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Agentic action as an aim for sustainability education: views from secondary school teachers in England

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ABSTRACT

To support young people and their futures, sustainability education is increasingly framed around enhancing young people's agency. In England, however, sustainability is not a formal subject within the National Curriculum and teachers may have different understandings of what sustainability education involves. New insights were revealed through content analysis of written questionnaire responses from 335 secondary school teachers of different subjects in England: 47% understood sustainability education as supporting students to act and respond to achieve sustainability; 30% included various value-perspectives such as equity; and 26% understood sustainability education as conveying awareness and information to students. Teacher understanding of sustainability education encompassed some elements of agency, although this was mentioned infrequently, such as empowering students (7%) and supporting their decision-making (15%). Differences across subjects were also revealed. These findings suggest areas for subject-specific professional development for teachers to support agency and action for young people.

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1. Introduction

Many young people in England and other countries convey that looking after the environment is important to them and that they would like to do more to help (Natural England 2023; OECD 2022); further, many have stated that they would appreciate education that guides them in so doing (British Science Association 2023). To support young people and their futures, advocates of sustainability education - and other related school curriculum fields including environmental education - increasingly highlight the relevance of enhancing agentic actions, as well as gaining knowledge and developing skills (British Educational Research Association 2021; NAAEE 2019; UNESCO 2019, 2021a).

In April 2022, the Department for Education (DfE) in England published a non-statutory strategy focused on sustainability and climate change in education and children's services systems (Department for Education 2022); this emphasises the importance of students learning about climate change and sustainability through the existing National Curriculum. However, the current National Curriculum for England does not include the term 'sustainability' (Department

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for Education 2014). While the National Curriculum does encompass relevant topics within the subjects of science and geography, such as in geography to understand ‘how human and physical processes interact to influence and change landscapes, environments and climate’ (Department for Education 2014, 243), it has been argued that education in England focuses more on supporting students’ knowledge and understanding than on their empowerment and agency for taking action (e.g. Glackin et al. 2018; Glackin and King 2018). It is possible that because of this policy context in England, where ‘sustainability education’ is not a defined curriculum subject with associated professional development, teachers may have varying views around the nature and value of sustainability education. To further consider this, the research presented here explored teachers’ understanding of sustainability education as expressed through written, open-ended questions within a national survey; in particular, this considered whether/how teachers’ understanding encompassed reference to students’ agency around acting to achieve sustainability. This is significant because gaining greater clarity on this would enable the development of improved, targeted professional development and support for teachers which, in turn, would lead to higher quality sustainability education for students in schools.

1.1. Sustainability in education

‘Sustainability’ has historically been defined around ensuring that the contemporary *and* future needs of people can be met (United Nations 1987), and involves people respecting and protecting the environment while also respecting other people (including those in the future) and their needs (United Nations 2000). It has often been framed within ‘sustainable development’, which initially encompassed consideration of environmental, economic, and social dimensions (United Nations 1987) and was subsequently adapted to include equity and other dimensions (United Nations 2015). Conceptualisations of sustainability and sustainable development have developed over time and have been critiqued in various ways (e.g. Sinakou, Boeve-de Pauw, and Van Petegem 2019). For example, the environment can be intrinsically valued and respected, or it can be extrinsically valued as a resource for people’s development, such that sustainability might orientate around ensuring that any such resources are preserved for people in the future (e.g. Hungerford, Peyton, and Wilke 1980; Stevenson 2007).

Sustainability continues to be the focus of many international endeavours, which have been applied through education in different ways (e.g. UNESCO 2021a; United Nations 2015). Contemporary advocates have framed Education for Sustainable Development (ESD) around supporting young people to acquire knowledge of environmental, economic, and social dimensions of sustainable development and their interdependence, and skills around critical thinking to help understand local and global issues; it further incorporates developing in young people attitudes and values for productive global citizenship, and a sense of responsibility for the future, where young people can then act to achieve a sustainable world (UNESCO 2019, 2021a). Concurrently, ‘competencies’ have been proposed as outcomes for education involving sustainability, including students becoming able to envision and evaluate futures and solutions, and gain systems-thinking and interpersonal skills (Bianchi 2020; Brundiers et al. 2021; Wiek, Withycombe, and Redman 2011). Competencies have also included students becoming able to act for sustainability including through individual, collective and political avenues (Bianchi, Pisiotis, and Cabrera 2022).

Despite its prevalence within global policy and practice, ESD can be conceptualised in a multitude of ways, such as ‘environmental education’, ‘education for the environment’, ‘education about the environment’, ‘sustainability education’, ‘education for sustainability’, ‘education about sustainability’, or ‘sustainable development education’ (e.g. Glackin and King 2020; Mulvik et al. 2023). For example, ‘environmental education’ has been framed as supporting students to: develop an awareness of, and sensitivity to, the environment; develop feelings of value and concern for the environment, together with a motivation to improve and protect it; and develop skills to identify and solve environmental issues (e.g. British Educational Research Association

2021; Hungerford, Peyton, and Wilke 1980; Hungerford and Volk 1990). Environmental education and education around sustainability share some similarities: these broadly involve students gaining awareness and information, developing skills, and acquiring supportive attitudes and values, especially focused around the environment (British Educational Research Association 2021; NAAEE 2019). Environmental education may tend towards more explicit focus around fostering attitudes (and actions) towards respecting and supporting the natural environment, although these are also encompassed within recent conceptualisations for education around sustainability (Bianchi, Pisiotis, and Cabrera 2022; UNESCO 2019, 2021a).

