Geographical education III: changing climate, changing geographies, changing geographical education?

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Abstract

This third progress report critically examines the shifting role of climate change in geographical education: from a peripheral concern to an urgent and defining priority. Climate change now occupies substantial space across research, practice and curriculum, however, this transformation unfolds amid ongoing 'lag' between public discourse, research evidence, and curriculum development. Highlighting tensions across urgency and complexity, global and local scales, and representation and justice, the report concludes with a call for building geographical education futures that are creative, generous, hopeful, diverse and robust enough to meet the challenges of climate change.

I Introduction

On May 24th 2006 *The Independent* newspaper in England ran a frontpage story with David Attenborough's words: "I am no longer sceptical. Now I have no doubt at all. Climate change is the major challenge facing the world…" (Attenborough, 2006). I was training to become a geography teacher at the time, and we immediately pinned it to our classroom walls. It felt like a threshold moment in public debate about climate change. Attenborough framed climate change through an epistemological binary of certainty / doubt, a politics of crisis and urgency, normative demands for a 'sea change in moral attitude', imperatives to act, and the identification of a single proxy: 'When I was a boy in the 1930s, the carbon dioxide level was still below 300 parts per million. This year, it reached 382, the highest figure for hundreds of thousands of years' (*ibid*.). Introducing the COP26 (Conference of Parties) negotiations fifteen years later, Attenborough warned world leaders that 'it's easy to forget that ultimately the climate emergency comes down to a single number: the concentration of carbon in our atmosphere' (CNBC, 2021).

There's enduring use of carbon dioxide concentration as a shorthand for climate change, but this example also illustrates how rapidly public discussion of climate change has moved. Today, it would be unthinkable to devote the front page of a national newspaper to an environmentalist saying they believe in climate change. It is also more complicated than a single number (Hulme, 2022), and the concept is in part 'an abstraction: 'climate change' is as epistemological as it is material and real' (Puttick *et al.*, 2024, p.796). Attenborough's claims provoke a range of questions about authority and knowledge that geographical education continues to wrestle with, and which I explore further in this report. In my first progress report I described the fields relating to geographical education and their relationships and interfaces. In the second report I argued for anti-racist, decolonial futures

that might be made possible through geographical education. This third report takes Bulkeley and MacFarlane's (2024) provocation *changing climate, changing geographies?* as its point of departure. I analyse attention in geographical education that has been given to climate change, drawing together arguments from the previous reports to focus on what has been framed as *the* defining issue of the present juncture, and one that will be around for as long as geographical education is. In what ways is geographical education changing in response to a changing climate and changing geographies?

Bulkeley and MacFarlane asked four broad questions about: the most significant geographical contributions to climate change research; how these contributions have changed over time; gaps and limits to geographical understandings of climate change, and; future geographies. Their edited collection highlights multiple ways in which geography has developed our understanding of climate vulnerabilities (Liverman, 2024), the geographies of knowledge and climate governance (Owens, 2024; Westman, 2024), contentious historical politics (Parsons, 2024), and how it is shaping future climates and geographies (Cox, 2024). Attention to climate change education is growing rapidly across multiple disciplines and phases of education (Leal & Hemstock, 2019), and there are ongoing debates about geographical education for the Anthropocene (Lambert, 2023; Morgan, 2012). These debates echo wider questions about expertise and trust, partly because teachers, along with most scientists, stand in a 'similar downstream relation to climate models as those of policy makers and the lay public: they are forced to put their faith in technical expertise that they do not fully understand' (Demeritt, 2001, p.309). And even for those who understand the modelling, climate change remains tied to inherently contestable issues of power, politics and values: 'epistemic uncertainty, ambiguity and sheer unknowability all require value-based judgements about what is 'really' happening to the Earth System now and in the future (Castree, 2022, p.926). I now review the ways geographical education's attention to climate change has shifted research priorities, discourses and policy.

