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Understanding teacher agency in the context of school-based climate change and sustainability education: A case study of the experiences of teachers and school students in England

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Abstract

Drawing on teacher agency as a conceptual framework, we explored the extent to which school teachers in secondary schools in England achieve agency in relation to teaching climate change and sustainability. This research provides a novel approach to understanding the relational and emergent qualities of teacher agency by bringing together insights from both teachers and school students (aged 11–14 years). Data were gathered through two separate online surveys with teachers ($n = 870$) and school students aged 11–14 years ($n = 2429$). Teachers and students articulated a range of material, structural and cultural barriers and enablers to achieving agency, with areas of agreement and divergence. While students were able to articulate different pedagogical approaches to improve the teaching of climate change and sustainability, teachers were more focused on the types of support they needed in their roles. This approach uncovers the everyday practices of teacher agency which students notice but that might not be visible to teachers. This research underlines the need for teachers in secondary school settings of all subjects to have the time and support to engage in high-quality professional learning which builds knowledge and understanding of climate change and sustainability

and develops their confidence to implement a range of pedagogical approaches which engage all children and young people.

KEYWORDS
climate change and sustainability, schools, students, teacher agency

Key insights

What is the main issue that the paper addresses?

This paper focuses on the teaching of climate change and sustainability in secondary schools in England through analysis of the experiences of teachers and secondary school students aged 11–14 years. The main issue addressed by the paper is why some secondary school teachers in England are able to achieve agency in teaching about climate change and sustainability, while others are not.

What are the main insights that the paper provides?

We found that teachers and students were able to identify a range of cultural, structural and material barriers which limit the extent to which teachers can achieve agency, and that students would like to receive more teaching about climate change and sustainability. We also found that students were able to imagine alternative pedagogies for climate change and sustainability which were engaging, and included discussion and dialogue, as well as opportunities to take action in their local communities.

INTRODUCTION

Education has been positioned by international organisations and national governments as instrumental to tackle the complex global challenges that confront the world, including climate change and biodiversity loss, through transformational change in education systems. At the same time, education, including formal schooling, is widely recognised as essential to ensuring every young person develops the knowledge, skills and capabilities to live with and respond to these complex challenges (Monroe et al., 2019; Rousell & Cutter-Mackenzie-Knowles, 2020). We argue that understanding how teachers can develop agency in the context of teaching and learning climate change and sustainability in school settings is a critical part of realising the potential of education to enable just and sustainable ways of living and being for all. Through this research we draw on the ecological approach to teacher agency conceptualised by Priestley et al. (2015), a socio-cultural conceptualisation which understands teacher agency as an emergent and dynamic phenomenon which people achieve or do not achieve depending on the resources available to them and the conditions in which they work and live. This research is guided by the following questions: how do school teachers in England understand and perceive agency in relation to teaching climate

change and sustainability? How do school students understand, observe and experience teachers' agency when they learn climate change and sustainability in secondary school? In responding to these questions, we gathered insights through two separate online surveys. The first was for teachers in England which collected data on teachers' views and practices related to teaching climate change and sustainability during October to December 2022, providing a total of 870 responses (Greer et al., 2023). The second survey was for school students in England aged 11–14 years and gathered data focused on students' ideas and experiences of learning climate change and sustainability in their secondary schools. This second survey collected data during March to May (2024), with 2429 responses (Walshe et al., 2024). This study is novel as it seeks to develop an understanding of teacher agency drawing on the insights and experiences of both teachers and school students. Through this innovative approach, this research expands our understanding of teacher agency in the context of teaching climate change and sustainability in schools in England beyond previous studies, which have solely considered these questions from the perspectives of teachers (e.g. Rushton, Dunlop, & Atkinson, 2025; Rushton, Walshe, & Johnston, 2025) and other school staff (e.g. Rushton, Walshe, et al., 2025). For example, this research helps us better understand teacher agency as relational, building not only on how teachers experience agency but how this is recognised by those with whom they interact, including the students they teach. By engaging with students' experiences, this research challenges adult-centric norms, disrupting conventional hierarchies of voice in educational research. This is especially important in the context of teaching climate change and sustainability which are inherently morally complex issues of intergenerational justice, with children and young people inheriting the consequence of the (in)action of generations of adults concerning the future health of the planet (Trott, 2024). We also contend that this research helps understand the emergent nature of teacher agency, uncovering the informal and everyday practices which students notice but which teachers may not articulate. We contend that students may be perceptive to forms of agency which may be less visible to teachers working contexts where accountability and performativity are pervasive (Ball, 2003; Quiroz-Martinez & Rushton, 2024). Therefore, this research informs how we understand teacher agency when teaching climate change and sustainability in schools in England, as well as providing an important opportunity to consider how students experience the extent to which those who teach them can achieve agency. We begin by outlining teacher agency as a conceptual framework which underpins this research.

TEACHER AGENCY AS A CONCEPTUAL FRAMEWORK

In the context of education, teachers' choices, goals and beliefs have a vital role in making effective decisions about complex and dynamic situations, and their professional agency is widely viewed as vital (Goodson, 2003; Lasky, 2005; Ryder et al., 2018). As such, teacher agency has become central to understanding teachers' practices, including as part of ideas of, and responses to accountability, teacher professionalism and educational change. Lasky (2005) defines agency as both an individual capacity including beliefs, identity, knowledge and emotional wellbeing, and social influences, such as language, policy and social structures. Pyhältö et al. (2012, 2015) underline the relational dimension of teacher agency, which is embedded in—and developed through—the professional interactions a teacher has with colleagues, young people, parents and the wider school community. Over the last decade, much research which explores teacher agency has been grounded in the ecological approach developed by Priestley et al. (2015). Firstly, and consistent with other sociocultural conceptualisations (e.g. Lasky, 2005), teacher agency is understood as a dynamic and emergent phenomenon, rather than the capacity of an individual: agency is something

which teachers achieve or enact rather than a quality they possess. Secondly, teacher agency is conceptualised as being formed by the conditions and qualities which shape teachers' professional lives, these include the cultural (e.g. beliefs, values), material (e.g. environment, money) and structural (e.g. roles, power) resources which exist and teachers' opportunities to use them. Thirdly, the ecological approach underscores the temporal quality of teacher agency, where agency is enacted in the present, informed by the past and oriented to the future (Priestley et al., 2015). The ecological approach to teacher agency draws together three distinct dimensions of agency: the iterational, the projective and the practical-evaluative dimensions. The iterational dimension brings together teachers' professional knowledge, beliefs and values with their personal life histories (Biesta et al., 2015; Priestley et al., 2015) which Leijen et al. (2020) have described as teachers' 'professional competence'. The projective dimension encompasses the short- and long-term ideas and aspirations teachers have for their practice, frequently rooted in their prior experiences and their beliefs (Biesta et al., 2015; Priestley et al., 2015). Lastly, the practical-evaluative dimension of teacher agency includes the cultural, material and structural resources or conditions which can enable or limit agency within a teachers' professional context (Priestley et al., 2015). The interactions between the iterational, projective and practical-evaluative dimensions occur over time and are relational processes, where the conditions, 'influence the decision-making process in professional situations, which draw on accumulated competence and are guided by projective purposes' (Leijen et al., 2020, p. 305). More recently, Quiroz-Martinez & Rushton (2024, p. 257) have underlined the spatial dimension of teacher agency where, 'teachers identify, move between and themselves create spaces of agency' as part of a non-linear entanglement of cultural, material and relational conditions made explicit in the ecological approach. Through the lens of space, Quiroz-Martinez & Rushton (2024, p. 254) argue that that researchers can explore these entanglements as, 'multiple, non-linear, loose connections which teachers bring together when they achieve agency'. In summary, the ecological approach to teacher agency, including how agency can be enabled and constrained, provides a useful conceptual framework for understanding why some teachers are equipped to engage in school-based climate change education in England while others are not. We now turn to consider teaching and learning climate change and sustainability in secondary schools in England.