Teaching sustainability and related areas may involve challenges, however, particularly in relation to the extent to which they are integrated within curricula and wider policies (Mulvik et al. 2023). For example, in England, sustainability and environmental foci have limited integration within curricula (Glackin and King 2020), whilst in Scotland, *Learning for Sustainability* is an entitlement for all children and young people and is embedded into the Professional Standards for Teachers (General Teaching Council for Scotland 2022). Additionally, curricula areas may not necessarily reflect those which are advocated for (UNESCO 2019, 2021a); across many countries, curricula coverage of sustainability has focused on fostering knowledge and understanding around relevant issues, with less emphasis on the competencies of inspiring or promoting actions to achieve sustainability, especially when applied within science subjects (UNESCO 2019). These intersecting challenges can also make it harder for teachers to include real-world examples within curricula topics, which might be more personally motivating for students (Glackin et al. 2018; Rushton, Dunlop, and Atkinson 2025). Although implemented teaching can be more expansive than formal curricula in contexts where teachers have greater autonomy (Howard-Jones et al. 2021), without curricula coverage the extent to which students learn about sustainability, and the content of any learning, becomes dependent on individual teachers. In that case, teaching becomes reliant on teachers' understanding of sustainability, and relevant pedagogy and practices; this is potentially problematic when many teachers have highlighted that their own education and training have not covered sustainability (Greer et al. 2023; UNESCO 2021b).

There have been wide-ranging shifts in global priorities and foci of sustainability education over the past few decades; however, it is unclear as to the impact that these have had on teachers' understandings, specifically in English schools. Existing research, within England and internationally, has tended to focus on teacher and student teacher conceptualisations of sustainable development, rather than sustainability education, finding that teachers have tended to convey greater awareness around environmental than economic or social dimensions of sustainability (Borg et al. 2012, 2014; Summers, Corney, and Childs 2004; Summers and Childs 2007). There has been relatively little research specifically considering teacher understandings of sustainability education, although existing research has revealed some wider insights. For example, student geography teachers in Scotland have articulated that ESD is an important issue that should be embedded across all subjects, but also a lack of confidence relating to defining and delivering ESD (Munro and Reid 2009). This need for further professional development was also identified through exploration of what secondary school teachers in Germany think and know about ESD: while teachers' self-reported knowledge about ESD had increased since 2007, 32.7% of the surveyed teachers had still not heard of the term ESD at all in 2019 (Waltner et al. 2020). In Sweden, research has explored discipline-based groups of teachers' perspectives of their contribution to ESD, suggesting that differences indicate that each subject area has the potential to make specific contributions to ESD: science teachers were found to focus on ecological content knowledge with the aim of improving students' scientific knowledge, whereas social science teachers regarded ESD as incorporating politically- and morally-oriented issues, such as the unfair global distribution of resources, with the aim of strengthening students' well-being; languages teachers saw their contribution to ESD as bridging the sciences and social sciences through argumentation, debates and discussions, with the broader aim of improving students' personal development and communication skills (Sund and Gericke 2020). Despite

these studies, new insight may be gleaned from exploring emergent themes within the perspectives on sustainability education of teachers of all subjects, particularly considering whether these reflect existing global policy or broader foci, including those around agency and acting to achieve sustainability.

1.2. Theoretical perspectives around agency and actions

Education is often conceptualised as students gaining knowledge, skills, and attitudes and values (British Educational Research Association 2021; NAAEE 2019; UNESCO 2019). These areas accord with theories of learning and motivated behaviour, such as Self Determination Theory (Ryan and Deci 2019), which accommodate the interplay of students acquiring knowledge and understanding, and being inspired to accommodate this knowledge and understanding, thereby being more likely to achieve agency in applying it to their lives and the world around them. Indeed, research has found that students' actions and behaviours to support and protect the environment depend not only on knowing and understanding, but also in being motivated to find out more and take action (Bamberg and Möser 2007; Hines, Hungerford, and Tomera 1987; Steg et al. 2014).

Agency is broadly conceptualised as involving people having active influence on their lives (Eteläpelto et al. 2013), including considering the future and generating responses to problematic situations (Emirbayer and Mische 1998). Within education, agency, or the autonomous behaviour that reflects it, is made manifest when a student intentionally engages in learning about something they want to grasp and then acts on the basis of their learning in new ways they consider appropriate (Emirbayer and Mische 1998; Eteläpelto et al. 2013; Hays 1994). In particular, agency in the classroom assumes that 'alternative courses of action are available, and the agent therefore could have acted otherwise' (Hays 1994, 64). Additionally, through achieving agency, young people develop an integrated sense of self that allows them to be creative and interactive in their lives, when they are motivated by the perception of their own self-determination (Ryan and Deci 2019). This necessitates them perceiving themselves as competent (i.e. achieving the valued curriculum), related (i.e. feeling a sense of belonging and being valued) as well as being autonomous (i.e. believing that they have choices in their actions and that actions have an impact on their surroundings) (Ryan and Deci 2019). Such motivational theories essentially provide a wider perspective onto sustainability education, where agency and action may be inherent and essential rather than optional.