II Change

In educational research by geographers attention to climate change has increased rapidly, particularly since 2017. None of the previous progress reports on geographical education (Walford, Graves, Winter) mentioned climate change. In Butt's (2011) *Geography, Education and the Future* it makes the list of contemporary issues: 'climate change, sustainable development…' (p.3), but without receiving substantive attention or an index entry. JGHE's (*Journal of Geography in Higher Education*) editorials since 2000 paint a similar picture, with concerns about fossil fuels running out harming 'our ability to meet our own future needs and those of our younger generation' (Davidson, 2003, p.235) shifting to arguments that foreground geography's contribution to understanding and acting on climate change (Banfield, Hampton, & Zurek, 2022). In IRGEE *(International Research in Geographical and Environmental Education)*, the first mention of climate change is in 1996, and until 2012 features in a small number of articles each year (between three and seven). By 2024 there

were over four times the highest of these. In Stoltman and Lidstone's (2001) editorial, 'global climate change' (p.216) is briefly mentioned amid other global challenges, whereas Kidman and Chang's (2024) editorial sees addressing climate change as the subject's main purpose: 'to prepare our students and people from all walks of life to take sustainable action for climate change' (p.4). Through a comprehensive analysis of research on climate change education across multiple fields, Wang *et al*. (2024) also describe this pattern of growth, illustrated across three periods of climate change education publications. The percentages of papers within their review of 1264 articles begins in a 'concealed' period (2000-2007; 1.3% of those articles), followed by an 'emerging' period (2008-2016; 27.3%), and culminating in a time of 'blooming' (2017-2022; 71.4%). They argue this growth trajectory represents a lag of at least a decade between widespread research attention to climate change (coinciding with the 2006 Attenborough marker) and the 2017 increase in educational interest. Wilmot and Brooks' (2023) discussion of the *Commission on Geographical Education's* book series from 2017 reinforces this point by placing climate change at the forefront and arguing the series 'is engaging with global realities of environment and sustainability, climate change…' (p.193).

Across the periods during which attention to climate change education has been increasing there have been rapid changes in wider climate discourses, including notions of urgency that are reflected in geographical education. In Hulme's (2019) terms, these shifts are characterised by 'deadline-ism', such as 'there being only "12 more years remaining to save the future", of feeling that "panic" was a needed and appropriate response to the unfolding changes occurring to the world's climate' (p.1). Many universities signed up to declare a Climate Emergency, the website of which (https://climateemergency.uk/) features a clock counting down years/days/hours/minutes/seconds: 'time left for 67% chance of staying below 1.5°C'. We found similar metaphors in research with teachers in India who described climate change as the 'need of the hour', and with tipping points that make it like 'a bomb that is hidden at the moment and can explode any time' (Puttick *et al*., 2024, p.809). These teachers – and many others in a range of international contexts – have strong beliefs about the importance of climate change, but also face challenges because of the complexity, scale and changing nature of the research, and so call for further increases in attention to climate change education through policy, resources and professional development (Greer et al., 2023).

Global policy networks within which geographical education is situated have also changed. Periods of focused action, such as the United Nations' Decade of Education for Sustainable Development (UNESCO, 2005), and their subsequent Global Action Programme declared ambitions to 'generate and scale up action in all levels and areas of education and learning to accelerate progress towards sustainable development' (UNESCO, 2014, p.14). These global initiatives exert a powerful influence, but often in tension with more critical strands of geographical thought and practice (Firth & Smith, 2017). Similarly, Greer *et al*. (2021)

question the ambition and quantity of attention given to climate change in education policy, which Dunlop and Rushton (2022) argue is at risk in England of being a placebo for policy. These arguments are echoed globally (Læssøe & Mochizuki, 2015), for example in; the Philippines and Singapore (Ho & Seow, 2017), Spain (Fuertes-Prieto, Ferrari, Eugenio-Gozalbo, & Ruiz, 2024), India (Chopra, Joshi, Nagarajan, Fomproix, & Shashidhara, 2019), Iraq and Zambia (Rushton, Sharp, & Walshe, 2023): reviews of curriculum outlining much recent change, but also calling for further urgent and far-reaching reform.

