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UNDERSTANDING ENVIRONMENTAL EDUCATION *in secondary schools in England*



BRITISH
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for the humanities and social sciences

THE PRACTITIONERS' PERSPECTIVE
REPORT 2 | 2018

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Executive summary

This report presents a review of the state of environmental education in secondary schools in England as viewed by experienced teachers, subject association and learned society staff, and those involved more widely in the environmental education sector. This research was carried out by the King's College London Environmental Education Research Group during 2017-18. The review was funded by a British Academy/Leverhulme Small Research Grant. The review is timely in that it responds to recent curriculum and assessment reforms in England which resulted in the removal of environmental education as one of four core pillars underpinning the National Curriculum (Martin et al., 2015).

The review found that the provision of environmental education in England is complex, contested and circular. Viewed as a broad church, and a discipline which students find 'interesting', environmental education encompasses multiple topics and skills. Currently, however, environmental education has no defined home resulting in the subject 'falling through the gaps'. Coverage is patchy, and the quantity and quality of environmental education is dependent on the teachers' own beliefs and whether the students study geography at KS4 (14-16 years). Environmental education content straddles geography and science departments with no single department having a clear overview of, or responsibility for, students' exposure to a coherent education *about, in and for* the environment.

The review also found that there is a mismatch between what teachers see as the potential for environmental education – a hook for students, an opportunity to teach 21st century skills, and a vehicle for enabling community and environmental activism – and the current curriculum focus perceived as subject acquisition. The acute focus on subject content, supported by the assessment method of written examinations, has a negative impact on students' attitudes towards environmental education. Negative attitudes may be further heightened by environmental education content being frequently pitched at a global/systemic level and removed from the local and personal, the latter being a level which can enable student ownership of ideas, and potentially empowerment – key aspects of 21st century skills and environmental activism.

Given the gaps and mismatches in provision and responsibility, our attention needs to be turned to ensuring schools are supported to develop citizens who have the knowledge, skills and conviction to positively respond to future global and local environmental issues impacting communities and our ecosystems. Although contentious and not without issue, we propose that the first step towards this aim is to align the status of environmental education with numeracy and literacy education. To this end, future reforms of Ofsted's school inspection framework and the Teachers' Standards must recognise environmental education. Examination boards also must shoulder some of the responsibility to ensure students are fully educated in environmental issues, including the importance of taking action to mitigate anthropogenic problems. Collectively these measures are only a start but constitute a vital first step.

Summary of Key Findings

- *Environmental education is perceived as a broad church* encompassing a wide range of topics/issues, including opportunities for skills development. Students are perceived as interested and inquisitive about environment-related issues. However, environmental education suffers from a poor or negative stereotype and is described as 'a soft science', a subject concerning 'littering', or a subject about 'mad people, who hug trees'. These stereotypes influence how the subject is positioned in school and potentially frame the way it is taught.
- *The amount of environmental education that should be in secondary schools in England is contested.* Most science teachers agree that since the 2014 curriculum and examination reforms, topics associated with environmental education have declined, receive less of an emphasis, and 'are falling through the gaps'. The decline of environmental education in the science curriculum is thought to be an outcome of the strong emphasis on subject acquisition (for example, physics content, rather than environmental education content)

and a reduction of context and application. The reduction of content is significant because effective (and engaging) environmental education is contingent on being situated in context. The decline of environmental related content was also considered to be a result of the new emphasis on mathematical skills and the removal of assessed coursework. Significantly, geography teachers, by contrast, were more likely to consider environmental education to be sufficiently addressed in the curriculum.

- *Environmental education is a 'hobo'*, that is the subject's location shifts between geography, science and beyond, with the perception of its locus being dependent on the interviewee's subject alignment. However, geography teachers are more likely to state that their subject has overall responsibility. If the locus of environmental education is indeed located in geography, such a positioning has implications for students' learning. As geography is only mandatory until the end of Key Stage 3 (11-14 years), around 50 per cent of young people in England who choose not to take GCSE geography will experience limited environmental education provision.
- *Environmental education is not supported at a whole school level.* Schools' foci and priorities are highly influenced by Ofsted's agenda, thus the absence of an environmental-related Ofsted standard is arguably limiting whole school, long-term commitment to environmental issues. It was widely agreed by all respondents that environmental education cannot be sustained through an individual teacher's passion and commitment alone.
- *The Green Economy¹ and 21st Century Skills² offer vehicles for environmental education.* Whilst subject acquisition is regarded as important in order to understand environmental issues, respondents commented that social responsibility and activism needed to be promoted. A focus on the Green Economy and the implementation of 21st Century skills were seen as a way to empower students with respect to the environment, and thus both initiatives need to be prioritised when designing future environmental education curricula.