Education offers many potential avenues for supporting agency. For example, the National Curriculum in England involves covering 'Earth as a source of limited resources and the efficacy of recycling' within science (Department for Education 2014, 207). This could involve focus on information and knowledge (e.g. Glackin et al. 2018; Glackin and King 2018), but could also offer an avenue for supporting students' actions (e.g. how to recycle, supporting students to feel competent in being able to recycle, and supporting students to feel that recycling is efficacious where actions can and will achieve wider outcomes and have impacts). Additionally, it might also provide information around the current and future availability of resources in order to foster understanding around the value of recycling; this may, in turn, be motivational as it engenders feelings of personal and collective responsibility, and an awareness of the implications of inaction. In this way, wider frameworks for sustainability education increasingly involve supporting students' individual and collective agency for action through the development of attitudes, knowledge, and skills to effect change (Bianchi, Pisiotis, and Cabrera 2022). Different conceptual frameworks and theoretical perspectives also help highlight the importance of different elements of agency and/or actions. For example, the wider concept of 'action competence' encompasses people having awareness of what can be done around sustainability, believing that undertaking actions will help support sustainability and make a difference, and being willing and motivated towards undertaking actions that will help support sustainability (Jensen and Schnack 1997; Sass et al. 2020). From a wider perspective, Self Determination Theory also highlights the relevance of internalised values as

motivating actions; the value of actions can be internalised, in various ways and for various reasons, which can be facilitated when they involve relatedness to and with others, where people can develop their identities through belonging within groups with similar and shared values (e.g. Mackay et al. 2021; Ryan and Deci 2000). Relatedness and belonging may have relevance to people undertaking wider actions and advocacy around sustainability, particularly through collective and political avenues (e.g. Bianchi, Pisiotis, and Cabrera 2022).

Overall, theoretical perspectives suggest that where sustainability education has been orientated around fostering students' agency and/or attitudes, rather than only acquisition of knowledge and awareness, this may be more likely to result in proactive behaviours. Nevertheless, it again remains unclear whether/how any such foci are reflected within teachers' understanding of sustainability education.

1.3. Education in England

Education in England has a National Curriculum that covers primary and secondary phases of education, which are further separated into Key Stages: the primary phase of education covers Key Stage 1 (Years 1–2, ages 5/6–6/7) and Key Stage 2 (Years 3–5, ages 7/8–9/10); the secondary phase of education covers Key Stage 3 (Years 7–9, ages 11/12–13/14) and Key Stage 4 (Years 10–11, ages 14/15–15/16) (Department for Education 2014). Within the curriculum, geography is compulsory until the end of Key Stage 3 (Year 9), and science is compulsory until the end of Key Stage 4 (Year 11) (Department for Education 2014). Students often undertake examinations at the end of Year 11 to gain General Certificate of Secondary Education (GCSE) or equivalent qualifications. Teaching can also be informed by GCSE or equivalent specifications, especially when subjects are not compulsory and have no National Curriculum content specified such as geography during Key Stage 4.

2. Methods

2.1. Research aims

This research aimed to clarify teachers' understanding of sustainability education, through revealing commonalities in views and their prevalence (including any emphasis on agency), among those teaching at secondary school (Key Stage 3 and/or Key Stage 4) in England.

2.2. Surveying

Teachers across England were invited to complete an online questionnaire, as part of a wider research project around sustainability and climate change. The research was reviewed and approved by the ethics committee of the host university (UCL IOE, Faculty of Education and Society, University College London; approval reference REC 1627) before data collection commenced. Participants were provided initial information about the research so that they could make informed decisions around participating and were free to not complete any questions within the questionnaire.

Responses were sought from teachers in England during autumn/winter 2022, across all subjects and phases of education; participants were sought through a range of networks, social media channels, and existing communication distribution lists, including those from the host university, subject associations, and the DfE. The research did not apply a random or stratified sampling approach, and participants may have been more (or less) likely to engage if they were interested (or not) in sustainability and climate change within education.

The questionnaire gathered information about teachers and their circumstances, in addition to their understandings of sustainability education (which forms the focus of the research presented here).

2.3. Participants

The sample comprised 335 teachers teaching at Key Stage 3 and/or Key Stage 4. This research identified those who reported teaching science and geography, given that relevant content is typically covered within those subjects: 74 (22%) taught science and not geography (described here as 'science teachers'), 96 (29%) taught geography and not science ('geography teachers'), 3 (1%) taught science and geography, and 162 (48%) taught other subjects but not science or geography ('teachers of other subjects'). Science or geography teachers may have also taught other subjects (excepting geography or science as described).

Across the sample, 230 (69% of those who answered the question about gender) were women, 98 (29%) were men, 5 (1%) were non-binary or conveyed other identities, and the remaining teachers left the question blank. 301 (92% of those who answered the question about ethnicity) were white, 7 (2%) were Asian/Asian British, 3 (1%) were Black/Black British, 10 (3%) had mixed ethnicities, 6 (2%) conveyed other ethnicities, and the remaining teachers left the question blank. The teachers had a range of experience, from 1 to 5 years spent teaching (103, 31% of those who answered the question), 6–10 years (59, 18%), 11–15 years (57, 17%), 16–20 years (39, 12%), to 20+ years (73, 22%), while the remaining teachers left the question about experience blank.

For partial context, across England during 2022/2023 within state-funded secondary schools, 65% of teachers were women and 35% were men (with less than 1% with other identities); 87% of teachers had white backgrounds, 7% Asian/Asian British, 3% Black/Black British, 2% mixed ethnicity, and 1% had other ethnicities (Department for Education 2023).