III Manifestos

In the longer tradition of Education for Sustainable Development (ESD), strongly normative, activist threads have run through geographical education. The urgency, scale and acceleration of climate change have intensified the relationships between geographical education and orientations towards action. In part, these shifts reflect concerns in the discipline 'that is about more than just describing what the world is: it is also concerned with what the world ought to be' (Lave, Biermann, & Lane, 2018, p.24). Similarly, across the wider scientific community, such as through Scientists for Extinction Rebellion, there are increasing calls for scientific activism in response to planetary emergency (Wyatt, Gardner, & Thierry, 2024). Despite 'warning after warning', harmful global trends (including atmospheric carbon dioxide concentration) persist, and 'humanity continues down a self-destructive path that is destroying the planet' (Reid, Dillon, Ardoin, & Ferreira, 2021, p.789). Youth-led calls have powerfully made this argument, reshaping discourses in geographical education about climate change and reframing the politics of curriculum. The school climate strikes began in 2018 after Greta Thunberg protested outside the Swedish parliament for three weeks instead of going to school, and #FridaysForFuture and #Climatestrike spread globally (see https://www.fridaysforfuture.org/). Epigraphs in Greta Thunberg's words open research articles discussing global crises and climate change (Finnegan, 2022; Jeffrey & Dyson, 2022), and the 'Greta Thunberg Effect' has received research attention for the shifts in climate action it generates (Sabherwal et al., 2021).

The *Manifesto for Education for Environmental Sustainability* (BERA, 2021) was co-created with young people and reframes these curricular debates by beginning with values including love for each other and the planet, and capabilities, such as knowledge for action. Against the broad consensus on climate education found through Dunlop *et al.*'s (2022) workshops, Kuthe et al.'s (2019) analysis of teenagers' awareness about climate change in Germany and Austria found four clusters, the: Disengaged; Paralysed; Charitables; Concerned Activists. The differences between these clusters, and the heterogeneity within each illustrates wide variance in perspectives towards climate change. It supports arguments for increasing climate change education because they found those in more 'extreme' positions (Disengaged, and Concerned Activists) were also those with least knowledge about climate change. Their work also highlights the challenges inherent in deciding what kind of

geographical education might best relate to, engage with and expand the knowledge, pre- and mis-conceptions brought by each group (let alone each individual within each group).

In England, the youth-led *Teach the Future* have called for substantial curricular changes (https://www.teachthefuture.uk/policy/england), including for geography to give greater attention to climate change. Their Climate Education Bill (2022) sought to integrate climate change across all phases of the curriculum, for example, by requiring schools to educate pupils 'on the climate and ecological emergency, climate justice, nature, sustainability, the need to cut carbon emissions to net zero…' (15). Climate strikes and manifestos, research on students' views (BSA, 2023) and the wider public globally (UNDP, 2024) all voice strong support for improving climate change education. Using an emergency framing and centring justice would involve radical change to curriculum at all levels of geographical education (Hodgkins, To, & Matthews, 2024), increasing critical engagement with climate change knowledge production (Healy, Mitchell, & Walshe, 2024), and managing holistic dimensions of living with climate change (Rushton et al., 2023). Some of these priorities are echoed in the growing number of institutional level commitments to climate change education from a number of universities, framed variously as investment opportunity (Harvard, 2023), and existential threat (USP, 2022).

IV Representation

Understandings of representation as the practices through which meanings are constituted and shared, and as questions about who does the representing, were famously expressed by Gayatri Spivak (1988) as speaking of and speaking for. Increasing attention has been given across geography to representation, patterns of Global North hegemony, and associated calls for worlding geography (Müller, 2021). Changing geographies of education are bound up with the wider context of rapid increases in the production and circulation of information, the unevenness of which is felt acutely in climate change where historic responsibility, risks and vulnerabilities are highly inequitable. Themes of race and de/coloniality cut across climate change (Mahony & Endfield, 2018; Sultana, 2021), and the racialised politics of representation are obvious in the foregrounding of actors from the Global North (such as Attenborough and Thunberg). In Walker's (2020) terms, interest in youth activism in relation to the school strikes 'runs the risk of flattening global inequalities in young people's exposure to environmental hazards, access to education and global knowledge networks' (p.1). The networks through which knowledge and information circulate act to reproduce and exacerbate multiple power differentials (Mills *et al.*, 2023), while being cloaked in the promise of democratising knowledge. Wang et al.'s (2024) analysis illustrates the dominance of the US in climate change education scholarship, followed by Australia, England and Canada. The sources of information about climate change that teachers use reflect this concentration of knowledge production (Puttick & Talks, 2021). A wider body of evidence supports claims about the importance of local places and experiences in shaping beliefs and actions towards the environment; arguments for the