Recommendations and messages for policy and practice

- **Environmental education should be recognised in future Ofsted's school inspection framework.** More specifically, we recommend that schools be given freedom to choose the way in which environmental education is addressed across the whole school. National discussions around the benefits of creating a separate environmental education discipline, or ensuring coverage through existing disciplines, or organising whole-school curriculum days would support schools in making choices that work for them.
- **Effective environmental education needs to encompass equal opportunities for environmental activism, subject acquisition, and skill development.** In other words, students need to engage in learning in, about and for the environment. To achieve this, learning opportunities need to occur both in and outside the classroom. Furthermore, learning opportunities need to be framed at both the global/systemic level and the local level. By emphasising local considerations, students are able to develop ownership and agency for solutions whilst also understanding the interconnected nature of local environmental issues in the global context.
- **Environmental education should be recognised in the Teachers' Standards.** Teachers need to be supported in their initial and continued education to cultivate dispositions and skills so that they feel confident to seek out and develop opportunities for environmental education in their teaching.
- **Examination boards need to be encouraged to development and promote assessment procedures that capture equally environmental education's three underpinning values:** social responsibility/activism in the environment, knowledge about the environment and skills for the environment.
- **Senior leaders need to be encouraged to include environmental responsibility and activism in their mission statement/school aim.** They should also be supported to incorporate principles of environmental responsibility into their school operations policies and practices.

1 The green economy is defined as an economy that aims at reducing ecological scarcities and environmental risk.

2 21st century skills comprise skills, abilities, and learning dispositions identified as being required for success in the 21st century society and workplaces (eg critical thinking, communication, creativity). See, www.p21.org

Introduction

The purpose of this report is to understand the current state of environmental education provision across secondary schools in England from the perspective of experienced teachers, subject association and learned society staff and those involved more widely in the environmental education sector.

The report is timely as in 2014 environmental education was removed as an explicit value underpinning the National Curriculum for England. Environmental education has since been left to schools and subject teachers, primarily within geography and science, to decide how, when and if it should be taught. With no formal requirement and accountability involved, environmental education in England has received little attention from curriculum developers, or academics concerned with formal schooling. Institutions and practitioners are now uncertain about the amount of emphasis to place on environmental education within teaching and learning (Martin, Dillon, Higgins, Strachan, & Vare, 2015). And yet, with mounting evidence that humanity's ecological trajectory is unsustainable (Orr, 2004), environmental education is arguably essential for national, social and cultural well-being, equipping future citizens with the skills to participate in debates concerning environmental risks and challenges (Hodson, 2011).

This report is the second in a series that explores the current state of environmental education in England. It answers the question: *What is the state of environmental education provision across secondary schools in England?* The first report set out the current policy landscape in terms of a document analysis of national and local environmental education-related policies, examination board specifications, schools' schemes of works, and published textbooks. In this report we explore how policy is understood, enacted and lived. Building on our findings, we offer a series of recommendations which we hope will help re-ignite the much-needed debate concerning the future of environmental education in schools.

Report structure

Following the research analyses, the findings are reported in two sections. Section I sets out the views of experienced secondary school teachers, and learned society and subject association staff. Section II sets out the responses to these findings from a wide-ranging group of environmental education sector professionals. The discussion draws these findings together to set out the perceived current state of environmental education in England and suggests recommendations for environmental education. The recommendations address the emerging implications from this debate and potential solutions required if we are to respond to the interconnected social and environmental challenges that face humanity now and in the future.

Analyses

Section I: Individual educator interviews

18 interviewees – 8 science secondary school teachers, 6 geography secondary school teachers and 4 staff from learned societies/subject associations – were interviewed between November 2017 and February 2018 either in their workplace or by telephone.

Interviews were conducted using a semi-structured interview protocol (see Appendix 1), and lasted and lasted approximately 30 minutes. They covered topics such as perceived quantity, curriculum fit and location of environmental education, the value of environmental education, and the requirements for future subject reforms.

Interviews were audio-recorded and transcribed. The data were analysed in an iterative fashion by the first three authors. Initially, data were grouped into categories corresponding to the main interview questions. The data were then reviewed collectively in order to identify specific patterns and themes within the broader categories. Interview excerpts illustrating these patterns were selected accordingly. Alongside the findings, emerging proto-principles for the future of environmental education were developed.

Due to the small number of interviewees, and the fact that comments on particular themes not only appeared in response to particular questions, but rather emerged in other points of the interview, it has not been possible to neatly quantify all viewpoints. However, where possible, we have tried to give a sense of the prevalence of opinions across respondents. Further, for ease, excerpts from staff from learned societies and subject associations are simply referred to as society staff.

Section II: Roundtable discussions

A one day conference was held at The Greater London Authority, City Hall London on April 30th 2018 to share the emerging findings and to discuss whether the findings resonated with conference participants' experiences (see Appendix 2 for the agenda). Thirty-two educators participated. To ensure a diversity of views, participants included staff from a range of organisations involved in environmental education including secondary schools, charities, NGOs, government departments, private companies and research institutions. All Section I interviewees were also invited to attend (see Appendix 3 for attendee list).

Section I findings were shared with the conference attendees, alongside the emerging proto-principles for the future of environmental education (see Appendix 4). During two sessions (1hr-1hr30mins), four roundtable discussion groups (max. participants 9) discussed the findings, proto-principles and explored practical ways in which the principles might be addressed.

Each roundtable had a facilitator, whose role was to focus the discussion and minute emerging discussion points. Key ideas were also captured on posters and photographed. Data from the roundtable discussions were analysed by the first two authors. The process involved comparing the roundtable data with interview findings and identifying agreements and contradictions. Further responses (allied to practical concerns) were also grouped and key issues identified.

