'What counts' as climate change education? Perspectives from policy influencers

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Abstract Recent civil action has called for '*more!*' climate change education but 'more' of what and why isn't there already 'more' in our schools today? Climate change education is guided by policies that are formed, and influenced, by a range of people working across multiple organisations. 'Policy influencers' are therefore important as their views, and the views of their organisations, shape education. This article discusses views of policy influencers in England on what climate change education is or should be. Considering these perspectives alongside current policy and the research literature enables policy shortfalls to be identified and alternative approaches to climate change education to be explored.

Responses to activists' calls for '*more!*' climate change education might well include the retorts '*of what?*' Climate change education defies straightforward definition. Furthermore, climate change education is increasingly considered to be important, so why is it not currently given higher priority in our schools? In this article, we consider questions of 'what' and 'why' by examining climate change education policy and the views of policy influencers. Policy plays a crucial, but frequently under-acknowledged, role in guiding what happens in our schools. Not only do we want to understand what current climate change education policy is, we also want to humanise climate change education policy formation by shining a light on the views of individuals who are in positions to influence that policy. With more nuanced and shared understanding of what is considered to count as climate change education we will be better placed to seek a way forward, with approaches to climate change education that find broad consensus and are responsive to the urgency at hand. We begin by setting out qualities of a meaningful educational response to climate change, drawing from the research literature. This offers a broad perspective and inspiration for our research. Then, we critically document a range of views on what climate change education entails based on how it appears in policy in England and according to a group of key 'policy influencers'. Our findings point to possible explanations for why climate change education is portrayed as it is in policy. They also provide insight to support critical reflection on our own preconceptions of climate change education, and thereby to respond to the calls for '*more!*' in ways that fully consider the aims of education in the context of climate change.

Qualities of meaningful climate change education: views from research literature

Views from the research literature can help us to consider the implementation of climate change education in schools. Among research exploring climate change education policy, practice and theory, we identified six key qualities that contribute to meaningful educational responses to climate change.

First, and overarching the five subsequent qualities, is that a meaningful educational response to climate change needs to offer, and be open to, **alternative visions** of the future and alternative approaches to education. Such visions are unwedded to perpetual economic growth (be that at individual, organisational, national or global scale) and, instead, promote living that achieves equity and sufficiency among humans and all species on the planet (Sterling, 2017).

Second, climate change is an inherently complex issue, with multifaceted causes, consequences and solutions. A meaningful educational response to climate change cannot shy away from this complexity; indeed, it must **accept and embrace complexity**, and recognise (in ways appropriate to students' ages) the trade-offs associated with mitigation and adaptation, disaster risk and social justice (Stevenson, Nicholls and Whitehouse, 2017).

Third, climate change education needs to **incorporate multiple types of knowledge** (Kagawa and Selby, 2010). This includes disciplinary knowledge that aligns with traditional school-based curricula, such as that taught in science or geography, and that supports students to establish a foundation for richer understandings, as well as teaching and learning across a wider

range of disciplines and bridging disciplinary boundaries. It includes supporting students to understand how to critique knowledge and its sources, and recognises that, more importantly than knowing answers, students need skills to solve complex problems. Sitting alongside these knowledge types that are common in mainstream schooling, scholars also emphasise the importance of developing young people's spiritual and emotional knowledge (Ojala, 2016) so they can connect to the Earth and other species, and engage with emotions related to climate change.

The fourth quality is to **re-orient towards justice**. Rather than climate change education fixating upon scientific knowledge, and climate change solutions being found in science and technology, various authors advocate understanding climate change as an issue of justice and of inequity among humans, and between humans and other species (Lotz-Sisitka, 2010). This involves recognising both global and local perspectives and that everyone shares the risk, and, by engaging students in local participatory learning, it involves understanding that local solutions are fundamental to a global response.

Fifth, and related to understanding climate change as a matter of justice, is to **develop ecological worldviews**. A meaningful educational response to climate change would involve revisiting and transforming the relationship between humans and the more-than-human world, that is, with all other species on Earth. Young people would be given opportunities to recognise the rights of other species, and the importance of such recognition for their own and future generations' survival (Sterling, 2017).

The sixth and final quality for climate change education is to **recognise and support students as agents of change**. This would require viewing students as more than recipients of information and observers and future inheritors of climate change-related problems. It involves recognising young people as participants in society's response to climate change and collaborators in society's transformation through action-oriented approaches and authentic engagement (Rousell and Cutter-Mackenzie-Knowles, 2020).