TEACHING AND LEARNING CLIMATE CHANGE AND SUSTAINABILITY IN SECONDARY SCHOOLS IN ENGLAND

At the current time in England, the teaching of climate change and sustainability in secondary schools is broadly located in science (a compulsory subject for students aged 11–16 years) and geography (a compulsory subject for students aged 11–14 years) (Dawson et al., 2022; Howard-Jones et al., 2021). As Dunlop and Rushton (2022a) have outlined, in the main, the current curriculum taught in secondary schools in England focuses on *understanding* the evidence for and impact of anthropogenic greenhouse gas production on climate, potential effects of mitigation, how human and physical processes interact to change the climate, and the reliance of human activity on the functioning of natural systems (Department for Education, 2014). However, the broader impacts of climate change on the environment, economy and society are little considered. Nor does the curriculum substantively address action and social justice in relation to climate change and sustainability issues (Dawson et al., 2022; Howard-Jones et al., 2021).

In 2022, the Department for Education in England published a non-statutory strategy focused on sustainability and climate change in the context of education and children's services systems (Department for Education, 2022). As Rushton, Dunlop, and Atkinson (2025)

have noted, key initiatives within the strategy in England include a *National Education Nature Park*, and associated learning resources; an extra-curricular *Climate Action Award* which recognises and celebrates students' green skills, championing of nature and work towards a sustainable future; and *Sustainability Leadership* (Department for Education, 2022). The implementation of the National Education Nature Park and the Climate Action Awards began in Autumn 2023 and, at the time of writing in mid-2025, a refresh of the strategy is underway. While the strategy acknowledges the importance of schools accessing funding, sharing best practice and developing networks to enhance the teaching of climate change and sustainability, the strategy is not underpinned by universally accessible funding (Department for Education, 2022). Furthermore, these unfunded priorities contrast with those of teachers, teacher educators and young people (aged 16–18) (Rushton & Walshe, 2025; Howard-Jones et al., 2021; Dunlop & Rushton, 2022a). These groups frequently underline the need for curriculum change so that teaching climate change and sustainability moves beyond secondary school geography and science and a persistent framing of a concern with knowledge and 'learning the facts' about climate change as a response to climate and environmental crises (Walshe et al., 2024; Dunlop & Rushton, 2022a). Recent research conducted with teachers in England which considers their views and practices has found that the current national curriculum is a barrier to their teaching of climate change and sustainability (Rushton & Walshe, 2025) and that teachers are in favour of interdisciplinary and action-oriented approaches which begin in the primary phase of education and attend to dimensions of social justice (Howard-Jones et al., 2021). Similarly, students in secondary schools in England provide strong advocacy that the current teaching and learning they experience in relation to climate change and sustainability does not equip them to live with climate-altered futures, particularly the future impacts of climate change, practical solutions which exist and understanding this through both local and global perspectives (Teach the Future, n.d.; Walshe et al., 2024).

Following the election of a Labour government in the summer of 2024, the newly appointed Secretary of State for Education, Bridget Philipson, announced a year-long Curriculum and Assessment Review (Department for Education, 2024). This announcement stated, 'a broader, richer, cutting-edge curriculum that drives high and rising school standards and sets all young people up for life and work will be central to the government's vision for education' (Department for Education, 2024 n.p.). The Review's interim report notes that the national curriculum should 'address global and social change' and that this should include a 'greater focus on sustainability and climate science' (Department for Education, 2025, p.26). It remains to be seen whether this greater focus identified sufficiently responds to previous calls for change from teachers and young people.

This current research provides an important opportunity to consider teacher agency in relation to teaching climate change and sustainability in secondary schools in England, drawing on insights from both teachers and school students aged 11–14 years who are at the beginning of their secondary education. Furthermore, this research is timely given the national curriculum in England is under review (Department for Education, 2024), and elsewhere other nations are engaged in discussion and debate about the purpose and content of their own curricular, including in Scotland (Education Scotland, 2024), Northern Ireland (Crehan, 2025) and Aotearoa New Zealand (New Zealand Curriculum, n.d.). Here, we report on findings from an online questionnaire which investigated teachers' ideas, experiences and practices related to climate change and sustainability in England. These data were collected in late 2022 ahead of both the implementation of the Department for Education's (2022) non-statutory strategy and the launch of the Curriculum and Assessment Review (Department for Education, 2024). We also report on findings from an online question focused on secondary school students' ideas and experiences of learning about climate change and sustainability in schools and these data were collected separately, in early 2024. Through an

analysis of both the experiences and perspectives of teachers and secondary school students, this approach provides a novel and distinctive way to both broadly consider how teacher agency is understood and experienced, and more specifically, teacher agency in the context of teaching climate change and sustainability in secondary schools in England. Our over-arching research questions were: *How do school teachers in England understand and perceive agency in relation to teaching climate change and sustainability? How do students understand, observe and experience teachers' agency when learning about climate change and sustainability in secondary school?*

MATERIALS AND METHODS

Our data collection method, participants, ethical considerations and limitations are described before outlining the analysis process.

Data collection

Data were collected through two separate online questionnaires using the Qualtrics software, one for teachers in England, the *Teacher survey* and one for school students in England aged 11–14 years, the *Student survey*. The design, format and piloting processes for the *Teacher survey* and the *Student survey* have been previously outlined by Greer et al. (2023) and Walshe et al. (2024) respectively. An overview of the key features of each survey are outlined in Table 1.

Teacher survey

With regards to the *Teacher survey*, data reported in this study were drawn from the responses to three questions: two questions in Section 2 of the survey which asked 'What has helped you to incorporate climate change and/or sustainability into your teaching?' and 'What barriers or challenges have you encountered in relation to incorporating climate change and/or sustainability in your teaching?'; and one question in Section 4 of the survey: 'Is there anything else about climate change and sustainability education that you would like to share with the research team?'

As set out in Table 1 and previously reported (Greer et al., 2023), the *Teacher survey* dataset comprised 870 responses where respondents were not required to complete every item. Of those who elected to complete Section 4 (approximately 60%), the majority reported that they were female (74%) and the vast majority were white (91%). As Rushton and Walshe (2025) have outlined, this is consistent with the demographics of the teaching workforce in England in 2022/23 where 76% of teachers were female and less than 10% of teachers identified as an ethnic minority (including Asian/Asian British and Black/Black British) (Department for Education, 2023). Teaching experience ranged from 1 year to over 20 years, and most respondents completed university-led initial teacher education programmes (87%) (Greer et al., 2023).