Ethics

The research received ethics approval from King's College London Research Ethics Committee (Ref: MR/16/17-185). Written consent was received from interviewees, and confidentiality was agreed. Verbal consent was received from conference attendees to be listed as participants. It was made clear that no comment would be attributed directly to an attendee.

2. The amount of environmental education that should be in secondary schools is contested

- i. Responding to the question ‘is there enough, too much or too little environmental education in secondary schools?’ Table 1 demonstrates a spread of opinion, illustrating a contested and complicated landscape. That said, the majority of interviewees considered there to be a lack of environmental education content in secondary schools.

Table 1. Responses to the amount of environmental education in the curriculum

	Geography teachers	Science teachers	Learned societies/ subject associations	Total
Too much	—	—	—	0
Too little	4	7	2	13
Enough	2	1	2	5

- ii. Most science teachers agreed that since the 2014 curriculum and examination changes, topics associated with environmental education have declined, received less of an emphasis and ‘are falling through the gaps’. Where it did feature it was often included as an additional topic or an example, or left to the end of a teaching sequence when it was often rushed. Many teachers were passionate in their response about the lack of environmental education:

I think there needs to be more, personally, because we’re hurtling towards a car crash... There needs to be more people more concerned more often than just when they watch Blue Planet. (Geography teacher, 17_3)

- iii. The decline of environmental education in the science curriculum was thought to be an outcome of the strong emphasis on subject acquisition and a reduction of context and application:

I think that the specification at the moment is more on the content, on the theory of some scientific concepts, more than actually the application to current issues. (Science teacher, 17_10)

The view that subject content had squeezed out environment-related content was echoed by society staff:

...what we’ve seen in the last reforms is a change that has moved more towards theoretical content, so conceptual understanding and a removal of a lot of application content. (Society staff, 11_17)

The decline of environment-related content was also considered to be the result of the new emphasis

on mathematical skills and the removal of assessed coursework where, for several interviewees, an environmental education-related investigation had once been included as a component of the GCSE assessment. Further, the decline in environment-related issues in the science curriculum seemed somewhat surprising as teachers reported students finding such topics ‘interesting’ and hence teachers often used them as a hook, as they were considered easily relatable to students’ lives.

- iv. As Table 1 presents, five respondents viewed environmental education in secondary schools as ‘enough’. Two geography teachers reported an increase since the curriculum changes in subject knowledge content related to the environment. Further, several respondents were of the opinion that regardless of the curriculum content and emphasis, teachers could make time within their lessons to teach environment-related subjects. However, those that expressed this view were still concerned that less experienced teachers, who were more reliant on publishers’ resources and exam question content, would be less inclined to include environment-related themes. Relatedly, whilst several subject association staff felt that environment-related topics were available to teach, they nonetheless acknowledged that environmental education ‘gets side-lined’.
- v. There was a consensus that the science and geography curriculums and examination assessments emphasised subject acquisition above all other types of learning such as: subject application; contextualisation; and participation/activism. So, whilst several teachers viewed environment-related content in the geography curriculum as enough, respondents viewed the acquisition of subject knowledge alone as limiting and moreover noted that there is no mechanism in the curriculum to encourage ‘personalisation’ of content, or to empower students to take environmental action:

The science curriculum talks about what global warming is, the evidence and debate, but we aren’t discussing the solutions. Young people are not empowered to actually make a difference. (Geography teacher, 21_14)

This view, that the current approach to environmental education needs to be broader, was similarly noted by a science teacher who stressed the requirement for a focus on understanding longer-term impacts alongside practical examples for student behaviour modification:

I think in terms of helping students understand what the long term potential impacts could be, there’s definitely not enough. I think we talk about vague terms like global warming and we talk about the greenhouse effect to a certain extent, but in terms of why we are making such a big deal out of these, it’s always in the media, but the kids

perhaps do not have as much understanding of what the potential long term impacts are going to be on them and so the motivation for them to modify their own behaviour patterns or choices are, there's not as much reason for them to do it, unless they're told and so giving them more information would be better, so I don't think enough at this point in time. (Science teacher, 17_5)

- vi. Similarly, there was a concern that the current environmental education offer was tokenistic, and was not upskilling the students or going far enough. This was an issue repeatedly raised across the interviews:

I don't think it's given enough priority. We're not like prioritising it and whilst we're all going on about climate change and everything else, we don't do anything, we kind of pay lip service a little bit and are just box-ticking. (Society staff, 17_1)

3. Environmental education is a 'hobo'

- i. In response to the question 'which subject has responsibility for environmental education?', the subject's location shifted between geography, science and beyond, and was often dependent on the interviewee's subject alignment. As Table 2 presents, the majority of respondents viewed environmental education straddling across subject disciplines. However, geography teachers were more likely to state that their subject had overall responsibility. That said, there was a shared vagueness as to an explicit 'home' and ownership of environmental education:

So that kind of environmental type stuff, so it kind of, it's here and there, but where it sits, I don't know if anybody really owns that, I'd probably say geography, kind of probably sits more in there, if anywhere. (Science teacher, 17_2)