Climate change education in government policy

Turning now to policy, we consider how climate change education is positioned in government policy in England. Across policy in England, very little attention has been paid to climate change education. Based on the content of key policies that guide school education, there is little to connect schools with the climate emergency (for a richer analysis see Greer (2021)). Key documents that govern what is considered to be important in schools, such as the *Education Inspection Framework* (Ofsted, 2019) and the accompanying *School Inspection*

Handbook (Ofsted, 2018), make no mention of climate change nor that schools have a role to play in society's response. Nevertheless, and as many readers of this journal will know, climate change does appear in England's National Curriculum and in the GCSE and GCE AS and A-level subject content (Table 1).

At a glance, this list of direct and indirect references might seem to amount to reasonable curricula coverage. However, and as Glackin and King (2020) have argued, the portrayal and balance of exposure to climate change, and environmental education more broadly, is problematic. They point out that while the science and geography curricula collectively offer some opportunities, given that geography is optional in key stage 4 (ages 14–16) many students will not study it from the age of 14. Consequently, the already limited climate change education offer is further reduced for a significant number of students. As a result, there is increased responsibility for science to provide a meaningful climate change education. However, there are relatively few references to climate change in the science curriculum and those references do not make it clear that there is a crisis or an emergency, nor that society (including students) should act on it. Instead, on several occasions, the curriculum highlights 'uncertainty in the evidence' for human causes of climate change. This is in contrast with most science topics taught at school. Given that all scientific data include uncertainties, the repetition of uncertainty relative to evidence of climate change is noteworthy, and we suggest troubling. Science teachers are left to interpret what 'uncertainty' means despite there being a wide-reaching consensus among the world's scientists (IPCC, 2018).

The lack of attention paid to climate change in education policies in England prompts enquiry into where else climate change education policy leadership might be found. We turned to climate change and environment-related policies. In policies that guide England's response to the environment, school education *is* mentioned, with an emphasis placed on learning in the outdoors for the benefit of human health and wellbeing (e.g. DEFRA, 2018). Although these are worthwhile benefits, the policies overlook a role for school education in acting towards preservation of the natural environment or reversal of environmental decline. In key policies of the Department for Business, Energy and Industrial Strategy (BEIS), a ministry with leadership responsibility for climate change, school education is absent. When education is mentioned, for instance, in the *Industrial Strategy* (BEIS, 2017a) and the *Clean Growth Strategy* (BEIS, 2017b), the emphasis is on an '*education and skills system*' that supports a high-wage, highly skilled economy. Students, soon to become citizens, are directed towards STEM careers, higher education is closely linked to industry, and

Table 1 References to climate change in England's National Curriculum

Subject	Level	Reference to climate change
Direct references		
Chemistry	KS4	'evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change' (DfE, 2014b: 221)
	GCSE Combined Science; GCSE Chemistry	'evaluate the evidence for additional anthropogenic causes of climate change, including the correlation between change in atmospheric carbon dioxide concentration and the consumption of fossil fuels, and describe the uncertainties in the evidence base; describe the potential effects of increased levels of carbon dioxide and methane on the Earth's climate and how these effects may be mitigated, including consideration of scale, risk and environmental implications' (DfE, 2015a: 32; 2015b: 26)
Environmental Science	GCE AS and A-level	'global climate change: how interconnected natural systems cause environmental change: negative and positive feedback mechanisms and tipping points … the difficulties of monitoring and predicting climate change' (DfE, 2015c: 7)
Geography	GCE AS and A-level	'How landforms and landscapes evolve as result of processes driven by past, present and future climate changes' (DfE, 2014a: 8)
Geology	GCE AS and A-level	[Non-Core opportunity] 'the application of evidence to study frequent changes in global climate that characterise the Quaternary period … hominin evolution in response to repeated large scale environmental and climate change, including hominin evolution up to Homo sapiens' (DfE, 2016a: 10)
Politics	GCE AS and A-level	'the role and significance of institutions of global environmental governance: including the UN Framework Convention on Climate Change (UNFCCC)' (DfE, 2016b: 11)
Indirect references		
Chemistry	KS3	'the production of carbon dioxide by human activity and the impact on climate' (DfE, 2014b: 207)
	KS4	'potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate' (DfE, 2014b: 221)
Geography	KS3	'including the change in climate from the Ice Age to the present' (DfE, 2014b: 243)
	KS3	'understand how human and physical processes interact to influence, and change landscapes, environments and the climate' (DfE, 2014b: 243)
Geology	GCSE	'Past global temperature and sea level changes: the major sources of carbon dioxide in the atmosphere (volcanic emissions and burning of fossil fuels); the evidence for changes in climate through geological time (icehouse to greenhouse conditions) and sea level from sedimentary rocks (tillite, limestone and drowned forests); the evidence for changes in atmospheric carbon dioxide levels over geological time (sedimentary rock and ice cores)' (DfE, 2015d: 6)

research is oriented towards commercialisation. When viewed as standalone policies, their foci could be considered reasonable: BEIS's leadership role relates to climate change, not education, and it sits alongside responsibilities related to industry and business, not schools. However, BEIS's leadership extends to oversight of the UK's commitments to international climate change treaties such as the *United Nations Framework Convention on Climate Change* (UNFCCC) (UN, 1992) and the *Paris Agreement* (UN, 2015), treaties that include commitments to education.