In this paper, we report on the responses from the three questions identified from Sections 2 and 4 of the *Teacher survey* as listed above. As these were decoupled from the demographic data apart from the main subject participants reported they taught, we do not have any further specific information about the teacher participant sample we report on here.

TABLE 1 An overview of the key features of the *Teacher survey* and the *Student survey*.

	Teacher survey	Student survey
Participant group	Teachers in England of all settings and subjects	School students aged 11–14 years (school years 7–9) in England
Data collection period	October–December 2022	March–May 2024
Recruitment strategies	• Shared via institutional electronic distribution lists, social media channels and professional networks including multi-academy trusts, subject associations and teacher unions • Incentive of two randomly drawn £100 cash prizes for climate change and sustainability related teaching resources was offered to those who completed the survey and elected to provide their contact details	• Recruitment via teachers who were contacted via professional networks, social media channels, and existing communication distribution lists • Incentive of three randomly drawn £20 book vouchers were offered to those who completed the survey and elected to provide their contact details
Total number of responses	870 responses	2429 responses from 30 schools in England
Number of items	38 items	27 items
Type of items	Multiple-choice options; scales for indicating levels of agreement or disagreement with different statements; frequency scales for various activities, and open-ended text fields for sharing opinions, experiences, or definitions	
Survey topics	Four sections: • Perceptions of climate change and sustainability • Views and practices related to climate change and sustainability education • Experiences and views concerning professional development • Respondents' demographic information and professional role and setting	Seven sections: • All about you • What do you think about climate change and sustainability? • What do you *think* about climate change and sustainability in school? • What do you *do* about climate change and sustainability in school? • What would you like to learn about in the future? • How do you feel about nature? • All about your life
Overview survey report	Greer et al. (2023)	Walshe et al. (2024)

Student survey

With regards to the *Student survey*, data were drawn from responses to one question in Section 5 (What would you like to learn about in the future?): 'Finish this sentence: I would improve the teaching of climate change and/or sustainability in secondary school by …'. As outlined in Table 1 and reported previously by Walshe et al., 2024, the *Student survey* dataset included a total of 2429 responses from 30 different schools in England including state funded schools (24) and fee-paying schools (6). In broad terms, the respondents comprised 40% in Year 7, 34% in Year 8 and 27% in Year 9. Of those who responded, 56% were girls, 43% were boys and 1% reported they were non-binary and gender diverse. Concerning ethnicity, respondents included 56% with white backgrounds; 25% with Asian/Asian British backgrounds; 7% with mixed backgrounds; 5% with Black/Black British backgrounds; 4% with Arab backgrounds; and 4% with other reported ethnicities or backgrounds (Walshe et al., 2024). Consistent with our analysis of the *Teacher survey* data reported in this paper,

responses from school students analysed in this paper were also decoupled from the demographic data. Therefore, we do not have any further specific information concerning the student participant sample.

Research design limitations

The data collected represent the views and experiences of those who responded to the questionnaire, rather than being generalisable across communities of teachers or students living, teaching and learning in England. Given that participation was wholly voluntary with very limited incentives, it is possible that that those who chose to complete the questionnaire were those teachers already incorporating climate change and sustainability as part of their practice or school students currently engaged with climate change and sustainability issues. It is also important to note that in the case of the *Teacher survey*, the recruitment period coincided with the annual United Nations climate change conference in Glasgow (COP26), which increased the prevalence and visibility of climate change in public discourse and may have influenced the number of people who elected to participate and informed their responses. With regards to the *Student survey*, efforts were made to gather responses in schools with varied experiences of teaching climate change and sustainability, although it is possible that those teachers who supported the survey were engaged with climate change and sustainability education. The research sought to capture responses from entire classes or year groups so that responses were received from students with a range of perspectives and engagement with climate change and sustainability. We also note that these two surveys were completed at different points in time, with the teacher survey being completed in late 2022 whereas the student survey was completed in spring 2024. Therefore, the teachers and students were completing these surveys during different social conditions and contexts. For example, the impact of COVID and the restrictions on being outside were more evident during late 2022 compared with spring 2024 and this may have shaped the responses provided. Finally, we recognise the limitations of eliciting detailed and nuanced insights into informal and everyday practices from a large-scale survey, rather, than for example, through interviews with teachers and students and/or observations of practice.

Ethical considerations

The research for each survey was approved by an Institutional Ethics Committee (REC 1627; REC 1918) prior to the commencement of data collection periods and voluntary, informed consent was obtained in writing from all participants. Data were managed consistently with the UK GDPR and DPA 2018. Data were anonymised before analysis. During phases of research design, data collection and analysis our approach was consistent with the BERA (2024) guidelines for ethical research. For example, in the design and piloting of the surveys, we were cognisant of our responsibilities as researchers to minimise any potential harm arising from participation in research, including the potential for the construction of the survey questions to prompt or elicit psychological distress associated with climate anxiety (BERA, 2024, paragraph 34). As part of the recruitment strategy, the research team drew on a range of professional networks at individual (for example former students and colleagues) and institutional (for example school networks) levels. Therefore, it was important as part of the recruitment process to explicitly state that both the decision to complete the questionnaire (or not) and any responses provided would have no bearing on current or future professional relationships (BERA, 2024, paragraph 19).

Data analysis

Data analysis focused on the open-text responses provided by teachers to three questions and by school students to one question as outlined above. These responses were explored through iterative content analysis undertaken by both authors which took place over a series of stages (Hsieh & Shannon, 2005). Stage one involved the creation of the dataset to be analysed by collating and importing all responses to the three questions from the *Teacher survey* and the one question from the *Student survey* into an Excel spreadsheet. The responses provided by school students ($n = 1530$) to the question 'Finish this sentence: I would improve the teaching of climate change and/or secondary school by …' totalled approximately 15,700 words.

The responses provided by teachers ($n = 334$) totalled approximately 5400 words to the first item ('What has helped you to incorporate climate change and/or sustainability into your teaching?'); approximately 7000 words of responses from teachers ($n = 380$) to the second item ('What barriers or challenges have you encountered in relation to incorporating climate change and/or sustainability in your teaching?'). Finally, responses totalling approximately 6500 words were provided by teachers ($n = 169$) to the third item ('Is there anything else about climate change and sustainability education that you would like to share with the research team?'). As part of this stage of initial analysis we explored the number of responses to each question organised by teachers' self-identified main subject taught. As set out in Table 2, this showed that geography, science and English the most represented alongside a range of other subjects.

The second stage of data analysis involved an initial review and categorisation of the data independently by both authors to identify commonalities. This initial review produced individual coding of the data which the authors shared, discussed and refined iteratively through regular meetings and ongoing individual analysis and refinement. This process of analysis involved a hybrid process of inductive and deductive coding (Fereday & Muir-Cochrane, 2006). This process brought together deductive analysis informed by ideas from published literature focused on school-based climate change and sustainability education in England (e.g. Rushton, Dunlop, & Atkinson, 2025; Howard-Jones et al., 2021; Priestley et al., 2015). We also approached data analysis inductively, where the coding process involved considering the individual responses provided across the responses to both questions. As part of this approach to coding, we understood our roles as researchers as organising and interpreting the data points such that we can develop patterns of information, or themes. As a further part of the deductive, analytical process, we drew on our professional lives and experiences as secondary school teachers and university-based teacher educators and education researchers, and how these shaped our engagement with the data. Stage three of data analysis took place as part of the writing and peer review process which further refined the consistency of classification and the foci of themes across the dataset, including through greater critical engagement with existing climate change and sustainability education literature. We recognise that teachers' responses frequently included more than one dimension of teacher agency and in our coding, we sought to identify the clearest or most visible dimension.