Table 2. Responses to subject responsibility for environmental education

Interviewees	Geography	Science	Geography & Science combined	Other responses
Geography teachers	5	0	1	'Off-timetable' 'special days'
Science teachers	0	2	3	All curriculum areas (2) 'It is in PSHE'
Learned societies/ subject associations	0	0	2	All curriculum areas (2)

- ii. It was clear from participant responses that individuals knew little about environmental-related subject coverage outside their own disciplines and across the school more generally:

I don't know anything about the geography curriculum... (Science teacher, 17_13)

- iii. The lack of curriculum subject awareness was viewed as a result of the recent curriculum changes but more importantly the lack of time available for cross-departmental communication:

Do you know, I have very little knowledge of the science curriculum, there's not a lot, it's something that we were talking about this year, 'cause we've both got new GCSEs and A Levels, there is a lot of crossover and it's something that we do really need to sit down and look at the cross-curricular links. I couldn't tell you what they teach. (Geography teacher, 17_11)

- iv. The multifaceted identity of environmental education emerged as a reason for the subject's 'homeless' status. The complexity of teaching environmental education and the potential for being incorporated across the curriculum means that it has no one focus or clear home. Nonetheless, environmental education was viewed as supporting various subject and skill domains. Furthermore, teachers acknowledged that the disciplines of science and geography could contribute to different aspects of environmental education:

Science can deal with the how it happens. Geography can deal more on the kind of impacts ... and perhaps different strategies [to address problems]. (Science teacher, 17_5)

- v. In particular, several subjects were listed as having an important role in environmental education including: citizenship; PSHE (eg focus on recycling); history (eg pre-curriculum reforms included the industrial revolution, communism); and Design and Technology (eg design a solar panel system). Teachers also noted that other disciplines, such as RE and tutor time could address the moral/ethical concerns of environmental degradation:

It could be done in RE, from a moral point of view, in terms of our impact on other living species. (Science teacher, 17_7)

- vi. The ambiguous identity of environmental education led to several teachers commenting that they were unsure if they actually taught 'environmental education' or if they taught just *about* the environment:

Not so much aligned to [environmental education] as just raising awareness of environmental issues is how I would

put it, I don't think we specifically sit and think about environmental education. (Geography teacher, 17_11)

- vii. The point that, ideologically, teachers see environmental education as a cross-curricular subject, and operating at various levels, chimes with the argument of Lucas (1972) who defined environmental education as being: education *in, about* and *for* the environment. However, pragmatically, because of the ways schools are structured and the curriculum is developed, opportunities for working at a variety of levels and across many disciplines is limited. Consequently, several respondents suggested that education *about* the environment is primarily addressed in the science curriculum, whilst education *for* the environment is primarily addressed into geography, citizenship, PSHE and RE. Education *in* the environment could be enacted across all subjects.

4. Environmental education is not supported at a whole school level

- i. In response to the question 'what is the school's role in supporting environmental education?', teachers did not, in general, express the notion that environmental education was something that was or should be the responsibility of the school. Most saw its inclusion at the level of individual subjects' schemes of work.
- ii. Schools' foci and priorities were viewed as a response to Ofsted's agenda. The absence of an environmental-related Ofsted standard led one participant to surmise that this was at the root of limited whole school, long-term commitment to environmental issues. In their view, environmental education needed to be a whole-school enterprise and could not be sustained through individual teachers alone. Where schools were inconsistent in their environmental commitment the result was that dedicated teachers felt undermined and powerless:

I think it's all about time, it's all about energy, it's all about priority and it's all about your day-to-day mundane activities that you've still got to do, that Ofsted look out for. I can give you a recent example, one of the geography teachers went to a lot of effort to have a massive, I would say the best part of a 20 metre, poly-tunnel put together and it only lasted about a year and a bit and now they've sort of concreted it up and put table tennis tables on there, so in terms of how sort of important it is to everyone is the question: one or two people can push it but it doesn't seem to last. (Science teacher, 17_7)

- iii. Whilst there was some evidence of senior leadership support, examples were very limited. For example, at one school the role of 'whole school environmental coordinator' was identified. However, although remunerated, the status and responsibility of the

position was vague; the interviewee was unclear if the post was still active. If such a post was to include coordination of environmental education across curriculum topics several respondents viewed this as progress compared to the current situation were topic synergies were left to providence:

I think it's probably assumed [by science] there's something happening here in geography, and there's probably something happening in science. But we don't have any links there for me to know what they've been doing in science, unless perhaps the students tell me. (Geography teacher, 17_4)

- iv. Interviewees who identified the school as having a significant role to ensure a holistic environmental education were concerned that it could be undermined when school policies situated 'community action' as punishments. That is, when formal reprimands were in the form of 'litter picking' or tidying, important collective community responsibilities were positioned as punishments, insignificant and valueless.