2.4. Analysis

The questionnaire asked teachers to write their own responses following the prompt 'I understand sustainability education as...'. Teachers' written responses were explored through iterative content analysis: initial review and categorisation was undertaken by the first author and identified commonalities; these were reviewed through discussions with the second author and refined in subsequent iterations. This process refined the foci of themes and consistency in classification. The combination of commonalities into wider themes helped quantify their prevalence; the narrative results also describe any underlying commonalities and important points being made within themes to help provide greater insight into teachers' understandings.

Analysis also explored similarities and differences across those teaching different subjects. These comparisons could not encompass those who taught both science and geography, because statistical analysis cannot accommodate overlapping groups. This analysis applied cross-tabulations with chi-squared statistical tests to reveal the magnitude (Cramer's V values) and statistical significance (p value) of similarities/differences in the prevalence of themes within the responses from those teaching different subjects (teachers of science, teachers of geography, and teachers of other subjects). Statistically significant findings were identified through p value below 0.05. Similarities/differences might be statistically significant (or not) and have varying magnitudes, for example where a finding might be statistically significant but small in magnitude while another finding might be statistically significant and large in magnitude, such that quantitative analysis considers statistical significance and also magnitudes of difference. Cramer's V values are often interpreted with values above 0.10 reflecting a small difference, above 0.30 reflecting a medium difference, and above 0.50 reflecting a large difference. Indicators of magnitude, such as Cramer's V values, allow the potential for comparison and contextualisation across different research studies, where different studies may involve different underlying units of measurement, such as percentages of themes (as considered within this research) or questionnaire agreement-scales.

3. Results

Teachers' responses to 'I understand sustainability education as...' encompassed a range of themes (Table 1), where many responses could be classified with multiple themes (such that

Table 1. Understanding of sustainability education.

'I understand sustainability education as...' theme	Percentage of responses from all teachers	Example responses from teachers
Acting for sustainability (overall)	47%	This overall area encompassed themes of 'approaches and strategies', 'decision-making', and 'empowering agency'
Acting for sustainability: approaches and strategies	42%	'Understanding the meaning of sustainability and knowing how students can take sustainable action in all parts of their lives' 'Teaching students to understand that most resources are finite and how behaviours need to adapt to cope with that' 'Providing practical advice regarding sustainable living'
Acting for sustainability: decision-making	15%	'Raising awareness and providing the information so that students can understand and evaluate the situation for themselves and then make decisions and take actions that can actively contribute' 'Teaching how to prepare students how to make good decisions for the future taking into account environment, economic and social factors on a range of issues at a range of scales' 'Allowing others to understand how to make sustainable choices, developing an appreciation of how to make decisions that are positive'
Acting for sustainability: empowering agency	7%	'Empowering our children to make positive changes' 'Ensuring students have a say in how their environment is managed and making sure they are as involved as they want to be to help stop climate change' 'Creating a platform and a forum whereby students and teachers can collectively seek to modify individual and social behaviours and thinking towards building a community that preserves the global ecosystem'
Values/perspectives around sustainability (overall)	30%	This overall area encompassed themes of 'equity', 'balancing dimensions', and 'nature and reducing impacts'
Values/perspectives around sustainability: nature and reducing impacts	19%	'Teaching respect for the planet, in all processes, and why this is important' 'Teaching people about how we might effectively reduce our impact on nature and the planet. This would include efforts to combat climate change' 'A means of teaching young people how to live in harmony with our planet'
Values/perspectives around sustainability: balancing dimensions	10%	'Gaining understanding of the complexity of trying to balance environmental, social and economic needs without undue detriment to any of the 3' 'Teaching students that to be sustainable and understanding that it is not just the environment we have to protect, but methods we choose must also consider the social and economic implications too' 'Giving students the tools to create a world where progress in all fields is able to take place alongside ecological protection'
Values/perspectives around sustainability: equity	9%	'A pivotal enabler to bringing about the social change needed to improve citizen decision-making to address human, social, economic and environmental issues. An understanding of these issues is crucial to be the best citizen that we can be, taking in account Intergenerational perspectives' 'Helping young people to understand how they can preserve resources for their continued use in the future' 'Focusing on protecting environments and creating a more ecologically and socially just world through informed action'
Awareness and information about sustainability	26%	'Making students aware of word and what it means and providing case studies for sustainable development' 'Understanding that some resources are finite and some are infinite' 'Teaching students about the social, economic and environmental aspects of sustainability and relating it to our own lives'
Important and fundamental	21%	'Absolutely fundamental to the future of the planet' 'The single most important thing we can teach our children' 'Something teachers can easily include in many areas of the curriculum'

The table summarises: the themes from teachers' written responses; the prevalence of themes (the percentage of responses classified with each theme); and illustrative quotations. Responses could be classified with multiple themes, such that the reported percentages can sum to more than 100%. Some 'overall' areas were formed through the combination of themes; the percentage of the 'overall' area reflects the responses classified with at least one of the relevant themes.

Table 2. Understanding of sustainability education across teachers of different subjects.

