate, absorbing, storing and moving heat, carbon and water (Laffoley et al., 2020). Existence not entangled with oceans is inconceivable. Complex human–ocean relationships have fundamental implications for climate change education.

These worm casts (Figure 11) offer a glimpse into the lives of the Wadden Sea inhabitants, the world’s largest intertidal mudflat. At low tide, this view stretches as far as the eye can see. Students dig with the mud, learning with this ecosystem. However, as sea levels rise, this ecosystem is being threatened by human exceptionalism. Could a different story be told? A story of relational becoming with myriad unnoticed relations unfolding beneath feet, “making kin” (Haraway, 2016) with watery neighbours. This more holistic education reflects interspecies connectedness and responsible coexistence, undoing past injustices and writing a more peaceful future with more-than-human worlds.

Figure 12. Biological becoming



Ground-breaking research on microorganism ubiquity is challenging understandings of ourselves as autonomous entities (Bordenstein & Theis, 2015). Less than half our cells are human (Sender et al., 2016); the rest are microbes upon which we rely. These codependencies extend outwards from microbes to insects to humans and beyond. Figure 12 captures an enchanted moment between child and dung beetle. The creature’s habits spark curiosity. This intimate encounter provides the space for becoming as two lives connect in childhoodnature.

Our lives *are* intertwined with dung beetles, which are found on all continents except Antarctica. They are essential for nutrient cycling, soil fertility and regulating livestock dung greenhouse gas emissions (Slade et al., 2016). Opportunities to interact with science and fieldwork can ignite interest in unnoticed ecological systems (Monroe et al., 2019). Moments of biological becoming, as pictured here, give rise to appreciations of entanglements and the codependence of life. This empowers learners to engage with CCE in ways

scientific educational practices alone cannot (Rousell & Cutter-Mackenzie-Knowles, 2020).

Figure 13. Lost in a microworld



A boy encounters a creature through an insect magnifier, noticed while researching how children living within Brecon Beacons National Park explored, played, learned and engaged with nature during a Summer Club (Dunkley & Smith, 2019). This research revealed that the children explored and understood micro-ecological worlds differently from adults; small insects and micro-ecosystems were encountered with curiosity and joyfulness.

Though brief, early experiences of micro-ecological worlds, such as those depicted here, can be significant within the process of ecological becoming, in different times and places, both in encountered moments and through recounted stories. Children, like adults, draw upon ecological memories, recalling and restoring in an ongoing process of relating to the natural world. Early experiences, however small they may appear to the adult gaze, afford children opportunities to make kin with other species.

Figure 14, was taken during research at [Grass Roots Forest School](#), where participants were immersed in nature: digging, planting, clearing, creating and cooking together. The research examined the roles of skilled forest school mentors in addressing the disengagement, marginalisation or exclusion of young people from a deprived urban area, who are also those less likely to be able to spend time in nature (Natural England, 2019). Such nature experiences away from classroom and cityscape are particularly urgent for students who may feel marginalised, penned in or adrift.

Here, these young people see themselves differently, as learners (Youdell, 2006), as part of the local and wider community and as nature. Through relational becoming, the layers of being and becoming are interwoven, like onion layers. These young people need quiet moments and safe spaces to remake every layer, to step back, catch their breath and only then explore themselves as childhoodnature.



**Figure 14.** A safe space to become in nature



Climate change education should be a globally inclusive endeavour. However, research and practice largely focus on the minority world (Rousell & Cutter-Mackenzie-Knowles, 2020), yet children in the majority world “face the greatest risks from climate change” (Currie & Deschênes, 2016, p. 3). Figure 15 portrays childhoodnature at the margins: a school for the unschooled in a kampung, Jakarta, Indonesia. In the kampung, human and nonhuman health is degraded, and wildlife is scant due to long-term environmental depredation. Informal dwellings sit among dereliction and smouldering rubbish, and the air is toxic from burning plastic.

**Figure 15.** Childhoodnature at the margins: an open-air school in South East Asia



This open-air charitable school offsets degradation effects, fostering local social and environmental justice. Children, who would otherwise be begging or scavenging, have access to healthy local food (cooked in situ), fresh air and green space. This Indigenous-style school is constructed from steel, bamboo and thatch with living walls that are home to orchids, creepers, ferns, insects, lizards and birds. In this childhoodnature setting, Indigenous species thrive. Children breathe, play and grow, becoming relational with Indigenous ecologies.

**Figure 16.** Response-ability for climate change justice



Figure 16 features the only school climate striker from Chinchilla, Australia, sitting in the shade of a watermelon, a powerful image because Chinchillans are proud watermelon producers. However, with the discovery of coal and gas, this identity has been eroded. Now, the town resembles a transitional mining community, with livelihoods dependent on fossil fuels.

In the school climate strikes, children and young people exercise responsibility and enact “response-ability” (Haraway, 2016, p. 34), the ability to respond to injustice continually by cultivating “collective knowing and doing”. The strikes present opportunities for teachable moments, activism and shifting ethical practices toward social *and* environmental justice. Education should engage in conversations about climate strikes. Otherwise, we risk transferring all responsibility to learners without giving them the tools or agency to act.

## Conclusion

The eight photographs represent Significant Life Experiences (Chawla, 1998), here manifesting hopeful and relational understandings of our role *as* nature. Reorientating education towards interconnections and decentring humans will transform approaches to climate change education.

This essay aims to provoke a cultural shift towards viewing humans as nature in order to tackle the climate emergency. We argue for more space in education for nature relations, slowing down, learning and becoming with nature to build learners’ understanding of themselves as childhoodnature

(Cutter-Mackenzie-Knowles et al., 2020). Nature relation experiences are indoors and out, formal and informal, curricular and extra-curricular and should be an inseparable part of education.

Nature relations benefit *all* learners, including urban children, where “nature” is harder to find, especially those at the intersections of social disadvantage, who have less access and opportunities for becoming relational with the natural world (Natural England, 2019). Equally, nature relations benefit rural children, including the millions in the majority world who live extremely close with nature and in ways others can learn from. Relational becoming is vital in recognising, sustaining and regenerating natural environments and an imperative for human well-being. A relational approach expands educational horizons, acknowledging that the futures of all lifeforms are intertwined. Climate change education must decentre humans, ensuring efforts to address climate emergency consider humans and nonhumans concomitantly.

Prioritising nature relations is essential because knowledge and skills alone will not solve the climate emergency (Kollmuss & Agyeman 2002; Rousell & Cutter-Mackenzie-Knowles, 2020). A relational shift can be foundational for action because learners come to see themselves *as* nature, interconnected with all life, provoking an imperative to act and a more response-able approach. “Nature relations” is not a romantic or idealistic notion, nor is it new. The concept has complementarity with—and is underpinned by—Indigenous philosophies, which have avoided anthropocentric destruction by living relationally for millennia. More than ever, all humans must understand our lifegiving entanglements with more-than-human nature.

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