This brief analysis is indicative of the climate change education policy gap in England, a troubling lack of policy leadership and a shortfall relative to the qualities of a meaningful educational response to climate change. Although some attention is paid to disciplinary knowledge, even that is problematic, and other qualities are largely overlooked.

The study

Our study explored policy influencers' views of what climate change education entails. We interviewed 24 'experts' who worked in relevant fields (science, geography and environmental education, climate change and environment), in various policy, strategy or leadership roles, and in different types of organisations (government, charities, learned societies and universities). The individuals held relatively senior positions that could influence policy (to varying extents), and were perceived to be knowledgeable so they could discuss relevant issues. Teachers or students were not included in this study because, generally speaking, their attention is directed towards practice more than policy influence. Instead, we focused on this somewhat under-studied group of individuals who have the ear of policymakers and decision-makers.

We conducted exploratory interviews, lasting for approximately one hour each. The interviews were audio-recorded and transcribed, and our analysis method was guided by Braun and Clarke's thematic analysis (2019). We identified our findings by, first, familiarising ourselves with the data by re-listening to the audio files, re-reading the transcripts and making notes about key ideas and concepts. Next, we coded and recoded the transcripts using qualitative analysis software (*NVivo*). Finally, by referring to the original data and our coded transcripts, and as part of our writing process, we identified our findings. Pseudonyms are used to ensure participants' anonymity.

The layered role of climate change education: policy influencers' perspectives

Our research found that 23 out of 24 participants considered that education had an important role to play in relation to climate change (one participant was uncertain rather than opposed), an importance that contrasted somewhat with the low profile of climate change in education policy and education in climate change policy. Beyond that near consensus, however, policy influencers' views about what climate change education entails varied widely. When considered collectively, they extended well beyond the portrayal of climate change-related education in policy. We organised the diverse perspectives into a model with three nested layers: *Climate Change Education for Knowledge*, *Climate Change Education for Capabilities* and *Expansive Climate Change Education* (Figure 1). The layers build on each other with the outer layers incorporating the inner, and they have permeable
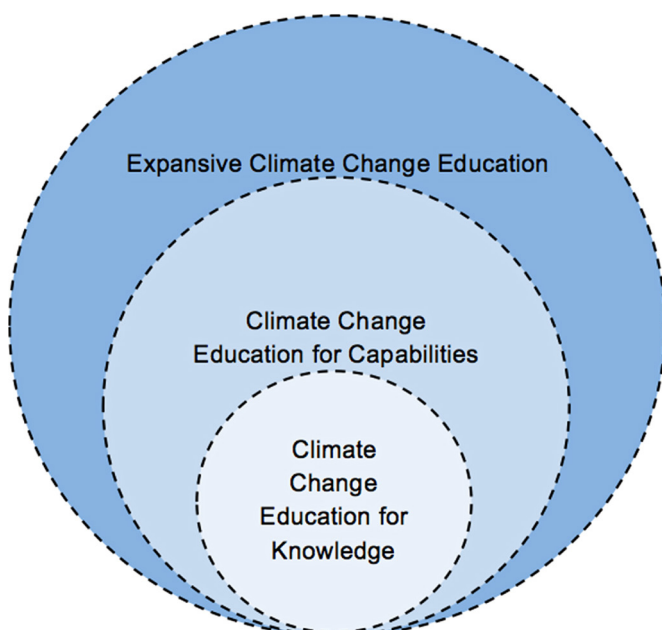
Figure 1 Three nested layers of influencers' views as to the role of climate change education

boundaries. Our findings section describes each layer with reference to the data.