'I understand sustainability education as...' theme	Percentage of responses from science teachers	Percentage of responses from geography teachers	Percentage of responses from teachers of other subjects	Comparison	
				Cramer's V	Sig. (<i>p</i>)
Acting for sustainability (overall)	33%	49%	52%	.149	.026
Acting for sustainability: approaches and strategies	29%	46%	46%	.144	.033
Acting for sustainability: decision-making	19%	18%	10%	.119	.098
Acting for sustainability: empowering agency	8%	4%	7%	.062	.529
Values/perspectives around sustainability (overall)	25%	40%	27%	.133	.054
Values/perspectives around sustainability: nature and reducing impacts	16%	21%	19%	.040	.770
Values/perspectives around sustainability: balancing dimensions	7%	19%	6%	.186	.003
Values/perspectives around sustainability: equity	7%	17%	6%	.159	.016
Awareness and information about sustainability	25%	35%	21%	.138	.045
Important and fundamental	25%	18%	22%	.062	.528

The table summarises: the themes from teachers' written responses; the prevalence of themes from teachers of different subjects (the percentage of responses classified with each theme); and a statistical comparison of whether the prevalences were similar/different across the teachers of different subjects. The statistical comparison involved cross-tabulations with chi-squared tests; the table conveys the statistical significance of the test ('Sig. (*p*'); *p* value) and the magnitude of the difference ('Cramer's V'; Cramer's V value), where 'statistically significant' differences ($p < 0.05$) have been highlighted in bold for clarity.

the reported percentages can sum to more than 100%). Some differences in the prevalence of themes were also revealed across teachers of different subjects (Table 2).

Overall, teachers' responses most frequently involved (Table 1): informing how to act for sustainability (classified within 47% of responses across all teachers, where this overall area encompassed the specific themes of approaches and strategies, decision-making, and empowering agency); values or perspectives around sustainability (30% of responses, where this overall area encompassed the specific themes of respecting nature and reducing environmental impact, sustainability through balancing different dimensions, and sustainability focused around equity); conveying awareness and information about sustainability to students (26% of responses); and highlighting sustainability as something important and fundamental (21% of responses). The following narrative summaries provide further detail, including quotations for illustration, and which convey (where relevant) the significant differences across teachers of different subjects.

3.1. Sustainability education as acting for sustainability

Sustainability education was understood as informing how to act, which encompassed specific themes of: actions, reactions, and other strategies to ensure sustainability; supporting students' decision-making; and empowering and supporting students' agency. This overall area was classified within almost half of all responses (47% of all responses, where these responses may have involved one or more of the three particular themes), but, intriguingly, this was less prevalent within responses from science teachers (classified within responses from 33% of science teachers, compared to 49% of geography teachers and 52% of those teaching other subjects). Some teachers particularly highlighted knowledge as integral to, or as the necessary precursor to, students' actions for achieving sustainability (e.g. 'Equipping students with knowledge and practical skills to live in a sustainable way'). Some also highlighted the role of

knowledge for students' (informed) decision-making (e.g. 'Informing our young people of the facts and arming them with the information to make their own educated choices').

3.1.1. Acting for sustainability: approaches and strategies

Teachers' responses included approaches and strategies whereby sustainability could be enacted (42% of all responses). This area was less prevalent within responses from science teachers (classified within responses from 29% of science teachers, compared to 46% of geography teachers and 46% of those teaching other subjects). Approaches and strategies could be generalised (e.g. 'Providing real world examples of how we should use resources sustainably and explain the implications of not doing so'), while others highlighted approaches and strategies specifically around sustainable living for everyday life (e.g. 'Understanding the meaning of sustainability and knowing how students can take sustainable action in all parts of their lives'). Some teachers highlighted approaches around managing resources, including maintaining, protecting, and conserving environmental resources as well as reducing their use (e.g. 'Teaching students to understand that most resources are finite and how behaviours need to adapt to cope with that').

3.1.2. Acting for sustainability: decision-making

Some teachers understood sustainability education as developing (informed) decision-making (15% of all responses) (e.g. 'Raising awareness and providing the information so that students can understand and evaluate the situation for themselves and then make decisions and take actions that can actively contribute'). Decision-making also encompassed evaluation of situations and solutions (e.g. 'Providing students with a workable definition of sustainability and equipping them with the knowledge to evaluate how sustainable a given process/proposal is'). Some teachers also highlighted aspects to consider within decision-making, including accommodating environmental, economic, and social aspects (e.g. 'Teaching how to prepare students how to make good decisions for the future taking into account environment, economic and social factors on a range of issues at a range of scales'). Some teachers specifically contextualised decision-making to everyday life, including around resources, products, and consumption (e.g. 'An important consciousness raising endeavour to encourage individual citizens to consider their own consumer choices and their impact carefully').

3.1.3. Acting for sustainability: empowering agency

Some, although relatively few, teachers understood sustainability education specifically as empowering students and their agency (7% of all responses). These responses included specific references to *personal* agency and empowerment (e.g. 'Empowering our children to make positive changes'; 'Enabling students to see that change is necessary, possible and they can be the orchestrators of it'). These also included empowerment as emerging or following from students gaining understanding and skills or competencies (e.g. 'Empowering students with the tools, skills, and knowledge they need to understand how to mitigate climate change and to act on these'), and with having opportunities for engagement or action (e.g. 'Ensuring students have a say in how their environment is managed and making sure they are as involved as they want to be to help stop climate change').