FINDINGS

We present findings which move beyond those initial analyses previously reported (Walshe et al., 2024; Greer et al., 2023; Greer et al., 2025) and focus in depth on teacher agency in the context of school-based climate change and sustainability education, drawing on the experiences of both teachers and school students. To begin, we consider the responses

TABLE 2 Number of responses to each questionnaire item organised by teachers' self-identified main subject taught.

Questionnaire items (number of responses)	Respondent's main subject	Number of responses (percentage of total)
What has helped you to incorporate climate change and/or sustainability into your teaching? (334) What barriers or challenges have you encountered in relation to incorporating climate change and/or sustainability in your teaching? (380) Is there anything else about climate change and sustainability education that you would like to share with the research team? (169)	Art and design	53 (6)
	Business	15 (1.7)
	Citizenship	9 (1)
	Classics	2 (0.2)
	Design and technology	26 (2.9)
	Drama	2 (0.2)
	Economics	7 (0.8)
	English	77 (8.7)
	Geography	227 (25.7)
	History	28 (3.2)
	ICT	6 (0.7)
	Mathematics	53 (6)
	Modern foreign languages	35 (4)
	Music	18 (2)
	Physical education	4 (0.5)
	Personal, social health and economic education	6 (0.7)
	Psychology	6 (0.7)
	Religious education	20 (2.3)
	Science	163 (18.5)
	Other (e.g. cover teacher, teaching assistant, extra-curricular, unsure)	126 (14.3)
	Total	883 (100)

of teachers, analysed with a focus on the practical evaluative dimension of teacher agency (Priestley et al., 2015) in the context of teaching climate change and sustainability (Table 3).

Teachers' experiences of the material, structural and cultural affordances and constraints within the practical evaluative dimension of teacher agency

Across the responses analysed, three aspects of the practical evaluative dimension of teacher agency were visible in teachers' responses (Table 3) with the material and structural the most visible ($n = 231$ and $n = 233$ respectively) compared with the cultural aspect ($n = 138$) (Table 3).

Across the cultural aspect of agency there were three sub-themes. The first was that teachers' ideas and beliefs in the relative importance of climate change and sustainability education were a cultural resource (for example engaging in climate change activism) and/or barrier (for example teachers' belief that climate change was not part of their subject) to the practical evaluative dimension of agency. As one Art and Design teacher noted, there was a 'lack of care or concern about its [climate change's] importance or relevance from other members of staff'. Secondly, students' and their parents' beliefs in the importance of climate

TABLE 3 Practical-evaluative dimensions of teacher agency in relation to climate change and sustainability education.

Practical-evaluative dimensions of teacher agency (number of references in responses)	Indicative quotes from teachers' responses
Cultural—ideas, values, beliefs, discourses, languages (138)	
• Teachers' ideas and beliefs in the importance/lack of importance of climate change and sustainability education (68)	Personal knowledge and research, as well as personal interaction with climate change activism. (Geography teacher) Some staff are short sighted in their view, or take the easy way out and say things for example like 'climate change doesn't really work in PE'. (Citizenship teacher)
• Students' and/or parents' beliefs in the importance of climate change and sustainability issues in education (42)	Students think that climate change is a debate, or conspiracy theory, or it doesn't matter. (English teacher) Pupils saying it doesn't exist or issues from parents. (Geography teacher)
• The prominence and visibility of climate change as a societal issue (28)	The immediacy of the issue and the impact it is having now on people living around the world. (Geography teacher) The increasing prominence of climate change as a political issue. (History teacher)
Material—resources, environment (231)	
• Availability of time and/or money to develop climate change and sustainability education in school settings (83)	Not much available without paying for it, or it comes from BP/Shell which are just trying to cover up all the negative impact they have had on the climate! (Science teacher) Schools should have a budget for environmental learning. The only reason our school has any climate and environmental awareness … is because I am passionate about gardening and the environment. I'm not paid to do my club, and if I stopped doing it with my colleague, there would be little extra happening. (English teacher)
• The accessibility of freely available, appropriate and high-quality resources focused on climate change and sustainability issues (76)	It would be great to have more resources available for students with additional needs. (Science teacher) Anything that can be cheap or free is always welcome! Textbooks are expensive and go out of date quickly. Resources that can be translated for EAL students is also important. (RE teacher)
• Accessibility and availability of high-quality professional learning focused on climate change and sustainability education which builds teachers' confidence (55)	To ensure that climate change is reversed we need teachers who are well educated in how this can be done. Only with the correct knowledge and skills can they pass on the right information to students. Therefore, this needs to be taught to all school staff and prioritised. (History teacher) It is so important that we bring the issues and importance of climate change and sustainability into the classroom, but not create more work for an already overworked workforce. I'm not even sure its possible since any of this training/CPD will most likely end up taking time out of personal time in order to engage with it. (Modern Foreign Languages teacher)
• A campus environment, school buildings and/or practices which foster or constrain climate change and sustainability education in practice (18)	I'd like to see all schools have solar panels fitted by the government. There are a lot of roofs out there. School energy bills are rising and this could help a lot, as well as exposing students to green technologies that they should include in their own homes. (Science teacher) School funding is so dire that schools are unable to role model sustainable practice. There needs to be a huge investment in retrofitting schools in order to demonstrate to pupils the importance of sustainability. (Art & Design teacher)

(Continues)

TABLE 3 (Continued)

Practical-evaluative dimensions of teacher agency (number of references in responses)	Indicative quotes from teachers' responses
Structural—social structures (relationships, roles, power, trust) (233)	
• Policy structures, for example national curriculum, inspection frameworks and exam specifications which value or marginalise school-based climate change and sustainability education (182)	In my opinion, climate change and sustainability education should not be made a separate subject on the curriculum. In Primary we have too many subjects and not enough time, as it is. I think it should be specifically made a part of the Science, Geography and Citizenship curriculum expectations. (Mathematics teacher) There is unlikely to be much movement in this area without a push from government to incorporate it in all areas of the curriculum. While teachers are interested in the topics involved, there is barely enough time to cover the existing curriculum and prepare students for exams so without a structured (and potentially mandatory) approach, this is something that is unlikely to be a priority for many teachers. (English teacher) Pressure of time on the curriculum. Assessment requirements and Ofsted. (Geography teacher)
• School-level leadership fostering or constraining climate change and sustainability practices (41)	All the other 'priorities' of school. Literally people cannot see beyond the year ahead, let alone the future young people face. I have found my voice and use it wisely to influence the Senior Leadership Team but truthfully, so many people are disconnected from the state of the Earth that it is very lonely work and people don't really care. (Art and Design teacher) The Senior Leadership Team (SLT). The pupils want change (e.g. to stop plastic bottles being sold) but the SLT haven't supported their suggestions in the past. We have a new Headteacher so I'm optimistic things might change! (Science teacher) Senior Leaders within school need to be encouraging sustainability across the school, not leave it to a few specialist teachers. It needs to be taken as seriously as PSHE [Personal, Social, Health and Economic education]. Time also needs allocating for sustainability leaders to be able to do their job effectively as a Head of Department/Year would receive. (Geography teacher)
• Local and/or national government fostering or constraining school-based climate change and sustainability education (10)	The students don't see changes happening around them, no urgency from governments, yet I have to teach the urgency of the situation. I think we need to educate children on the fact that climate events have followed scientific predictions, but governments have not heeded scientific advice and media outlets have not focused on it. We probably need to teach kids as to why—selfishness, short sighted economic gains and putting sales (like newspapers) ahead of genuine information sharing. (Geography teacher) Concerned by current government and lack of visible support for green issues. Concerned about issues with me actually voicing my opinions on climate change to students (in light of not being allowed to share views on 'political issues'). (Mathematics teacher)

