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Article:

Dunlop, Lynda and Rushton, Elizabeth (2022) A manifesto for Education for Environmental Sustainability: implications for science education. *School Science Review*. ISSN: 0036-6811

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A manifesto for Education for Environmental Sustainability: implications for science education

Lynda Dunlop and Elizabeth Rushton

Abstract Drawing on a UK-based case study, the authors share their insights from a series of online, inclusive, participatory workshops with the aim of co-creating with teachers and young people an illustrated manifesto for Education for Environmental Sustainability (EfES). They focus on the implications for science education by examining what young people (aged 16–18) and teachers said were priorities for education: knowledge for action, the development of skills to think critically and conduct research, and opportunities to communicate and network.

School science is recognised as having an important role in Education for Environmental Sustainability (EfES) (DfE, 2021); however, the relationship between sustainability and science is complex and subject to ongoing debate. This is perhaps because sustainability has origins beyond the traditional boundaries of science, including social, political and economic considerations that might be diminished by only including sustainability in science lessons (Feinstein and Kirchgasser, 2015). In the UK (the context for this work), education is a devolved responsibility, which means that EfES is understood and enacted differently in policy across the four administrations. In Wales, Education for Sustainable Development and Global Citizenship (ESDGC) is recognised as a priority, reflected in the school inspection framework and guidance for schools (Welsh Assembly Government, 2008). Similarly, sustainability is recognised within the curriculum aims and purposes in Northern Ireland and Scotland (Department of Education, 2007; Scottish Government, n.d.). In England, the environment features in the National Curriculum for design and technology, geography and the sciences (with no references to sustainability) and in a recent review of environmental education policy in England, Glackin and King (2020) found that there was limited attention to education *for* the environment (as opposed to education *about* or *in* the environment) in national educational policy and assessment specifications. In November 2021, the Department for Education released a draft strategy for Sustainability and Climate Change in the context of education and children's services systems, which underlined the importance of science, geography and citizenship school curricula as contexts for young people to learn about climate change (DfE, 2021). Sjöström, Rauch and Eilks (2015) argue that scientific knowledge in the context of sustainability is necessary but not

sufficient for developing competencies for understanding and participating in societal debate: young people also need to learn how to debate about science, economics and how the environment functions, and to develop skills to participate in society.

Our recent work brought young people and teachers from across the UK together to co-create a manifesto for EfES (BERA, 2021), identifying their common vision (Figure 1). In this article, we identify some of the implications of the manifesto that are especially relevant for science education.

Approach to manifesto-making

The manifesto was based on the perspectives of teachers and young people (aged 16–18), as shared during nine 2-hour online participatory workshops during May–June 2021, seven facilitated by academic and non-governmental organisation partners, and two by artist and art facilitator partners. The project focused on creating spaces for voices less frequently heard in discussions concerning EfES, including people with additional educational needs (AEN). A total of 210 participants were included in the making of the manifesto, including 34 young people with declared AEN.

During the workshops, teachers and young people were able to articulate what they need from EfES, the changes they would like to see and to realise a shared vision of what the future of EfES could look like. A key facet of the project was the opportunity for researchers and participants to work with Maisy Summer, an artist and illustrator. This approach afforded opportunities for participants to visualise, share and discuss their values, ideas and vision for the future of EfES. Workshops were recorded and transcribed, and analysed along with written contributions (e.g. contributions to *Zoom Chat*,



Figure 1 Front cover of the BERA *Manifesto for Education for Environmental Sustainability* (artist: Maisy Summer, <https://maisysummer.com>)

Google Jamboard and Mentimeter) to identify priorities common to both teachers and young people at the level of classroom, school, community and policy. In what follows, we analyse the contributions that refer specifically to science education and discuss these in relation to the priorities identified in the manifesto (BERA, 2021), specifically developing knowledge for action, research, innovation, creativity, and communication and networking.

Implications for science education: what is taught

Participants – young people and teachers alike – saw science as making an important contribution to EfES in that it is one of the few places in the curriculum, alongside geography, where it features. As one young person observed:

It's really only in science that I've learnt anything and maybe YouTube. Also I didn't really know anything until S2 or S3 [school year groups in Scotland including ages 12–15].

However, there was concern among participants that very little content focuses on environmental sustainability and, where it does, provision tends to focus on

knowledge and understanding. For example, from a young person and teacher respectively:

Right now, we tend to only learn the theory about climate change and environment, confined to classes like geography and science ... the teachers don't tend to talk about climate change.

Some opportunity in the science curriculum to discuss some concepts and consequences. It depends, however, on the teacher as to how these are then expanded upon and what ideas are discussed.

This is the case even in jurisdictions where environmental science exists as a national qualification, as one participant in the teacher educator workshops pointed out:

Another positive move in Scotland was the introduction of Environmental Science National Qualifications but generally seen as 'lesser' than the 'three sciences' and again limits thinking about the environment to factual (e.g. electricity generation through wind turbines) rather than bigger picture.

These reflections from teachers and young people across the UK are consistent with Glackin and King's (2020) analysis of education policy, which found that education (in England) tends to be *about* the environment rather than *for* the environment, arguing that young people need to learn *for* and *in* (as well as *about*) the environment. Similarly, Mackey (2012) has argued for more empowering approaches that enable young people to *decide* and *act* not just *know* about the environment.