Some responses encompassed *collective* agency, including through shared action or changes to shared systems (e.g. 'Creating a platform and a forum whereby students and teachers can collectively seek to modify individual and social behaviours and thinking towards building a community that preserves the global ecosystem'; 'Informing (typically but not always young) people about how processes and activities can be made less damaging to the environment especially in the long term and developing understanding of ways in which they can act

individually and collectively to make their lives, the institutions and groups of which they form part, and wider society more sustainable'), and through advocacy, including calling for changes or actions (e.g. 'Teaching others on their ecological shortcomings and how they can make improvements in their lives and encourage others to do the same').

Some teachers also highlighted education as an avenue for motivating the agency for students to make positive changes (e.g. 'One which enables all of us to acquire the knowledge, skills and motivation/agency to make more sustainable choices and live more sustainable lives') which also encompassed hope (e.g. 'Allowing pupils to see hope'; 'Giving hope through opportunities, inventions and every day tips to tackle climate change together').

3.2. Values/perspectives around sustainability

Sustainability education was understood to involve various values or perspectives, including specific themes of: respecting nature and reducing environmental impacts; sustainability through balancing different dimensions; and equity. This overall area was classified within almost a third of all responses (30% of all responses, where these responses may have involved one or more of the three particular themes). These themes can be characterised as value-perspectives around why sustainability education might be applied or what sustainability education might be aiming towards.

3.2.1. Values/perspectives: nature and reducing impacts

Sustainability education was understood to involve inherently valuing nature (19% of all responses). This area included valuing and respecting nature (e.g. 'Teaching respect for the planet, in all processes, and why this is important'; 'Learning how to live in greater harmony with nature and how to enact individual and societal change'). Sustainability education was also understood to encompass protecting and restoring nature, including reducing negative impact in general (e.g. 'Engaging young people with strategies and ways to prevent further environmental decline'), and particularly addressing and reversing current challenges (e.g. 'Teaching people about how we might effectively reduce our impact on nature and the planet. This would include efforts to combat climate change'; 'Giving students the information to make decisions about how they can reduce the pace of global warming, and learn about what governments and other organisations are doing to tackle global warming').

3.2.2. Values/perspectives: balancing dimensions

Sustainability education was also understood to involve balancing dimensions (10% of all responses). This area was more prevalent within responses from geography teachers (classified within responses from 19% of geography teachers, compared to 7% of science teachers and 6% of those teaching other subjects). Some responses emphasised promoting balance across dimensions including environmental, social, and economic areas (e.g. 'Gaining understanding of the complexity of trying to balance environmental, social and economic needs without undue detriment to any of the 3'). Other responses focused on ensuring development and progress while simultaneously protecting nature (e.g. 'Giving students the tools to create a world where progress in all fields is able to take place alongside ecological protection'), and where sustaining (natural) resources ensures people's ways of life (e.g. 'Preparing students to think about how current ways of life and resources can be preserved into the future').

3.2.3. Values/perspectives: equity

Sustainability education was understood to involve values of equity (9% of all responses). This area was more prevalent within responses from geography teachers (classified within 17% of

responses from those teaching geography, compared to 7% of those teaching science and 6% of those teaching other subjects).

Teachers' responses especially focused around inter-generational equity (e.g. 'A pivotal enabler to bringing about the social change needed to improve citizen decision-making to address human, social, economic and environmental issues. An understanding of these issues is crucial to be the best citizen that we can be, taking in account Intergenerational perspectives'). Some responses particularly focused around preserving resources for people in the future (e.g. 'Helping young people to understand how they can preserve resources for their continued use in the future'). Some teachers covered equity more broadly, including sustainability as an avenue for envisioning a better future (e.g. 'Providing a socially just alternative vision for future'; 'Focusing on protecting environments and creating a more ecologically and socially just world through informed action').

These aspects can be characterised using terms such as equity and justice, although any such concepts can be understood or applied in various ways. For example, inter-generational equity may include assumptions around continuing to use natural resources into the future, so that people in the future can continue to benefit. Social justice can include mitigating inequities or inequalities for people, and more expansive ideas around social justice applied to sustainability may also include envisioning futures with (potentially radically) different assumptions around resources and their use.

3.3. Sustainability education as awareness and information about sustainability

Sustainability education was understood as conveying awareness and information to students (26% of all responses). This area was more prevalent within responses from geography teachers (classified within 35% of responses from those teaching geography, compared to 25% of those teaching science and 21% of those teaching other subjects). This area included general awareness and information around the concept of sustainability and relevant topics (e.g. 'Making students aware of word and what it means and providing case studies for sustainable development'). Some teachers highlighted understanding around resources and their use or consumption by people (e.g. 'Ensuring that students understand the renewal rate of resources, what it means to manage land use and consumption to ensure we have enough resources in the future'), and also encompassed wider aspects including the traditional 'three dimensions' of sustainability (e.g. 'Teaching students about the social, economic and environmental aspects of sustainability and relating it to our own lives').

3.4. Sustainability education as important and fundamental

Sustainability education was understood as something important and fundamental (classified within 21% of responses across all teachers). Some teachers conveyed the general or wider importance of sustainability education (e.g. 'Fundamental to our future'; 'Absolutely fundamental to the future of the planet'). Some perceived ubiquitous responsibility around sustainability education (e.g. 'Everyone's responsibility'; 'A key responsibility of schools'). Some highlighted the area as having particular importance within education (e.g. 'The single most important thing we can teach our children') and something that can be universally applied within education (e.g. 'Something that can be embedded across all subjects and areas of school life'). While these responses did not refer directly to agency, they implied that sustainability education should pervade all areas of education and indeed life.