change and sustainability issues in education were similarly understood as a barrier, with teachers reporting that some parents and students did not believe that climate change exists (Table 3). However, other teachers highlighted that students' ideas and values concerning climate change were a resource, including a Design and Technology teacher who reported, 'the current state of the climate emergency has brought these issues to the fore and students now take the issues more seriously than they used to'. Thirdly, some respondents also

noted that the visibility, immediacy and prominence of climate change as a societal issue was also a cultural resource (Table 3).

Turning to the material aspect of the practical evaluative dimension of teacher agency, the most frequently highlighted was the availability of time and/or money to develop climate change and sustainability education in school settings ($n = 83$), with teachers noting that they used their own expertise and unremunerated time to teach climate change and sustainability, including through extra-curricular activities (Table 3). Relatedly, the accessibility of freely available, appropriate and high-quality resources focused on climate change and sustainability issues was also reported as a material barrier by teachers ($n = 76$). In the context that school funding was recognised as 'dire', teachers were cognisant that some of the free resources available were funded by fossil fuel companies and some teachers also highlighted that they needed focused support to enable children with additional needs to engage with climate change and sustainability (Table 3). As well as classroom resources, teachers shared that a key material barrier and/or resource was the accessibility and availability of high-quality professional learning to build their confidence to teach climate change and sustainability education ($n = 55$) (Table 3). For example, one geography teacher reflected:

> I feel that we do not teach about climate change enough—there are plenty of opportunities for cross curricular teaching, but we don't have the time to plan and engage with these. I also feel that beyond Geography and Science it isn't covered enough and that staff in other departments don't have the knowledge to teach it effectively.

Finally, within the material aspect, a minority of teachers who responded recognised that the campus environment, school buildings and/or practices foster or constrain climate change and sustainability education in practice ($n = 17$) (Table 3).

Across the structural aspect of the practical evaluative dimension of teacher agency, which was the most prevalent in teachers' responses ($n = 233$), teachers underlined the importance of policy structures, including the national curriculum, inspection frameworks and examination specifications, which value or marginalise school-based climate change and sustainability education (Table 3). As one teacher commented, 'if it isn't on the curriculum, or in an inspector's handbook, then it will be hard to get it in the classroom!' and as a geography teacher reflected, 'very strongly believe we need to make this a greater feature of school curriculum through the key stages FOR ALL not just those who chose KS4 Geography and beyond'. For some respondents ($n = 41$), school leadership was also recognised as an important structure resource or constraint in relation to climate change and sustainability practices (Table 3). For example, one teacher of mathematics shared:

> The head is very supportive and has appointed me as STEM and Sustainability Lead. This is helping to raise the profile at school but, as it is a temporary post, I am concerned about lasting impact across other departments.

Similarly, a teacher of modern foreign languages noted:

> I think the presence in my school of teachers who include a focus on promoting awareness of climate change is important, and also the fact that our headteacher has spoken up on this topic and there is discussion about school trips using flights, etc.

Lastly within the structural aspect of the practical evaluative dimension, a minority of respondents ($n = 10$) (Table 3) noted that government at different scales (local or national) had

a role in fostering or constraining school-based climate change and sustainability education. As one teacher noted: 'The change needs to come from Government but be driven by those on the ground. Primary pupils are frequently excluded from any pupil consultations, and their voice needs to be heard'.

We now turn to the responses of school students and their suggestions for improving the teaching of climate change and sustainability in their schools by providing a response to the prompt, 'I would improve the teaching of climate change and/or sustainability at secondary school by …'. We analysed these responses through the framework of the practical-evaluative dimensions of teacher agency made visible in the responses from teachers. Through this approach we seek to explore the extent to which these affordances and constraints to teacher agency are realised in the experiences of school students. Therefore, in Table 4, we present an overview of the practical-evaluative dimensions of teacher agency in relation to climate change and sustainability as experienced by school students.

In Table 5, we provide an overview of the ideas young people shared through their responses to the survey as to how to improve the teaching of climate change and sustainability in their school and how these perspectives can be understood through the practical evaluative dimension of teacher agency.

Students' experiences of the material, structural and cultural affordances and constraints within the practical evaluative dimension of teacher agency

In relation to the cultural dimension, and consistent with analysis of the teachers' responses, some students recognised the need to support their teachers to understand that climate change and sustainability are important issues that should be part or a greater part of what they teach ($n = 20$, Table 4), 'making teachers more aware of the world around them, influence them to teach it to us.' (Student response). Also, within the cultural dimension, and consistent with teachers' recognition of the importance of students' beliefs of the value of climate change and sustainability, students' responses further demonstrated some examples where students' beliefs were evident. These included examples where students believed climate change and sustainability issues were important or unimportant or where students' experienced climate change and sustainability as problematic ($n = 47$, Table 4).

Across the material dimension of teacher agency, students' experiences were aligned with features of the teachers' responses. For example, some students highlighted the need for teachers to include more real-world examples, future scenarios, data and research when teaching climate change and sustainability ($n = 144$, Table 4). This is consistent with the time, money and the accessibility of free, appropriate and high-quality resources focused on climate change and sustainability issues which teachers experience as a constraint or affordance of their agency (Table 4). Some students ($n = 40$, Table 4) also recognised that their teachers needed support to improve the quality and frequency of teaching climate change and sustainability in lessons and in informal spaces, for example, 'informing the teachers of ideas of how to incorporate climate change learning into their lessons' (Student response). This is consistent with teachers' ($n = 55$) reflections that a barrier or enabler of their agency was the accessibility and availability of high-quality professional learning focused on climate change and sustainability which builds professional confidence (Tables 4 and 5). Finally, the importance of a campus environment, school buildings and/or practices which foster or constrain climate change and sustainability education in practice were only minimally visible in teachers' responses ($n = 17$, Tables 4 and 5). However, this was very strongly visible in students' reflections where they wanted to learn in settings where the school grounds, buildings and operations visibly model sustainable practices ($n = 172$, Table 5) and to have more

TABLE 4 The practical-evaluative dimensions of teacher agency in relation to climate change and sustainability education as experienced by school students.