Climate Change Education for Knowledge

The innermost layer aligns with a knowledge-led approach to education. Climate change-related knowledge was considered by all to be important and was where the largest number of participants focused their responses, thereby reflecting the current knowledge-driven approach to climate change education policy in England. As one participant remarked:

> *Climate change is one of the most important issues that young people are going to face in their life, so they need to be equipped with the knowledge and the information to make informed decisions.* (Hugh)

The perspectives captured here tended to place fact-based knowledge and disciplinary learning centre stage, most commonly describing knowledge that is found in geography and science curricula. Participants emphasised the importance of '*understanding climate change processes*' (Theo) and of the '*building blocks*' where young people are taught about '*weather, climate and then climate science before jumping into teaching them about climate change*' (Rex). Arguably, *Climate Change Education for Knowledge* captures qualities of climate change education that are among the more straightforward to write into policy documents, whereas qualities such as an openness to alternatives, or recognition of complexity, are less so. A small number of participants expressed that they were comfortable with the climate change-related knowledge included in the curriculum; however, criticism was more common. Concerns were raised that the knowledge outlined in the curriculum was too '*narrow*' (Richard) and '*pared back*' (Molly) to address the complexity of climate change. Participants argued that a greater breadth of knowledge was necessary to develop students' proficiency at exploring '*issues*' associated with climate change, including mitigation and adaptation, risk and trade-offs, ethics and justice. Of key concern was the '*systematic*' and '*siloed*' (Lawrence) nature of the curriculum, where there is a need to join up knowledge:

> *Do you put it in chemistry, do you put it in biology, even in physics or do you put it in geography? ... Well, you don't put it in any **one** of them. You put it in **all** of them.* (Theo)

Despite the criticism of the current curriculum, only a few participants proposed content for other subject areas, and scant attention was paid to spiritual or emotional knowledge. In short, and reflecting the qualities described above, while *Climate Change Education for Knowledge* was considered important, climate change education was frequently considered to be broader.

Climate Change Education for Capabilities

The second layer, *Climate Change Education for Capabilities*, emphasises the development of young people's capabilities for living in the context of climate change. This layer was framed by the 'capabilities approach' (Sen, 2010), a theory of justice that views 'capabilities' as opportunities for people to choose what they want to do or be. *Climate Change Education for Capabilities* prioritises enabling student choices about living amid climate change, while also recognising that other species should have opportunities too. It involves engaging with complex issues related to climate change amelioration and supporting action. Among the perspectives that coalesced here (arising from 18 participants) we identified three key capabilities. First, was a capability for empathy. For example:

> *Education should get people to have empathy with other human beings and learn about their role as global citizens, and even as a citizen of their country, caring about those in poverty, or caring about those who will be affected* [by climate change]. *I think, more broadly, education should teach us to not be selfish, I guess. And climate change, in a lot of cases, is a problem of selfishness.* (Ada)

Second, were capabilities for critical thinking, that while '*students can't be expected to crack climate change*' they can be '*taught to constantly question beyond the science*' (Xavier) and to distinguish between justified and unjustified opinions. Third, many policy influencers emphasised the importance of preparing young people for employment in a climate change future, particularly for employment in STEM/science professions. These views aligned with climate change policy discourse and with policy priorities for economic growth. However, in addition, several policy influencers recognised that all employment will be subject to change, so all students need capabilities for problem-solving and critical thinking, '*soft skills*' (Ewan) such as networking and influencing, and the ability '*to question, to create, to innovate, to work collectively*' (Jon). That is, several policy influencers underscored that *all* young people will be working and living in the context of climate change, not just the STEM professionals. Such views reflected qualities from the literature in the way they recognised that a meaningful educational response to climate change should acknowledge *all* students as agents of change, now and in the future. Thus, *Climate Change Education for Capabilities* focuses on education's role in developing students' capabilities in terms of their whole life, more so than as a pathway to the next step of education or work.

Expansive Climate Change Education

The third layer of policy influencers' views, *Expansive Climate Change Education*, positions formal education within the climate crisis and integral to society's climate change response, not as a separate social institution without obligations as might be interpreted from reading policy. Notably, the perspectives of only 11 participants are reflected here. This layer is underpinned by policy influencers' concerns about the role that education plays in a society that continues to exacerbate climate change, for example:

> *You've got to question a system that produces well-meaning people* [destroying] *the world.* (Xavier)

Concerns about the links between education and climate change included that the '*linear*' knowledge processes that focus on '*what we knew yesterday*' (Lawrence) and dominate formal education are misaligned with approaches to education that are required to meet present-day and future needs. That is, that climate change solutions, including educational responses, are not necessarily known, fixed or readily available, so there is a need to explore alternative ways of teaching and learning, and recognise that societies will need to respond to change, *writ large*, including climate change, to flourish.