4. Discussion

Many young people in England convey that sustaining the environment is important to them and that they would like to do more to help (Natural England 2023). Many also feel sad, powerless, and helpless around climate change (Hickman et al. 2021). To help support young people

and their futures, many advocates of sustainability education emphasise enhancing young people's agency, leading to action (UNESCO 2019, 2021a, 2022). Education offers an avenue for conveying awareness and knowledge about challenges, including what can be done in response, while fostering respect for the natural environment; it can also provide support for young people's autonomous decision-making and action. These foci may then help enhance young people's agency within their lives, including effecting positive change towards sustainability.

The findings from this research show that students' agency was rarely referenced directly within teachers' understanding of sustainability education (where empowering agency was classified within responses from only 7% of teachers). Although nearly half understood sustainability education as informing how people can respond and act to achieve sustainability (47% of teachers), fewer articulated sustainability education as conveying awareness and information to students (26% of teachers) and wider value-perspectives such as equity (30% of teachers). This is potentially problematic when global consideration of sustainability education frequently encompasses an aim to support young people's agency and foster supportive attitudes and values towards the natural environment (e.g. UNESCO 2019, 2021a), and where international endeavours rely on these aims being accommodated and achieved within national contexts (UNESCO 2020). The overall findings from the research presented here highlight scope for education to have greater focus on students' agency and to take seriously their inherent motivations, hopes, and concerns around the environment. Greater focus on students' agency might bring other benefits, aside from teaching and learning outcomes, as agency has been found to be an avenue towards wider well-being (Chawla 2020; Ojala et al. 2021).

Sustainability education in England has often been criticised as focusing on 'knowledge' rather than the nurturing of agency (e.g. Glackin et al. 2018; Rushton, Sharp, and Walshe 2023). The teachers surveyed here, in contrast, tended to more often understand sustainability education as involving action to achieve sustainability, including within everyday life: 47% of all teachers understood sustainability education as involving action to achieve sustainability, which aggregated the themes of approaches and strategies, decision-making, and empowering agency (and where, more specifically, 42% of all teachers understood sustainability education as involving approaches and strategies to achieve sustainability), while 26% understood sustainability education as conveying awareness and information about sustainability. Another particularly notable finding was that geography teachers were more likely to emphasise action than science teachers: 49% of geography teachers and 33% of science teachers understood sustainability education as involving action to achieve sustainability, which aggregated the themes of approaches and strategies, decision-making, and empowering agency (and where this finding followed from, more specifically, 46% of geography teachers and 29% of science teachers understanding sustainability education as involving approaches and strategies to achieve sustainability, while differences were not found for decision-making and empowering agency). Science is compulsory across secondary education in England while geography is not (Department for Education 2014); as such, some students may receive less support around actions to achieve sustainability once they no longer study geography. It is uncertain as to whether differences in understanding across different teachers follow from disciplinary expectations, from geography potentially having a closer relationship with sustainability education than science, or for other reasons; further research around subject-specific challenges and facilitators may be beneficial, including building on Sund and Gericke (2020) research exploring how aspects of sustainability could be contextualised and applied within particular subject disciplines.

Sustainability education was specifically understood by some teachers as empowering students' personal and, to some extent, collective agency, both of which have been promoted within contemporary frameworks for sustainability education (Bianchi, Pisiotis, and Cabrera 2022). Nevertheless, these areas were mentioned relatively infrequently (within only 7% of responses). Sustainability education is increasingly framed around (inherently interrelated)

individual actions and the wider reorganisation of societal structures (UNESCO 2020), and recognising the relevance of individual actions, collective actions, and political actions as avenues for agency (Bianchi, Pisiotis, and Cabrera 2022). Young people across many countries are increasingly (and autonomously) engaging in activism and advocacy, such as School Strike for Climate, which includes highlighting and challenging current circumstances where their concerns and desire for greater empowerment have limited recognition and support within many areas of education (Mayes and Holdsworth 2020). Within the research presented here, collective agency was generally encompassed together with personal agency within teachers' understanding (for example, where sustainability education was understood to involve 'Creating a platform and a forum whereby students and teachers can collectively seek to modify individual and social behaviours and thinking towards building a community that preserves the global ecosystem'). Political agency was less clearly evident, although teachers could recognise the relevance of governments (for example, where sustainability education was understood to involve 'Giving students the information to make decisions about how they can reduce the pace of global warming, and learn about what governments and other organisations are doing to tackle global warming'). Future research may benefit from focusing on whether and how teachers feel supported to, in turn, support students' personal, collective, and political agency, and how this might be undertaken. Contemporary strategy in England promotes extra-curricular opportunities and activities for students, such as around sustainable food choices, recycling, adaptation projects, and weather and energy monitoring (Department for Education 2022); these, and other activities, may offer some avenues for students' involvement (agency) within school-level decision making, although depending on circumstances and schools. Such activities could potentially provide avenues for fostering shared values, (collective) belonging, and agency within school-level contexts, all of which may inspire (potentially collective) actions in other contexts. Concurrently, community-based activities and partnerships have also been proposed as avenues for teaching and learning, and for students' applied actions, around sustainability (e.g. British Educational Research Association 2021; NAAEE 2019). Nevertheless, it remains unclear whether or how these and other activities are being applied through schools, and what facilitating factors or barriers may be present. Many of these areas could be explored through future research, together with exploring how personal, collective, and political agency receive focus within other, classroom and curriculum-based, teaching and learning across different subjects.