Practical-evaluative dimensions of teacher agency	Practical-evaluative dimensions as identified in teachers' responses (number of references in responses)	Practical-evaluative dimensions made visible in students' responses (number of references in responses)	Indicative quotes
Cultural—ideas, values, beliefs, discourses, languages	Teachers' ideas and beliefs in the importance/lack of importance of climate change and sustainability education (68)	Supporting teachers to understand that climate change and sustainability are important issues and should be part/a greater part of what they teach (20)	Making sure the teachers know how much climate change impacts the world so they will believe in it and therefore teach better
	Students' and/or parents' beliefs in the importance of climate change and sustainability issues in education (42)	Students' beliefs in the importance/unimportance/problematic nature of climate change and sustainability issues (47)	Adding in more crucial topics of climate change to make the people understand how serious of a topic it is I don't want to improve the teaching of climate change and/or sustainability because it is unimportant Not forcing the ideas of being sustainable as I can only do somethings that are very limited as I am 13
Material—resources, environment	Availability of time and/or money to develop climate change and sustainability education in school settings (83) The accessibility of freely available, appropriate and high-quality resources focused on climate change and sustainability issues (76)	Include more real-world examples, future scenarios, data and research when teaching climate change and sustainability (144)	I would improve teaching about climate change and sustainability in secondary school by including more hands-on activities and real-life examples Focusing more on the local effects of climate change as it will be more important to me because it would affect the area I live in Giving a wider perspective of how it affects places beyond just England By teachers explaining to us how this will affect our future
	Accessibility and availability of high-quality professional learning focused on climate change and sustainability education which builds teachers' confidence (55)	Supporting teachers to improve the quality and frequency of climate change and sustainability in lessons and in informal spaces (40)	Encouraging the teachers to teach just a bit more about it so we can get an understanding of why/how/what is happening Engaging more teachers to teach and involve themselves more in this subject and persuade them to try to teach more about climate change Asking my teachers and form tutor to explain more about how we can help our environment and school community

(Continues)

TABLE 4 (Continued)

Practical-evaluative dimensions of teacher agency	Practical-evaluative dimensions as identified in teachers' responses (number of references in responses)	Practical-evaluative dimensions made visible in students' responses (number of references in responses)	Indicative quotes
	A campus environment, school buildings and/or practices which foster or constrain climate change and sustainability education in practice (17)	Ensure that the school grounds, buildings and operations visibly model sustainable practices (172)	Making sure that they use sustainable energy and recycle rubbish, plant more greenery around the area Reducing single-use plastic and paper in the cafeteria Adding more bins so all the waste is collected, persuading people to walk or bike to school instead of driving
		Increase opportunities to learn outside and with nature as part of cllimate change and sustainability education (CCSE) (92)	Have more outdoor lessons e.g. science lessons are always indoors, even when we're learning about leaves and ecosystems and nature—why not outside?! it's better for us, in so many ways! Doing more outdoor learning because most of it is at clubs afterschool Free compulsory nature trips
Structural—social structures (relationships, roles, power, trust)	Policy structures, for example national curriculum, inspection frameworks and exam specifications which value or marginalise school-based climate change and sustainability education (182)	Given greater prominence, including in the National Curriculum, and included across a greater variety of subjects (72)	Trying to encourage the government to put climate change on the school curriculum Add more about climate change to the school curriculum Build it into the curriculum in every subject
		Include climate change as a separate school subject with dedicated time (58)	Creating a subject that we do every 2weeks involving climate change
	School-level leadership fostering or constraining climate change and sustainability practices (41)	Ensuring that school leaders and leadership groups value climate change and sustainability (12)	Letting the head of school know that it is important to teach it in every year Making it a part of a whole school ethos Working at creating new opportunities to become aware of this issue in my school through my school's eco-committee team Speaking to all the staff or even if I can talk to the head teacher and say how we or I would or could improve teaching everyone about climate changing

TABLE 5 Young people's ideas for improving the teaching of climate change and sustainability in their school as understood through the practical evaluative dimension of teacher agency.

Theme (number of references in responses)	Indicative quotes
Include more CCSE in secondary schools which requires enhancing the material aspect of the practical evaluative dimension of teacher agency (333)	
Extended learning and teaching about climate change and sustainability in lessons, with more detail and depth (255)	Focusing on climate change for a longer period of time and in more depth
	Doing it in other subjects and in more detail
	Giving us more lessons on the topic
Extended learning about climate change and sustainability in extra-curricular activities, assemblies and non-lesson time (68)	Learning more in lessons, assemblies and tutor time
	Having more clubs talking about climate change and how we can help
	Introducing clubs centred all around spreading awareness about climate change/proposing ideas that could prevent further damage
	Campaigning for more to be taught about sustainability and/or suggesting to my form tutor we do something to do with it in form time
Teach CCSE differently in secondary schools through shared ideas, values and beliefs as part of the cultural aspect of the practical evaluative dimension of agency (815)	
Increase opportunities for students to actively participate in and take action in relation to climate change and sustainability issues (253)	Becoming an ambassador and educating people on both and making a stand against littering in school. I would also conduct surveys with the pupils, to see how they would improve the environment through their eyes
	We could hold various events that are fun but help to reduce climate change as well. I would tell my friends about it and maybe it can spread
	Do physical acts to help climate change for example plant trees and plants, make posters to put around the village
	Not only teaching students about climate change more often, but also helping them make an impact. For example, arranging competitions to see who rides a bike or walks to school the most
	Teaching about how to be more sustainable and how nature can help mental health
Ensuring that teaching about climate change and sustainability is fun, interesting and engaging (99)	Applying it to more lessons but still having fun and not having the stress of climate change in all lessons to take a break and enjoy yourself
	I would improve the teaching of climate change and/or sustainability at secondary school by making fun activities and/or more interactive lessons to encourage kids who may not really care
	Making it more engaging so that students care about it more and would want to get involved
	Making it more fun and interactive for students so they can feel more like they have an opinion in climate change
Ensure there are opportunities for discussion and dialogue when learning about climate change and sustainability (73)	Allowing us more creative output and more ways to share our ideas and views by giving us a more public point to do so. For example, school-wide debates (perhaps branching to other schools in the area) or allowing us to express our views through art and music pieces or composition
	Being about to talk more openly about it instead of only having to listen to a teacher explain it, for the explanation and teaching to be more interactive for students and to allow more discussion

opportunities to learn outside and with nature ($n = 92$, Table 5), 'allow[ing] us to spend more time in nature, to learn the importance of preserving our environment' (Student response).

Across the structural dimension of teacher agency, as with teachers' responses, students also underlined policy structures, including the national curriculum as barriers to their learning of climate change and sustainability in school. Some responses from students ($n = 72$) underlined that climate change and sustainability should be given greater prominence, including in the National Curriculum, and included across a greater variety of subjects (Table 4). In addition, some students also wanted climate change to be included as a separate subject with dedicated time ($n = 58$, Table 4). For example, one student suggested 'having a lesson once a week about the environment' and another student wanted 'designated lessons every few months giving an in-depth overview of the current state of the planet and reminding students of the things we should be doing to improve the planet's wellbeing'. Also within the structural dimension, a small number of teachers ($n = 41$) and students ($n = 12$) explicitly recognised the importance of school leaders and leadership groups valuing climate change and sustainability in their schools (Table 4).