5. The Green Economy and 21st Century Skills offer a vehicle for environmental education

- i. Teachers identified a variety of topics and skills as being important for students in the future to learn. The subject areas that were noted as currently absent or limited, and in need of greater emphasis in the future included: the Green Economy; population growth; food production; climate change; air pollution; global warming; and energy resources. There was a shared consensus that whilst subject acquisition was important, social responsibility and activism, and student empowerment required greater emphasis. That is, teachers' viewed future learning as needing to present alternative behaviours/ ways of living and should stress the incremental impact of behavioural change to present a possible positive future. Several teachers suggested that this would be different from the current often negative and harmful approach taken:

I think giving the alternatives, teaching students about the alternatives, instead of saying, all this is bad, don't do that, give them something to look at and say, well, I want to do this instead. (Science teacher, 17_5)

- ii. Interviewees highlighted that skills, such as 'critical thinking', 'problem solving' and 'creativity' (often referred to as 21st century skills) needed to be taught to ensure that students were able to cope with unknown futures. In practical terms, the respondents spoke about the need for skills in the 'interpretation of data' (eg data gathering, synthesis of secondary data, forming predictions) and understanding data credibility and trustworthiness:

They need critical skills and increased creativity. So much information is thrown at them in the news but they have no way of knowing what is important or not. (Science teacher, 17_8)

A science teacher noted that in the past data criticality had been assessed through coursework (eg case study), however since the curriculum changes this assessment opportunity was no longer available.

- iii. A further 'critical skill' was the need to cultivate student creativity. This was perceived as necessary so that students would be better prepared to respond to future environmental related issues. This included the need to broaden out topics to include the following opportunities: to understand how current environment policies are formed; how policies compare internationally; how job roles emerge as a result of organisation shifts; and how global sectors are interconnected.

Section 2: Roundtable discussions

Section 2 presents the roundtable participant responses to the five key findings, the proto-principles (see Appendix 4) and captures further emerging issues.

1. Environmental education encompasses a broad range of topics

- i. Participants agreed that environmental education was scattered across various subjects and topics. However, there was no agreement as to what it should consist of or where/how it should be taught. Ideas included: environmental education as an overarching school subject (eg sustainable development) which collectively addressed physics, biodiversity, circular economy and design-tech; environmental education being a separate school subject that addressed both functional knowledge (eg nature/ecology) and ethics/values (eg how to live sustainably); and environmental education taught across separate subjects contributing to critical literacy and citizenship. If, however, the status quo prevailed participants agreed that with more joined-up thinking concerning environmental education common content, geography and science school departments would save money and time.
- ii. Participants agreed that the perception of environmental education by students and schools was not only confused, it also often suffered from having a poor or negative stereotype. Students were said to align environmental issues mainly with 'littering' and also 'mad people, who hug trees'. These stereotypes were felt to influence how the subject was positioned in school and taught.
- iii. Participants agreed that environmental education was an excellent educational 'hook' and could be easily related to 'interesting' topics discussed in the media. However, there was a concern that 'hooks' and interest were short-term influencers, dying away once media attention moved on. Such short-termism was felt to feed into the disposable, and often non-credible image of environmental education. Participants called for more debate on how the 'Attenborough effect', with regard to the increased profile of plastic waste, might be capitalised upon and how public interest might be prevented from dying away like it did after Al Gore's film *Inconvenient Truth*.
- iv. There was a range of opinion concerning who should be ultimately responsible for environmental education.

Some participants felt that it was the teacher's decision whether to incorporate environmental education into the curriculum/lesson (in whatever form/focus). Conversely, where participants had been involved in projects to support teachers in socio-scientific pedagogical approaches they reported being met with resistance by teachers who purported not having the time or space to incorporate it. The pressures of the examination system was also raised throughout the roundtable discussions as a barrier to environmental education inclusion. Indeed, most acknowledged that whilst it was true in theory that teachers have agency in selecting content, this was not always the case in practice.

2. The amount of environmental education that should be in secondary schools is contested

- i. Participants agreed with the finding - the amount of environmental education that should be in secondary schools is contested - and suggested two reasons for this: the influence of the examination specification, and competition for curriculum time.
- ii. Several participants highlighted the role examination awarding bodies play in ensuring the inclusion, and nature, of environmental education due to their role in writing examination specifications. This claim was supported by the current inclusion of field work in geography examination specifications that had resulted in the prioritisation of the approach in schools.
- iii. Participants all acknowledged that there was already a perception by teachers that the curriculum is crowded. For environmental education to be increased in secondary schools it was accepted that the necessary time would have to come from somewhere and funding would be required (for example, for teacher education and resources). There was a notion that environmental education was seen as a competitor to the Arts which had already received reduced timetabling in many schools due to the introduction of the English Baccalaureate (E-bacc)⁵.

3. Environmental education is a 'hobo'

- i. Participants agreed that environmental education was a 'hobo'. However, there was some disagreement as to 'the ideal home' of environmental education. As noted in Finding Section 1 3.i, there was much discussion as to whether it should, and could, be fully embedded across all curriculum subjects (eg 'Needs to be embedded as well as integrated') or whether it should

5 The E-Bacc refers to a combination of subjects that the government thinks is important for young people to study at GCSE. It includes: English language and literature, maths, the sciences, geography or history and a language.

be allocated specific curriculum space which would give teachers a mandate to teach environmental education.