Teachers' understandings of sustainability education also included reference to values around equity (especially inter-generational equity), and balancing environmental, social, and economic areas in order to ensure human development and progress while also protecting nature. These reflect established foci within sustainable development emphasised by the United Nations (UNESCO 2019; United Nations 2015); nevertheless, frameworks for ESD have subsequently expanded and developed, including to emphasise the importance of students' agency and actions (e.g. Bianchi, Pisiotis, and Cabrera 2022; UNESCO 2019, 2021a). The findings presented here provide a contemporary perspective that extends understanding from existing research on teachers that has revealed that environmental dimensions have been foregrounded within teachers' views of sustainability (e.g. Birdsall 2014; Borg et al. 2014; Summers and Childs 2007). The findings presented here also provide other new insights: geography teachers were more than twice as likely to give responses referring to equity and balancing dimensions, compared to science teachers and those teaching other subjects. This accords with earlier research, where geography teachers were more likely than science teachers to mention inter-generational equity (Summers, Corney, and Childs 2004), although further research would be useful to explore why these differences may arise.

One final point of note is that the findings suggest that teachers' understanding of sustainability education included valuing nature and reducing environmental impacts, which reflect previously identified attitudes in relation to intrinsic appreciation of nature (e.g. Bianchi, Pisiotis,

and Cabrera 2022; NAAEE 2019). This is significant because intrinsic appreciation of nature is often encompassed within the motivational concept of ‘nature connection’, together with other attitudes such as feeling responsibility for protecting nature (Cheng and Monroe 2012; Tam 2013). Nature connection is related to social and psychological well-being, as well as people undertaking actions to support the environment to which they feel connected (Dillon and Lovell 2022; Mackay and Schmitt 2019; Seers, Mughal, and Chatterjee 2022). However, despite these multiple benefits, research highlights concern with increasing societal disconnect with nature (e.g. Beery et al. 2023), and school curricula or traditional pedagogies in England do not offer spaces within which to connect children and young people with nature, particularly through outdoor experiences (Walsh, Perry, and Moula 2023). As such, there appears a disconnect between teachers’ understandings of sustainability education as valuing nature, and explicit opportunities or expertise for them to incorporate this into their practice.

Across these developing themes, compelling evidence emerges for the need for improved professional development to support teachers’ understanding of – and practice in – sustainability education. This is to ensure that students are better informed and given the agency to act, as well as being supported to develop intrinsic appreciation of nature and, thereby, the motivation to protect it. Given differences identified between teachers of science, geography and other subjects, any such professional development should, therefore, encompass subject-specific contextualisation, and with wider support and resourcing to enable teachers to provide high quality, locally contextualised sustainability education within their school contexts which provides agentic action as its outcome.

4.1. Limitations and implications for further research

The presented research considered 335 teachers; however, the findings may not necessarily be generalised further than the sample. The identified themes represent one group of authors’ perspectives, and different classification schemes might reveal different or further insights. Only 7% of responses from teachers were classified as understanding sustainability education as involving empowering students and their agency; however, teachers may have prioritised mentioning different ideas for different reasons, such that the absence of any ideas or themes may not necessarily entail that some teachers are unaware of agency or other matters.

Future research may benefit from applying multiple methods, including using qualitative methods to further explore teachers’ perspectives on the value and nature of sustainability education, including in relation to fostering children and young people’s agency. For greater insight, future research could ask teachers to convey whether they agree or disagree that education could or should involve different areas such as the emergent themes revealed through this research, while also exploring their perspectives in detail through focus groups or interviews. Additionally, but fundamentally, teachers’ understandings of sustainability education as articulated through the questionnaire do not necessarily reflect their classroom practice; future research would benefit from exploring how teachers’ understandings of sustainability education are enacted in their practice, including what potential facilitating factors or barriers might be.

Future research may also benefit from extending understanding around the presented findings, including exploring whether teachers take into account aspects such as awareness and action separately, or if they consider agency more holistically. Holistic consideration of agency may involve, for example, recognising the concurrent and combined relevance of students having awareness of what can be done around sustainability, believing that undertaking actions will help support sustainability and make a difference, being willing and motivated towards undertaking actions that will help support sustainability, and any other aspects of relevance (e.g. Jensen and Schnack 1997; Sass et al. 2020). The findings presented here show that some teachers’ understandings of sustainability education encompassed some of the many aspects that have been conceptualised as relevant to agency, including knowledge as being relevant

to actions; some also conveyed the relevance of motivations, where sustainability education was understood as, for example, something ‘which enables all of us to acquire the knowledge, skills and motivation/agency to make more sustainable choices and live more sustainable lives’. Essentially, the presented findings provide a base for future research to expand and develop, for example where teachers’ understandings of these and other elements (and their relations) might be explored through interviews.

In addition, an important direction for future research would be to explore how values-based issues, such as equity, may influence students’ agency and motivation, which in turn may affect their willingness to act. This may be particularly important, given that geography education in England has been critiqued as framing global challenges as resolvable through development and scientific innovation with less reference to values-based issues such as equity (Glackin and King 2020). If people consider that scientific innovation will (somehow) solve problems, they may feel less need to take personal or collective action towards sustainability (essentially assuming that other people will resolve matters regardless).

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