Finally, a small number of responses indicated that they already received 'good' teaching in relation to climate change and sustainability ($n = 16$). For example, one young person said, 'I think that they do it fine and I probably wouldn't change anything' and another reflected, 'it is very good already as they offer lots of clubs to help you understand about the environment and we learn about it and talk in assembly and tutor'. As well as these themes, considered through the practical-evaluative dimension of teacher agency, our analysis of students' responses also identified two further distinct themes: that students would like to have more teaching of climate change and sustainability in schools, and that this should be different from what they currently experience (see Table 5). We consider each of these themes in turn.

More and different: School students' perspectives on improving climate change and sustainability education in their school

Across the responses from school students a substantial minority ($n = 333$) indicated that more climate change and sustainability education was needed (Table 5). This included ensuring climate change and sustainability was covered in more subjects and in greater detail and depth ($n = 255$) as well as featuring more prominently in extra-curricular opportunities which were available to all ($n = 68$) (Table 5). Both of these types of responses require greater resources and enhanced learning environments, which are examples of the material aspect of the practical evaluative dimension of teacher agency. In addition, school students gave ideas and suggestions as to how climate change and sustainability could be taught differently, with three distinct aspects identified ($n = 425$) (Table 5). These examples of providing opportunities to take action, making teaching more fun and engaging, and including discussion and dialogue, point to the cultural aspect of shared ideas, values and beliefs regarding climate change and sustainability and how it should be taught in schools. The most frequent aspect identified relation to teaching climate change and sustainability differently was to increase opportunities for students to actively participate in and take action in relation to climate change and sustainability issues ($n = 253$) (Table 5). For example, many students wanted opportunities to 'make a change' and also recognised the need to make 'people more aware of what we're doing to the planet in our daily lives and giving them a deeper understanding of it and how they can help'. School students ($n = 73$) also indicated that they would like increased opportunity for discussion and dialogue when learning about climate change and sustainability, giving them 'more opportunities to talk about how they feel about climate change' (Table 5). Other students highlighted the need to ensure that teaching of

these topics was fun, interesting and engaging ($n = 99$) (Table 5). Across the analysis of students' responses through the framework of the practical-evaluative dimension of teacher agency presented in Table 4, students' ideas of different approaches to teaching climate change and sustainability were also visible. For example, some students ($n = 92$, Table 4) underlined how they would like to have some or more opportunities to learn outdoors and with nature as part of climate change and sustainability. For example, one young person suggested 'adding more trips and fun outdoor actives in nature to learn about the beauties of the wildlife around us'. Other students identified improving the teaching of climate change and sustainability by including more real-world examples, future-scenarios, data and research when teaching ($n = 144$, Table 4). Finally, while this is more implicit in the responses from students, the clear desire for change in relation to the teaching of climate change and sustainability requires the support of school leaders to create an environment in which students and teachers are trusted and supported to engage in education in these ways. This is indicative of the structural aspect of the practical evaluative dimension of teacher agency, which considers social structures, relationships, roles, power and trust.

DISCUSSION

Across our analysis of teachers' responses, we found that teachers articulated the cultural, material and structural barriers and affordances they experienced in relation to teaching climate change and sustainability as part of their professional lives. Some of these aspects of the practical-evaluative dimension of teacher agency were also visible in the experiences of students. Both groups of respondents reported cultural barriers and enablers to teacher agency, such as the shared ideas and beliefs that students and teachers hold regarding the value and importance of teaching climate change and sustainability in schools. The material dimension of agency was also evident, including the availability of time, money and access to high-quality resources; professional learning was fundamental to the extent to which teachers could achieve this dimension of agency, illustrated in students' suggestions for improving learning about climate change and sustainability in school. Both teachers and students recognised structural aspects, such as the National Curriculum and the role of school leaders in providing contexts through which teachers could achieve agency in relation to teaching climate change and sustainability in schools. Our analysis also underlines examples of divergence across the responses from teachers and students: while students strongly recognised the importance of opportunities for them to learn outside and to have school grounds, buildings and operations which reflect practices consistent with climate change and sustainability issues, these are far less visible in the responses from teachers. Broadly speaking, these findings are consistent with previous research focused on school-based climate change and sustainability education from across England (Rushton & Walshe, 2025; Howard-Jones et al., 2021) and beyond (Ennes et al., 2021; Thenga et al., 2020). What is distinct about our approach and, therefore, findings, is that these findings have been developed through the analysis of the reflections, ideas and experiences of both teachers and school students. We argue that this approach helps us to uncover informal, everyday and less visible practices of teacher agency, which students notice but teachers might not articulate or may be supressed in their reflections on their practice owing to accountability and performativity pressures they experience as part of their professional lives (Ball, 2003; Dunlop & Rushton, 2022a). Furthermore, we also contend that the students in this research were able to look beyond their current experiences of climate change and sustainability education in school and articulate emergent pedagogical practices which, if implemented, strengthened and/or expanded, would enhance the teaching and learning they receive. For example, students were able to articulate climate change and sustainability pedagogies

which are fun and engaging, which involve more discussion and dialogue, and which enable them to take more action in relation to climate change and sustainability. In this way, our research provides an important opportunity to consider how students experience the extent to which their teachers can achieve agency. For example, these types of pedagogies arguably require shared ideas, values and belief about the purpose and nature of school-based climate change and sustainability education, consistent with the cultural aspect of the practical evaluative dimension of teacher agency. Similarly, school students' desire for learning about climate change and sustainability through more real-world examples, future scenarios, data and research could arguably be connected to teachers' limited access to high-quality resources for teaching climate change and sustainability as part of their school subject, as well as limited time and availability of high-quality professional learning which builds teachers' confidence, consistent with the material aspect of the practical evaluative dimension of teacher agency. Furthermore, the desire from school students for their learning about climate change and sustainability to be more fun and engaging, including more dialogue and discussion and incorporating more opportunities for taking action, could be connected to the lack of opportunities for teachers to engage in high-quality professional learning that develops and builds their confidence. The role of professional learning in developing teacher confidence in relation to climate change and sustainability education has been previously documented in England (Greer et al., 2025; Rushton, Dunlop, & Atkinson, 2025; Rushton, Walshe, et al., 2025; Rushton, Walshe, & Johnston, 2025) and beyond (Drewes et al., 2018). The responses provided by some school students reflect an understanding that their own teachers need help, support and guidance in relation to teaching climate change and sustainability—these are examples of the ways in which students notice the everyday practices of their teachers. Some of these reflections include a sense of frustration, with school students wanting to 'make' teachers teach climate change and sustainability, wanting to have 'better teachers' who either teach these topics at all and/or teach new and different content so that they are not 'learning the same things all the time'. This experience of absence, and particularly of repetition, of climate change and sustainability topics in the school-based education young people receive is less visible in teachers' responses. This is an example of how students notice everyday practices which teachers may not articulate. Other responses reflect a desire from school students that their teachers are 'well-educated' and 'given information' about climate change and sustainability so that they are 'better informed' and can 'introduce it in more subjects'. Through these reflections, school students clearly articulate the role of teachers in improving school-based climate change and sustainability, and also broadly identify that teachers need support to—in simple terms—learn more about climate change and sustainability. These are examples where teachers and students understand and experience agency in consistent ways, with both groups perceiving that teachers require more professional support.