Thus, *Expansive Climate Change Education* involves schools being able to adapt (physically, socially, educationally) and acknowledges their role in fostering society more so than individual benefits. It includes and extends beyond teaching:

> *We need this to be a social learning process that doesn't start in school. It can't just be laid at the door of teachers, that they are responsible for it … but it is part of the teaching process to embrace that.* (Lawrence)

This layer points to the potential for thinking about climate change education unfettered by the school gate, as occurring in formal and informal spaces, among family and friends, in language and faith groups, in community and youth groups, in community gardens and in the outdoors, online and in the '*places in between*':

> *where the really interesting stuff happens, and where people take their learning in school and apply it somewhere.* (Lori)

It also includes sites of activism, '*fertile moments*' (Xavier) that create geographical and intellectual environments for learning, exchange and fostering politically active citizens. These views chimed, in particular, with the overarching quality of being open to alternative visions of the future and alternative approaches to education, and of embracing complexity. Indeed, *Expansive Climate Change Education* could be thought of as '*breaking down the walls*' (Lotz-Sisitka, 2019) of formal education and envisaging more open, changing and integrated educational responses to climate change.

Viewing policy, policy influencers and literature together

Our research, which brings policy, policy influencers' perspectives and the literature into view, offers several key insights about climate change education in England. First, viewing policy relative to the literature enables climate change education policy shortcomings in England to be identified. Policy links between education and climate change are primarily confined to disciplinary knowledge, or to employment driven by economic participation, rather than covering issues of climate change amelioration or contributing to a society that is based on equity and sufficiency. Looking to the literature helps us to see various ways in which the policy offer for our students is constrained and to recognise that the calls for 'more!' require an alternative response from education that is more just, more ecologically centric and more orientated towards student agency.

Second, while we might be clear minded in recognising that policy shortfalls exist, our analysis of policy influencers' perspectives points to a possible explanation as to why the current policy offer is limited. That is, our analysis highlights the complexity and depth associated with defining and agreeing to what climate change education is. Policy influencers did not necessarily agree on 'what counts' as climate change education and there were numerous tensions evident among the policy influencers' perspectives, as would be likely among teachers. As one participant remarked when considering the enormity of the task:

> You're asking a teacher to pull stuff together that top climate scientists and politicians can't do. (Alannah)

Arguably, this complexity is a key reason why climate change education has such a low profile in England, and it indicates a difficulty associated with responding to calls for 'more!' Where policy reflects a consensus, it makes sense that areas of agreement among policy influencers – knowledge and employment – appear in policy. Whereas, the further out of the layers of the model you go, the less the agreement among perspectives and the weaker the parallels with policy. The outer layers of the model are most different from 'what counts' as climate change education in policy; ideologically and practically they are radically different from our current education system. Such bold policy change would require a majority consensus realised through a significant injection of energy and drive coupled with a vision that reaches beyond the issue of climate change in curriculum to reshape our education system.

Third, reflecting on the qualities identified in the literature relative to policy perspectives helps us to unpack the situation and to think more critically about where emphasis *should* be placed. All the qualities of a meaningful educational response to climate change were evident among policy influencers' perspectives, and, while perspectives spanned the three layers of the model, more attention was paid to *Climate Change Education for Knowledge* and less to *Expansive Climate Change Education*. The qualities similarly span the three layers; however, and conversely, many scholars emphasise that expansive approaches are needed if a meaningful educational response to climate change is to be achieved. Our analysis highlights that policy influencers can be caught up in the innermost layer, emphasising the importance of certain types of knowledge, while paying less attention to other types of knowledge, other layers, or qualities of climate change education. Where policies and policy influencers' advocacy of knowledge types reinforce each other, there is the potential to limit 'what counts' as climate change education, shut out the meaningful qualities and, as a result, limit our students. However, by mapping what the literature recommends onto participants' responses, we can see that some views are more desirable than others. While *Climate Change Education for Knowledge* is important, 'more' is clearly needed. To align with good practice, policy influencers *should* be building upon the inner layers and pushing outwards to view climate change education in a more expansive way.

Final words: questioning our own views of what climate change education entails

There is a need for all of us, whether we are inside or outside spheres of policy influence, to pay critical attention to 'what counts' as climate change education. Our article provides insight that can help us expand our own understandings of what might and, dare we say, *should* count. The qualities and the layered perspectives support the critique of current approaches and the envisaging of alternative ways of equipping young people to live in a climate change world. Thus, this article encourages teachers and school leaders to ask:

- How do I, and my school, currently view climate change education? What do I (we) consider the purpose to be?
- How should the education we offer our young people incorporate more `qualities' of a meaningful climate change education?
- In essence, are our students accessing an expansive climate change education yet?

Chiming with Lotz-Sisitka's provocation:

Can we break education, and think about it not as in terms of the inside – of teachers and institutions – but from the perspectives of 'out there'? (Lotz-Sisitka, 2019)

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