- ii. Related to the point above, some participants held the view that science subject boundaries were not helpful for environmental education and it needed to be explicitly included across all science topics – not just biology.
- iii. Several participants suggested that new avenues for environmental education needed to be explored – such as developing ideas around ‘wellbeing in the environment’ and using environmental education during primary-secondary school transitions. Such discussions effectively returned to the wider consideration relating to what the aim of environmental education should be.

4. Environmental education is not supported at a whole school level

- i. Whilst secondary schools were considered as liking the idea of environmental education, the majority of participants agreed that very few schools prioritized it leading to an issue of equity of experience across schools. There was much debate, and disagreement, as to how this situation might be resolved were the profile of environmental education in schools to be increased. Some participants felt that schools had to be the agents for change, deciding what was best for the school community. Conversely, others felt that external government bodies needed to impose environmental education upon schools. The majority of participants were conscious that regardless of the approach, both benefits and unforeseen outcomes would inevitably result.
- ii. Where participants viewed schools as agents for change they suggested that schools needed to appoint high profile environmental champions, and environmental education needed to be included in the school mission statement. However, several participants viewed these approaches as tokenistic resulting in limited impact on student learning.
- iii. Where participants viewed it necessary for environmental education to be officially mandated, Ofsted was discussed as potential mechanism by which this could happen. That is, participants discussed the advantages if environmental education was included within the Ofsted inspection framework, highlighting how numeracy and literacy currently received considerable curriculum time due to the priority placed on them by Ofsted. The case was not simple though: if Ofsted were to prioritise environmental education, participants were concerned that the unintentional consequence could be that the quality and value of environmental education offered would

be overlooked as a result of simply needed to complete the activity. That said, participants who were keen for Ofsted to mandate environmental education also recognised the numerous demands and interest groups pressuring Ofsted to inspect their issues. Hence, even if environmental education was to feature as an Ofsted standard, participants were quick to note that due to these numerous demands, there would still be a need for teachers’ and senior leaders’ environmental education buy-in.

- iv. A third way by which schools’ could prioritise environmental education was through partnership work with outside organisations. Successful models included the Pembrokeshire ‘outside school’ (<http://pembrokeshireoutdoorschools.co.uk>) programme whereby schools were encouraged and supported to respond to local environmental problems, highlighting the need for localism, school buy-in and the need for funding to be spread across all partners rather than just being with the school or with the outside organisation.

5. The Green Economy and 21st Century Skills offer a vehicle for environmental education

- i. Participants agreed that the Green Economy and the issues concerning sustainable economic development should be given higher profile in future curriculum reforms. Participants further agreed that environmental education should be seen as a vehicle for 21st Century Skills (prioritizing critical thinking and creativity), highlighting the necessity for skill development to be rooted in opportunities affording local agency through collective community problem-solving. To this end, there was a call for an increase of citizen science investigations, considered as offering real world, contextualised science, where students had some autonomy over what/how they were learning.
- ii. With the reform of the BTECs and a reintroduction of skills-based curriculums through T-Levels and apprenticeships, participants highlighted the opportunities for environmental education in their design.

Other emerging issues: enablers & challenges

- Teacher education was positioned as a potential enabler for increased environmental education. Participants expressed the view that environmental education needed to be addressed explicitly during initial teacher education. After the curriculum, participants considered teachers as the key gatekeeper for the development of environmental education in secondary schools. Future teachers’ attitudes, skills and knowledge need to be better aligned with the needs of societies.

-
- Broader societal issues emerged as challenging the status of environmental education. Participants questioned the role regional differences played in preventing a universal approach to environmental education and environmental responsibility more broadly. Participants commented that: (1) people, in general, are attitudinally a long way away from where environmental education needed them to be in order to integrate and embed environmental education in secondary schools; (2) there is urban-rural divide in students' attitudes, with several participants taking the view that urban students did not have the chance to engage with nature to the same extent as rural students.
 - Due to the diversity and the pressure of market competition within the environmental education sector, participants regarded a key challenge for the future as agreeing a clear unified message for government. Several participants were frustrated by the historic inertia in the sector. To move forward, they talked about the need for a cohesive/coordinated sector that could advocate on national policy. This would be in contrast to the current situation where only a small minority in the environmental education community have the government's ear.

Discussion

The state of environmental education provision in secondary schools in England as perceived by educators and environmental education sector professionals is that it encompasses a wide range of topics and skills. As a result, there is no agreement as to the amount of exposure secondary students should receive or where the subject should be located. In general, environmental education is driven by passionate individual educators and is rarely incorporated into a whole-school approach or vision.

The key questions

Is environmental education too broad a church?

The breadth of environmental education could be argued to be both its saviour and its downfall. That is, being a broad church offers multiple opportunities for inter-departmental, whole-school, community and national/global collaborations. Further, as students are already widely perceived as being ‘interested’ in environmental related topics, more attention on these themes should be well received. However, its very breadth means that it does not fit neatly into a single disciplinary locus. As a result, environmental education falls through the gaps. Given its itinerant state, straddling geography, science and disciplines such as PSHE or ethics, no single department has an oversight or a complete picture of the subject’s coverage. That is, currently there is no specific department fighting for an inclusive and holistic environmental education in secondary schools in England.

What if a subject was given responsibility?