Across the responses provided by teachers and school students, other dimensions of teacher agency articulated by Priestley et al. (2015)—including the projective and iterative dimensions—were not evident. This is perhaps due to the format of the survey questions which invited teachers to consider their current or more immediate past and/or future practices, rather than providing opportunities for teachers to share their professional or life histories and/or longer-term experiences. In the future, researchers might helpfully consider which questions could capture these dimensions in their survey design or approach these aspects of teacher agency via different data collection methods, such as interviews and focus groups, including those which invite participants to engage with scenarios (e.g. Kusters et al., 2024). We also recognise that this might similarly reflect a research design limitation which relied on a large-scale survey to understand informal and everyday practices rather than, for example, through interviews with teachers and students and/or observations of practice.

Students' advocacy for new pedagogies for school-based climate change and sustainability

A strong theme across the responses from school students was that they wanted to experience 'different' teaching of climate change and sustainability. A key aspect of 'difference' was the opportunity to engage with climate change and sustainability topics which were action-oriented and authentic—including opportunities to engage in real-world data and research and to work with their peers and wider community. This is consistent with previous research which has considered teachers' approaches to teaching climate change and sustainability in schools in England (Howard-Jones et al., 2021). Our findings are also aligned with research with youth climate activists in England which underlined that some young people identified a deficiency in the formal education system in preparing them for the future and their desire for change and improvement (Hennessy, 2025). Consistent with our research, young people imagined that improvements to their education would include more opportunities to learn through discussion, engage with external experts and experience education which was broader than the curriculum content (Hennessy, 2025). What is perhaps distinct with regards to the findings of students' experiences presented in this research is that these insights are drawn from a group of students who probably had a broader range of prior engagement with climate change and sustainability issues than those engaged in youth climate activism.

Across our findings, school students also clearly identified important aspects of 'different' teaching of climate change and sustainability as including more opportunities to learn outdoors, including learning with nature and for their school grounds, buildings and operations to make more visible practices consistent with climate change and sustainability. This emphasis on school grounds as an opportunity to foster or constrain teacher agency in relation to climate change and sustainability was less visible in teachers' responses, with fewer than 20 noting the role of the campus environment, school buildings and/or practices ($n = 17$, Table 3). Again, this is an example of the ways in which students notice everyday practices which are less visible to teachers. However, in some of their responses, teachers did connect the role of school leaders in ensuring sustainability practices were evident, and this included aspects of school buildings and operations such as energy and resource use and waste disposal (Table 3). We suggest that this is a further example of the affordances of understanding teacher agency, in this case in relation to teaching climate change and sustainability, through both the responses provided by teachers and by students. Here, students are arguably able to envisage the conditions and resources required for teachers to do things 'differently'. This is perhaps because students are less influenced by policy and/or institutional barriers which are so influential in shaping the professional lives of teachers, who in our research are seemingly less equipped to reimagine teaching climate change and sustainability.

Reflecting across the analysis of both the data provided by students and teachers, a key difference in the responses is the way that students are able to articulate what constitutes 'different' in relation to the climate change and sustainability education they currently receive in school and what they would like to experience in the future. This includes approaches to climate change and sustainability education which have been identified in the wider literature as being high-quality and effective, including that which is participatory (Rousell & Cutter-Mackenzie-Knowles, 2020) and action-oriented (Howard-Jones et al., 2021; Van Poeck et al., 2024), and pedagogies which are both place responsive (Lynch & Mannion, 2021) and emotionally responsive (Walshe et al., 2022; Oberman, 2024; Dunlop & Rushton, 2022b). Through these responses, students have articulated a clear and detailed account of the climate change and sustainability pedagogies they understand as relevant, authentic and valuable in terms of helping them to

learn and live with the impacts of climate change and sustainability issues in the future. These pedagogies include learning in authentic ways which use real-life data, enable them to take action in their local communities and understand what they will encounter and experience in the future. Students also highlighted the importance of pedagogies which are fun, enjoyable and engaging, and which allow them to learn in outdoor settings with nature. We suggest that students have been able to articulate pedagogies for climate change and sustainability which are place-responsive in that they wish to learn in ways which harness the qualities of their local communities, environments and outdoor settings (Lynch & Mannion, 2021; Mannion et al., 2013) and take action for places (Chawla, 2024; Hennessy, 2025). In comparison, such a sense of what might be possible in relation to teaching climate change and sustainability in schools was less visible in the teachers' responses, with a much clearer emphasis on the barriers they experienced and the support they needed. Given the limited opportunities for outdoor learning in schools in England this is perhaps unsurprising (Walker et al., 2021). Research shows that for outdoor learning to be widespread and effective, teachers need sustained support over time, to learn collaboratively with their peers and to understand the value of these approaches for students' learning (Christie et al., 2016; Glackin, 2016).

CONCLUSION

This research has provided a novel approach to understanding both teacher agency and the nature and scope of teaching climate change and sustainability in secondary schools in England, drawing on the understandings, experiences and perspectives of teachers and students. While studies have previously explored teacher agency in relation to climate change and sustainability education in England from the perspectives of teachers, school leaders, policy analysis and site visits (e.g. Higham et al., 2025; Rushton, Dunlop, & Atkinson, 2025; Rushton, Walshe, et al., 2025), it is uncommon to draw together insights from both teachers and students to consider how teacher agency is observed, understood and achieved. Through this approach we can further understand the relational and emergent qualities of teacher agency, which are not only experienced by teachers but are formed and reformed through the interactions and experiences of the students they teach.

Future research could further develop this approach to understanding teacher agency so that insights are developed which are grounded in the wholly relational and emergent nature of teaching and learning which is experienced and enacted by teachers and students. Such an approach would also disrupt and challenge adult-centric norms and hierarchies in educational research and practice. Furthermore, we note that students have been able to clearly articulate detailed and nuanced pedagogies for school-based climate change and sustainability and that their noticing and uncovering of informal and everyday practices makes visible possibilities which teachers did not articulate. This research underlines the value of authentically engaging students in research, policy and practice which seeks to enhance education spaces, and that this is essential to respond to the inherent intergenerational justice dimension, which is particularly evident across climate change and sustainability issues. Building on the insights from these survey responses provided by students, future work to co-create climate change and sustainability education research, policy and practice must recognise children as 'differently equal' partners in shared decision-making processes, where children are being treated with dignity and respect as valuable persons (Bjerke, 2011). Finally, we reiterate the need for teachers in secondary school settings of all subjects to have the time and support throughout their professional lives to engage in high-quality professional learning which builds their knowledge and understanding of climate change and sustainability which is relevant to their subject expertise and develops their

confidence to engage in and initiate a range of pedagogical approaches which engage all children and young people.

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No potential conflict of interest was reported by the authors.

DATA AVAILABILITY STATEMENT

The data used in this research are not publicly available.

ETHICS STATEMENT

Ethical approval was granted by the UCL Institute of Education Research Ethics Committee prior to each stage of this research.

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