‘double-move’ of worlding geography while also attending to the local (Puttick, 2024). The scale of climate change is a major challenge for geographical education: it is an inherently global concept made knowable though long-term, global observations and modelling, but it is also produced and experienced in particular places and times, and there are important senses in which local experiences reduce hypothetical, temporal, spatial and social distances from climate change (Hoffmann, Muttarak, Peisker, & Stanig, 2022). Navigating the tensions between these scales is an important area of research, and there is a growing body of work facilitating young people’s engagement with local environments, including through aesthetic modes of expression (Rousell, Cutter-Mackenzie, & Foster, 2017) and in collaboration with artists (Moula, Walshe, & Lee, 2023).

Global patterns of knowledge production and circulation have shaped the ‘speaking of’ climate change in geographical education: the practices through which meanings are constituted and shared continue to be dominated by the media and the most visible online representations (Mitchell, 2020; Rousell & Cutter-Mackenzie-Knowles, 2020), which is associated with the way that framings of climate change in textbooks often ‘match the public discourse of doubt about climate change rather than the scientific discourse’ (Román & Busch, 2016, p.1175). In particular, Román and Busch highlight the framing of climate change as primarily something about which scientists disagree, similar to the opening sentences of Chang’s (2014) abstract to *Climate Change Education Knowing, Doing and Being*:

> Climate change is a controversial topic; some people assert that climate change is not occurring, and others believe that reports are inaccurate, that whilst climate change is happening, it may not be caused by human activity. There are also climate alarmists who use IPCC reports to support their claims that erratic weather patterns are a result of climate change caused by human activity…

The discourses have shifted considerably, and eight years later these sentences were not repeated in the abstract to the second edition. Healy *et al*. (2024) also find representations ‘stuck in time’ (p.13), including uncritical use of the Brundtland definition of sustainable development, mirroring the limited attention given to issues of power and justice in curricular representations of climate change internationally (Dawson *et a*l., 2022). Visual representations of climate change in education have also been critiqued for over-representing particular kinds of impacts, such as those affecting polar bears (Schauss, Nöthen, Ottosander, & Sprenger, 2024).

V Climate Change Education Forever

‘Climate change will forever be in the human imagination, as much as it shall continue to reshape physical and social worlds’ (Hulme, 2022, p.196).

I have sketched changes in the quantity and nature of geographical education's attention to climate change. From a peripheral object of study to an urgent priority, climate change now occupies a significant amount of space across research and practice. Calls to improve climate education, often driven by young people, continue to demand further curricular reform. This report has been written in the midst of ongoing curriculum review in many countries, and much of the rapidly growing body of geography education research makes a similar argument in highlighting the emerging nature of the field and the limited empirical evidence available to inform debate about the health, nature and future of climate change education. The dramatic increase attention to climate change education, particularly since 2017, has also reflected changes in public discourse about climate change in ways described through the image of trailing behind; there is 'lag' that challenges other arguments about the transformative potential of geographical education to inform and influence public reasoning about knowledge, uncertainty and action rather than merely reproducing popular representations (such as populist understandings of uncertainty and doubt). Research identifying the effectiveness of teaching strategies for climate change (Monroe, Plate, Oxarart, Bowers, & Chaves, 2019) is important but secondary to more fundamental questions about the purposes of geographical education: what kind of geographical education is fit for purpose in this day and age? Geography has a key role to play in addressing climate change, but the scale of the epistemological, political, moral and technical challenges it poses make profound demands on everyone involved with the intersecting fields (geography education research, geography education practice and scholarship, and geographies of education) constituting geographical education. How might we build geographical education that is creative, robust, generous, hopeful and diverse enough to empower and inspire everyone teaching and learning geography to create more just and equitable futures amid a changing climate?

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