Geography teachers might feel that environmental education is most suited to their subject, as reflected by the responses in this study (Table 2). However, geography is not a mandatory subject. Cambridge Assessment, for example, reports only 41 per cent of students taking the subject at GCSE (Carroll & Gill, 2017). With GCSEs increasingly commencing during Year 9, this means that some students will only receive limited exposure to environmental education in the two years allocated to Key Stage 3. If we are seeking to refine and increase environmental education provision, locating environmental education within geography in its current state, would not necessarily benefit the majority of young people and could limit what environmental education is.

So should environmental education be addressed through whole school initiatives? Similar to literacy, might environmental education be embedded through cross cutting themes?

For a whole school environmental education initiative to be successful, there needs to be clear curricula guidance,

ensuring continuity through year groups and subjects. If this approach were to materialise it could be driven either internally or externally. Internally, responsibility would need to rest with senior staff in order for environmental education to gain and maintain priority status, and be consistently returned to as a driving value for the school. Externally, Ofsted could introduce an inspection standard within the framework which sets out the national expectations of environmental education for young people. Although the latter option would likely lead to a greater volume of environmental education activity in England’s schools, it could have unintended consequences, namely an adverse impact on the quality and value of environmental education offered. That is, activities may be designed that are easily achieved and able to be ‘ticked off’, effectively bypassing the need to create authentic school buy-in by school senior leaders.

Returning to the notion of values, initial teacher education currently consists of limited exposure to environmental education with no subject PGCE or dedicated teaching standard. Hence, regardless of whether change is driven internally or externally, teachers as agents of change at the level of the classroom require increased exposure to environmental subject knowledge, and time to develop appropriate assessment and pedagogical skills.

Might the push for 21st century skills be an appropriate vehicle for environmental education?

There is a clear synergy between aspects of environmental education and 21st century skills such as critical thinking and creativity. However, teachers see a mismatch between the potential for environmental education – that is to hook students in, the development of key skills, and space for active community engagement – and the current curriculum focus which demands subject acquisition. Furthermore, the current focus on subject content, supported by the assessment method of written examinations, limits the ability to address environmental education issues and the development of skills necessary to respond to an unknown environmental future. For example, with content being frequently pitched at a global/systemic level and removed from the local and personal, the opportunities for students to develop a sense of ownership and empowerment are dramatically reduced.

The solutions?

Whilst these key questions have no simple answers, it is beyond doubt that the current environmental education offer in secondary schools in England requires reform. Doing nothing is not an option and compromises are required.

We acknowledge the structural difficulties implicit in calling for environmental education to be located in one curriculum area. We note that the inclusion of environmental education would mean the exclusion of other content areas. Furthermore, we note that environmental education does not fit solely into one discipline. We also note the epistemological differences in the way that environmental

education is taught. In science, the focus tends to be on explaining the underlying mechanisms shaping an environmental issue; in geography, a greater focus is placed on examining the environmental impacts of phenomena and discussing human responses; whilst in PSHE, religion, or ethics, environmental topics are discussed through a consideration of rights and responsibilities. Finally, and as discussed above, the location of environmental education may detrimentally affect its delivery to all students through to the age 16. For related reasons, concerning subject knowledge and perspectives, we do not advocate that environmental education be consigned to delivery solely through 21st century skills.

Schools, and their leaders, are at the very heart of the solution. We understand that schools have numerous tasks and pressures. However, what is more important than ensuring future citizens are environmentally aware and able to act? Schools need to develop their own policy on environmental education which should be echoed in the school's environmental impact policies demonstrating a holistic commitment. This policy needs to ensure that all students engage both theoretically and practically with local environmental issues and to understand the connection of the local to the global picture. In this way, environmental education will be able to nurture engagement in, about and for the environment. Whilst we know many school leaders will support this move, we call on Ofsted to support us by including a school's environmental commitment to the inspection regime. To this end we also ask that external guidance, advice and funding is made available to schools and their leaders. For environmental education to gain purchase and to flourish it needs formal recognition.

However, as we have identified, an Ofsted mandate is arguably not enough: teachers' and school leaders' skills and dispositions need to be nurtured from the beginning. Hence, we also propose a revision to teachers' initial and continuing education to equip them to be agents of change in schools. That is, programmes are required that ensure teachers gain key environmental education subject knowledge and skills, alongside appropriate pedagogy and assessment skills. To support this, we are lobbying for the inclusion of environmental education in the general Teachers' Standard.

Finally, we recognise the power of the examination. We appeal to examination boards to develop and promote assessment procedures that capture equally environmental education's three underpinning values, as recognised by teachers: knowledge about the environment, skills in the environment, and social activism for the environment.

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Appendices

Appendix 1: Semi-structured interview protocol

Participant teachers will have taught for a minimum of 4 years and thus will have experience of the curriculum prior to the 2014 changes.

Questions

1. Tell me about your education history (what subjects did you study (for A level (or equivalent and in higher education); what is your 'science' 'geography' specialism?)
2. How would you define/describe 'an environmental advocate'?
3. [if science teacher] What KS3 and KS4 topics in science do you see as being most aligned with environmental education?
- 3b. And from what you know of geography, what topics in geography do you see as being most aligned with environmental education?