In the manifesto, young people and teachers call for sustainability to be addressed in all subjects, not just science, and for space and time to learn about climate change and environmental sustainability that is not linked to assessments. Some noted that they would like to see greater attention within subjects to meeting the United Nations Sustainable Development Goals (UN, 2015). The amount of time given to environmental sustainability was limited by barriers identified by teachers and young people during the workshops, including government inertia, motivation and awareness, exam pressures, teacher workload, economic (rather than environmental) priorities in society at large, and limited

resourcing for environmental sustainability. As one teacher participant noted:

As a science teacher at GCSE level there are tokenistic topics such as Life Cycle Assessments and Energy Resources. These could be used well but for most teachers they are seen as 'not proper science' and so are rushed. Also, because they are not assessed as much in the exams they tend not to be valued by staff and students.

Young people and teachers wanted more than knowledge from education: they called for 'knowledge for action' (consistent with education for the environment), which included education on how to respond to climate change, how to act in more environmentally sustainable ways and improve local (including school) environments, how to question existing systems that contribute to climate change, how to take action through communication and networking and how to think critically and conduct research. These action-oriented goals are within the scope of science education. In the following section we discuss implications of the manifesto for how science is taught.

Implications for science education: how it is taught

The manifesto identifies a number of priorities relating to how environmental sustainability is taught, calling for students to be encouraged to research and take action on sustainability and for more sustainable resources and practices to be used across the curriculum and in extra- and co-curricular contexts. While there was an appreciation for EfES beyond the curriculum, participants believed that sustainability was too important to be the responsibility of enthusiastic teachers willing to give up their time during lunch or after school, and wanted to see more focus on environmental sustainability in the core curriculum. As one young person noted:

Curriculum education is very limited in terms of environmental sustainability – the onus is often put on teachers or senior students to lead clubs to hone outside interest ... sciences could expand on the brief way they cover it currently; psychology could explore the impact on mental health and wellbeing.

Desired approaches to EfES included opportunities for discussion, greater use of invited speakers, small-scale projects, opportunities to participate in citizen science, peer teaching and learning, support to take civic and political action, action to green their own (including school) environment, and outdoor education where students and teachers increase biodiversity in their school environment (consistent with education in the environment).

Implications for science education: where it is taught

Participants expressed concern in many cases about whole-school practices that reinforced unsustainable practices, particularly in relation to energy, food and waste. The manifesto calls for the use of more sustainable resources and practices across the school, and there are opportunities to use science to inform more sustainable decisions within schools, including those relating to the resources used in science teaching and how to minimise waste in science teaching.

Including, but not limited to, science teaching spaces, teachers and young people wanted to understand where the school's energy comes from, how much the school uses, and to work with school leaders to take action to reduce consumption and find more sustainable energy providers. One teacher described how their school had calculated how much budget could be saved by small actions such as turning off lights, computers and projectors, and had introduced automated messages to remind teachers to do this at the end of the school day. Transport was also seen as a way in which schools could support more sustainable practices by making public transport, cycling and walking the most convenient or desirable ways of travelling to school.

Participants also identified connections between science and food by calling for the analysis of ways in which school cafeterias can make better use of healthy ingredients, reduce packaged food and minimise food miles and food waste. These real-life contexts offer opportunities for students to conduct small-scale research projects that can provide information to inform school-wide decisions, meeting the manifesto demands relating to 'how' to teach for environmental sustainability.

Early reflections on new directions, post-COP26

The calls from the manifesto are echoed in the announcement from the co-chairs of the education and environment ministers' summit at COP26 in November 2021, titled 'learn for our planet, act for the climate', where they commit to integrate sustainability and climate change in formal and non-formal learning, including them 'as core curriculum components, in guidelines, teacher training, examination standards and at multiple levels through institutions'. The process of manifesto-making identified government priorities (including those relating to the economy as well as to education) as a key barrier to achieving education for environmental sustainability. Some policy moves consistent with the manifesto demands can be seen in the announcement from the UK Secretary of State for Education (DfE, 2021), including plans to create a green education estate

and to embed sustainability in operations and supply chains (the 'where'). However, in relation to what is taught and how, there remains a focus on *knowledge and understanding rather than knowledge for action*, for example in the discussion of a model science curriculum for England, and there is also limited recognition of the role of other school subjects in achieving EfES. It is also unclear how plans for EfES will be resourced or incentivised, given the focus on additional activities for schools and teachers and the inconsistent approach to EfES in existing education policy across the UK. For example, in England environmental sustainability is absent from influential frameworks such as the teachers' standards, *Initial Teacher Training (ITT) Core Content Framework* (DfE, 2019) and *Education Inspection Framework* (Ofsted, 2019).

Conclusions

Science education occupies a privileged place in the school curriculum as a core subject, and science disciplines play an important role in understanding the climate crisis and identifying possible responses. However, teachers and young people see science – and secondary education more widely – as currently being under-utilised in the context of enabling EfES. There are calls for action in relation to what is taught, where it is taught and how it is taught. Teachers and young people alike see a much greater role for science in EfES, but support is needed from devolved and national governments to value sustainability in core education policies.

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The full, illustrated *Manifesto for Education for Environmental Sustainability* is available at www.bera.ac.uk/news/manifesto-for-education-for-environmental-sustainability-efes-published-by-bera-research-commission