[if geography teacher] What KS3 and KS4 topics in geography do you see as being most aligned with environmental education?

And from what you know of science, what topics in science do you see as being most aligned with environmental education?
4. Which subject has responsibility for Environmental Education?
5. In the current secondary school curriculum is their enough, too much, or too little Environmental Education content?
6. Can you say more about your opinion? If 'too much' ask: what should be reduced?; If 'too little' ask what more is required?
7. What, if any, is the school's role in supporting Environmental Education?
8. Thinking about both content and skills, what sorts of area will be important for students of the future to learn?
9. What do you understand as 'education for sustainable development'? How is ESD different from environmental education?

Interview staff c.4 learned societies – interviewees to be recruited through existing networks.

In advance of interview, ask interviewee to gather together documents (resources and policy materials) that detail the society's position (advocacy and practical support) with respect to environmental education in school.

1. Tell me about your education/work history (what subjects did you study, what is your 'science' 'geography' specialism?)
2. What KS3 and KS4 topics in science do you see as being most aligned with environmental education?

OR What KS3 and KS4 topics in geography do you see as being most aligned with environmental education? (as appropriate to subject alignment)
3. Which secondary school subject has responsibility for Environmental Education?
4. In the current secondary school curriculum is their enough, too much or too little Environmental Education content?
5. Can you say more about your opinion? if 'too much' ask: what should be reduced?; if 'too little' ask what more is required?
6. What, if any, is a school's role in supporting Environmental Education?
7. What do you think will be important for students of the future to learn about?
8. What do you understand as 'education for sustainable development'? How is ESD different from environmental education?

Appendix 2: Roundtable City Hall agenda

Understanding Environmental Education in Secondary Schools

Teacher and Practitioner event

30 April 2018

Programme

- 10:00am **Registration** (and refreshments)
- 10:30am **Welcome and Introductions**
Chair: Dr Heather King, Lecturer in Science Education, King's College London
- 10.40am **STEM learning and the London context**
Susan Crisp, School Strategy Delivery Manager, Education & Youth Team, Greater London Authority
- 10:50am **Teaching Environmental Education: A Teacher's perspective**
Jake Steers, Lead Practitioner for Biology, St. Paul's Way Trust School
- 11:15am **Research findings**
Dr Melissa Glackin, Lecturer in Science Education, King's College London
- 12.00pm **Roundtable discussion focused on principles of environmental education (1)**
Facilitator: Dr Heather King, King's College London
- 13:00pm Lunch
- 13:45 pm **Making the invisible visible: Monitoring air pollution in contemporary London**
Diana Varaden, Division of Analytical & Environmental Sciences, King's College London
- 14.30pm Results of the roundtable voting on the principles
- 14:45pm **Roundtable discussion & feedback focused on next steps (2)** (tea and coffee will be available)
Facilitator: Dr Heather King, King's College London
- 15:30pm **London's nature, what opportunities is education missing?**
Mathew Frith, Director of Conservation, London Wildlife Trust
- 16:15pm Final word

Appendix 3: Roundtable participants, 30 April 2018

Name	Organisation/School
Akinyi Apopa	Edinburgh University
Alex Green	Ashden
Becky Kitchen	Geography Association
Daniele Gibney	Royal Society of Chemistry
Diana Varaden	King's College London
Divyesh Patel	Douay Martyrs school
Emily Harris	Trustee of LEEF/consultant
Heather King	King's College London
Helen Robertson	Field Studies Council
Henry Greenwood	Greenschools project
Henry Johnson	King's College London
Jake Steers	St Paul's Way Trust
Jerome Dutton	Bay Trust
Natalie Day	Global Research HundrED
Jingjing Li	IoE/UCL
Kate Greer	King's College London
Lorna Fox	Wildfowl and Wetlands Trust
Marianne Achiam	University of Copenhagen
Marianne Cutler	Association of Science Education
Mark Ward	Field Studies Council
Martin Gilchrist	Natural England
Mary Beadles	Chelsea Academy
Mathew Frith	London Wildlife Trust
Melissa Glackin	King's College London
Neil Atkin	Institute of Physics
Paula Owens	Less Co2 programme
Rachel Cook	King's College London/Natural England
Ramya Rajkumar	St Paul's Way Trust
Ruth Amos	IoE/UCL
Sean Vertigan	IoE/UCL
Simon Ward	Field Studies Council
Susan Crisp	The Greater London Authority

Appendix 4: Possible principles for environmental education discussed at City Hall

Where should it be?

- EE should be a core component of a mandatory KS3 & KS4 subject.
- EE should be integrated across multiple subjects.
- EE should form part of a school's mission statement and be delivered through non-curriculum provision.

What should it consist of?

- EE should focus equally on learning *about* the environment, learning *for* the environment, and learning *in* the environment.
- The focus of environmental education should be on the Green Economy and more sustainable economic development.
- EE should be seen as the vehicle for 21st Century skills (eg critical thinking, creativity, teamwork).

How should it be strengthened?

- Ofsted should include environmental education within their inspection standards.
- The environmental education sector should foster a greater critical mass to strengthen the role of environmental education in schools.

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